EUROPEAN COMMISSION
DG Competition

CASE M.7061 - HUNTSMAN CORPORATION / EQUITY INTERESTS HELD BY ROCKWOOD HOLDINGS

(Only the English text is authentic)

MERGER PROCEDURE

REGULATION (EC) 139/2004

Article 8(2) Regulation (EC) 139/2004

Date: 10.09.2014

EUROPEAN
COMMISSION

Brussels, 10.9.2014
C(2014) 6319 final

COMMISSION DECISION

of 10.9.2014

addressed to:
- HUNTSMAN CORPORATION

declaring a concentration to be compatible with the internal market and the EEA agreement

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THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to the Agreement on the European Economic Area, and in particular Article 57 thereof,

Having regard to Council Regulation (EC) No 139/2004 of 20 January 2004 on the control of concentrations between undertakings,[1] and in particular Article 8(2) thereof,

Having regard to the Commission's decision of 5 March 2014 to initiate proceedings in this case,

Having given the undertakings concerned the opportunity to make known their views on the objections raised by the Commission,

Having regard to the opinion of the Advisory Committee on Concentrations,[2]

Having regard to the final report of the Hearing Officer in this case,[3]

Whereas:

(1) On 29 January 2014, the Commission received a notification of a proposed concentration ("the Transaction") pursuant to Article 4 of Council Regulation (EC) No 139/2004 ("the Merger Regulation") by which Huntsman International LLC, a wholly-owned subsidiary of Huntsman Corporation ("Huntsman", USA) would acquire a number of businesses from Rockwood Specialties Group, Inc. ("Rockwood", USA), namely:

(a) Rockwood's titanium dioxide pigments (TiO_2) and functional additives businesses, which together operate under the name Sachtleben;

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1 OJ L 24, 29.1.2004, p. 1 ("the Merger Regulation"). With effect from 1 December 2009, the Treaty on the Functioning of the European Union ("TFEU") has introduced certain changes, such as the replacement of "Community" by "Union" and "common market" by "internal market". The terminology of the TFEU will be used throughout this decision.

2 OJ C ...,...200. , p....

3 OJ C ...,...200. , p....

(b) Rockwood's timber treatment and wood protection chemicals business in North America, colour pigments business, and water treatment business; and

(c) Gomet, a specialist provider of automotive spare parts developed for the automotive aftermarket.

(2) For the purpose of this Decision the above businesses are referred to as the "Acquired Businesses", Huntsman is referred to as "the Notifying Party" and Huntsman and Rockwood collectively as "the Parties".

1. INTRODUCTION

(3) Huntsman is a company registered in the United States of America producing a diverse range of specialty and intermediate chemicals. Huntsman has five divisions, as follows: (i) Polyurethanes, which produces raw materials for the production of polyurethanes, thermoplastic polyurethanes and intermediate chemicals; (ii) Performance Products, which produces various products, including amines, surfactants, carbonates, ethylene glycols, linear alkyl benzene, and maleic anhydride as well as internally used chemicals, e.g., ethylene oxide; (iii) Pigments, which produce titanium dioxide; (iv) Advanced Materials, which produces epoxy resins and related chemicals as well as formulated systems based on both epoxy and non-epoxy chemistries; and (v) Textile Effects, which produces textile dyes and textile chemicals.

(4) Rockwood is a US-based global developer, manufacturer and marketer of specialty chemicals and advanced materials used for industrial and commercial purposes. As of 2012, Rockwood's activities were focused on the following areas: lithium and surface treatment chemicals, advanced ceramics, titanium dioxide pigments, iron-oxide pigments, timber-treatment chemicals and clay-based additives. Rockwood has however recently sold its advanced ceramics and clay-based additives businesses.[4]

2. THE OPERATION AND THE CONCENTRATION

(5) On 17 September 2013, Huntsman and Rockwood signed a share purchase agreement ("SPA") whereby Huntsman would acquire all equity interests of Rockwood in the Acquired Businesses, which together accounted for approximately 45% of Rockwood's overall turnover in 2012. The purchase price of the Transaction is USD 1.1 billion, that is around EUR 810 million. As a result Huntsman would acquire sole control over the Acquired Businesses.

(6) According to Huntsman, the rationale of the Transaction lies principally in cost savings. Indeed, Huntsman expects to make cost savings totalling $130 million annually, [*for example through purchasing and logistics savings*].[5] Within two years of the Transaction, Huntsman plans an initial public offering of the combined TiO_2 unit and the other acquired assets.[6] On Rockwood's side the rationale for the

4 Form CO, paragraph 25.

5 Form CO, paragraph 17.

6 Jack Kaskey and Simon Casey, *Huntsman to buy Rockwood Titanium Unit for $ 1.1 billion*, 17.09.2013, available at: http://www.bloomberg.com/news/2013-09-17/huntsman-to-acquire-rockwood-s-tio2-business-for-1-1-billion html, visited on 02.07.2014.

Transaction seems to lie in their strategy to spin off non-core businesses and to focus on its higher-value lithium business.[7]

(7) Therefore, the Transaction constitutes a concentration within the meaning of Article 3(1)(b) of the Merger Regulation.

3. UNION DIMENSION

(8) The undertakings concerned have a combined aggregate world-wide turnover of more than EUR 5 000 million (in 2012, Huntsman: EUR 8 707 million; the Acquired Businesses: EUR […]* million). Each of them has a Union-wide turnover in excess of EUR 250 million (in 2012, Huntsman: EUR […]* million; the Acquired Businesses: EUR […]* million), and they do not achieve more than two-thirds of their aggregate Union-wide turnover within one and the same Member State.

(9) The Transaction therefore is deemed to have a Union dimension pursuant to Article 1(2) of the Merger Regulation.

4. THE PROCEDURE

(10) Following the results of the phase I market investigation launched on 29 January 2014, the Commission concluded that the proposed Transaction raised serious doubts as to its compatibility with the internal market.[8] On 5 March 2014 it adopted a decision initiating the proceedings pursuant to Article 6(1)(c) of the Merger Regulation ("Decision opening the proceedings") and opened a phase II market investigation. Specifically, serious doubts were identified in relation to the EEA markets for TiO_2 for printing ink applications, for food and cosmetics applications and for fibre applications.

(11) Further to a request by the Notifying Party of 6 March 2014, a number of key documents[9] were provided to the Notifying Party on 14 March 2014.

(12) The Notifying Party submitted written comments on the Decision opening the proceedings on 19 March 2014 ("Notifying Party's response to the Decision opening the proceedings")

(13) On 21 March 2014, at the request of the Notifying Party, the time limit for taking a final decision in this case was extended by 20 working days.

(14) In order to address the serious doubts identified in the Decision opening the proceedings the Notifying Party submitted commitments on 28 March 2014. The market test of these commitments was launched on 4 April 2014.

(15) The Notifying Party was informed of the outcome of the market test during a state of play meeting on 15 April 2014.

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7 Jack Kaskey and Simon Casey, *Huntsman to buy Rockwood Titanium Unit for $ 1.1 billion*, 17.09.2013, available at: http://www.bloomberg.com/news/2013-09-17/huntsman-to-acquire-rockwood-s-tio2-business-for-1-1-billion html, visited on 02.07.2014.

8 Pursuant to paragraph 5.1 of the Best Practices on the conduct of EU merger control proceedings (see http://ec.europa.eu/competition/mergers/legislation/proceedings.pdf), the Notifying Party was informed of the results of the phase 1 market investigation during a state of play meeting held on 20 February 2014.

9 Pursuant to paragraph 45 of the Best Practices on the conduct of EU merger control proceedings, the Notifying Party received key submissions to which specific reference was made in the Decision opening the proceedings.

(16) Following a failure to respond to a simple request for information sent by the Commission on 13 March 2014 pursuant to Article 11(2) of the Merger Regulation, on 16 April 2014 the Commission issued, pursuant to Article 11(3) of the Merger Regulation, a decision requesting certain information, in particular the Parties' internal documents relevant for the assessment of the case at hand. As a consequence, the time limits referred to in Article 10(3) of the Merger Regulation were suspended as of 25 March 2014 (deadline of the initial request for information). The Notifying Party complied with this request on 28 April 2014, and as a result the suspension of time limits was lifted.

(17) On 17 June 2014, during a state of play meeting, the Commission informed the Notifying Party of the results of the phase II market investigation.

(18) On 20 June 2014, the Commission issued three decisions pursuant to Article 11(3) of Council Regulation No 139/2004 to key customers of the EEA market for TiO_2 for printing ink applications, namely [...]*, [...]* and [...]*.

(19) On 8 July 2014, the Commission addressed a Statement of Objections to the Parties spelling out its concerns in relation to the unilateral effects likely to arise on the EEA market for TiO_2 for printing ink applications.

(20) On 18 July 2014, the Notifying Party submitted commitments to address the issues raised by the market test of 4 April 2014. The market test of these commitments was launched on 18 July 2014.

(21) On 23 July 2014, the Notifying Party submitted written comments on the Statement of Objections ("Notifying Party's response to the Statement of Objections").

(22) On 28 July 2014, the Notifying Party submitted a final set of commitments to address a number of technicalities raised during the market test of 18 July 2014. On the basis of those commitments the Commission concludes that the Transaction no longer leads to a significant impediment of effective competition and issues a decision pursuant to Article 8(2) of the Merger Regulation.

5. INTRODUCTION TO THE TiO_2 INDUSTRY

(23) The Transaction gives rise to a number of affected markets namely in the area of the production and supply of TiO_2 (see sections 6 to 9) and in the production and supply of certain by-products of the sulphate TiO_2 manufacturing process, namely ferrous sulphate ("copperas") and filter salts (see section 10). No other markets are affected by the Transaction.

5.1. TiO_2 value chain

(24) TiO_2 is an inorganic chemical which is essentially used to opacify, brighten and whiten various industry and consumer good products. Specifically, it is used in paints and coatings (61%), plastics (25%), paper (8%), usually referred to as "mass applications", as well as in a variety of so called "specialty applications", including printing inks (3.5%), fibres, cosmetics, pharmaceuticals and food (altogether 2.5%).[10]

(25) In 2012, approximately 5 million tonnes of TiO_2 were sold worldwide, of which 1 million tons were sold in the EEA. In 2012, TiO_2 was sold on average at around EUR 3 000 per tonne. Therefore, the value of the overall TiO_2 market in 2012 amounted to approximately EUR 14 billion worldwide and EUR 3 billion in the EEA.

[10] Commission's calculation based upon Form CO and other data from the Parties.

(26) Generally speaking, the production process of TiO_2 can be divided into two stages. The first stage ("front end" or "black end") of the process separates titanium from the ore and creates the raw TiO_2 crystals. There are two different black end processes in use. The second stage of the process is referred to as "finishing" ("back end" or "white end"). The finishing white end process is identical, regardless of the preceding black end process.

TiO_2 production technologies – black end

(27) There are two technologies used to produce the TiO_2: a sulphate-based production process (55% of global capacity, predominant in the EEA and in China) and a chloride-based production process (45% of global capacity, predominant in North America). The difference between the two production technologies concerns the front end of the process during which the raw TiO_2 crystals are generated.

(28) The traditional technology is sulphate-based using ilmenite ore or slag as feedstock. The feedstock is treated with sulphuric acid and then the intermediate product is calcinated at 1000°C to form the TiO_2 crystal. The sulphate-based process is capable of producing TiO_2 in either rutile or anatase crystal forms.

(29) In the "chloride-based" process, chlorine gas is used to extract the titanium from the ore. The intermediate product is then oxidised to create raw TiO_2 crystals. The chloride-based process requires feedstock composed of a type of ore which is purer than that used in the sulphate-based technology, for example natural rutile or synthetic rutile. These ores have a much higher titanium content than the ore used in the sulphate-based process and are therefore more expensive. The chloride-based process is only capable of producing TiO_2 in rutile crystal form. Due to the process, chloride-based rutile TiO_2 is harder than sulphate-based rutile TiO_2. Consequently, whenever abrasiveness of the TiO_2 crystal is important, such as for printing ink applications, sulphate-based rutile TiO_2 is preferred over chloride-based TiO_2.

TiO_2 crystals

(30) The anatase crystal is a less abrasive and softer particle than the rutile crystal. Due to this characteristic it is preferred for certain applications, such as cosmetics, food, pharmaceuticals, fibres and photo catalysts and in certain special applications of the paper industry (e.g. as filler for uncoated free-sheet paper).[11] The rutile crystal is preferred for the majority of TiO_2 applications, particularly in the coatings and plastics sectors, where brightness plays a role.[12] The rutile crystal is also preferred for printing ink applications[13] after having been finished in the white end process by the TiO_2 suppliers to fulfil the technical characteristics needed such as high gloss, low abrasiveness, high opacity and good dispersibility.

Feedstock

(31) The feedstock used varies according to the suppliers, the supplier's technology, sourcing strategy, ability to use TiO_2 feedstock with lower titanium content, such as ilmenite or leucoxene, versus feedstock with higher titanium content, such as slag,

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11 Huntsman's internal document, TZMI, *TiO_2 pigment Price Forecast*, Q3/2012, page 11.

12 Huntsman's internal document, TZMI, *TiO_2 pigment Price Forecast*, Q3/2012, page 11.

13 See responses to question 17 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I".

upgraded slag, natural rutile, synthetic rutile, as well as targeted utilisation rates and by-products / waste production and treatment constraints.[14]

(32) When using ilmenite as feedstock, the sulphate-based TiO_2 production process generates several by-products, such as iron sulphate, which are *de facto* waste products, i.e not further used in the TiO_2 value chain. These by-products can either be sold to other applications (see section 10) or disposed of by landfilling which is very costly. Indeed, TiO_2 suppliers, in Europe and in Japan in particular are constrained by various environmental regulations causing high disposal costs.[15] This explains why there has been no additional sulphate-based capacity built for decades, in Europe in particular.

White end

(33) In the white end part of the process the raw TiO_2 crystals are milled and polished in order to ensure that the optimal crystal size distribution is achieved. The raw TiO_2 crystals are then coated with a layer of various inorganic oxides (e.g. silica SiO_2, alumina Al_2O_3, zirconia ZrO or other transition metal oxides) or with organic layers of material such as trimethlyolpropane (TMP) in a series of batch coating tanks. These coatings add durability to the pigment and facilitate the incorporation of the pigment into a coating resin or into the organic polymer chains of a plastic. The coated pigment particles are washed and dried and finally jet milled.

TiO_2 grades

(34) TiO_2 is produced in a number of different grades, which can be differentiated by varying in particular (i) the average crystal size of the product and (ii) the coating applied on the crystal. Although they generally have the same basic properties, TiO_2 grades differ as regards certain technical characteristics and their intended use.

By-products: ferrous sulphate and filter salts

(35) The production of TiO_2 via the sulphate-based process results in the production of by-products, such as ferrous sulphate ($FeSO_4 \bullet 7H_2O$; "copperas") and filter salts (acidic iron sulphate salts).[16] While the precise amount of iron sulphate per ton of TiO_2 produced depends on the iron content of the ore used by the plant, on average 2.5 tons of copperas are produced as by-product per ton of TiO_2 produced.[17]

(36) Until the early 1990s these by-products were usually directly landfilled. Following stricter waste management and environmental regulation in the European Union during the 1990s, landfilling was either prohibited or pre-treatment became mandatory. Therefore the by-products turned into a cost issue for the TiO_2 producers using the sulphate process. Accordingly they searched for ways to dispose of the by-products minimising their costs.

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[14] Huntsman's internal document, TZMI, *Global TiO_2 Pigment Producers, Comparative cost and Profitability Study*, 2013, page 82.

[15] Huntsman's internal document, TZMI, *Global TiO_2 Pigment Producers, Comparative cost and Profitability Study*, 2013, page 82.

[16] There are other by-products derived from copperas and filter salts, such as in particular ferric sulphate, iron oxide concentrates, rutilit, red and white gypsum, snowpaste, carbon dioxide, and magnesium sulphate; however the Parties' horizontal overlap is limited to copperas, filter salts and sulphuric acid. In view of the fact that sulphuric acid is the most produced chemical worldwide and the nameplate capacity of European sulphuric acid producers is 21 000 kt, the Parties' combined production volume of […]* kt is insignificant and will therefore not give rise to competitive concerns in the context of this decision.

[17] Form CO, paragraph 457.

(37) During this time, several TiO_2 producers developed their own ways to recycle the sulphate process by-products internally or started to sell them directly to end-users. In addition, recycling companies began offering to purchase the by-products in order to use them for applications where the chemical properties of the by-products were found useful.

(38) Today, the by-products copperas and filter salt are used for a number of applications, namely water treatment (48%), as a cement additive (25%), in iron pigments (15%), for fertiliser (7%) and for animal nutrition (5%). Small amounts are also used in the pharmaceutical sector, for soil remediation and in the biogas production. In order to be used, the by-products have to fulfil certain purity requirements, such as respecting the maximum content in heavy metals, free acid, etc. While 89% of the copperas is produced as a by-product of the TiO_2 production (sulphate-based process), 11% results from the steel industry (steel pickling with sulphuric acid).[18] Copperas from the steel industry is general purer and has a higher iron content than copperas from the TiO_2 production.[19] Filter salts result only from the TiO_2 production.

(39) Copperas and filter salts are usually quite moist when produced and their storage and transport time are limited. Therefore, for some applications, copperas and filter salts are pre-treated, e.g. neutralisation, drying, milling. Such pre-treatment also facilitates transport (through the reduction of water content). Once re-processed at a plant the by-products are no longer considered as waste.

5.2. Commission's decisional practice in relation to the titanium dioxide markets

5.2.1. Relevant product markets

(40) The Commission analysed TiO_2 markets in a number of previous cases,[20] where it assessed these markets on the basis of end-applications. Specifically, the Commission identified three main categories of TiO_2 end-applications: coatings, plastics and specialty applications. In addition, the Commission considered that these categories could be further subdivided in the following subcategories: "*[coatings] into decorative, automotive, industrial durable and general industrial applications; plastics into masterbatches, PVC and other plastics applications; specialities into inks, paper, laminates and fibre applications*".[21]

(41) The Commission also found that within each application subcategory, a number of grades are used to match the specific technical requirements of the customers.[22] However, in previous decisions, the Commission considered that there was no need to further delineate the relevant product markets on the basis of TiO_2 grades, as one grade can be used for a range of end-applications and as there is a high degree of supply-side substitutability, in particular in relation to the grades within mass

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18 Annex 49 of the Form CO, Frost&Sullivan, *Iron Salts market expansion opportunity assessment*, p.14.

19 Form CO, paragraphs 406 and 408

20 Commission Decision C 90/304/EEC in Case No IV/M.23 ICI/Tioxide, OJ C304, 04.12.1990, page 27, Commission Decision C 97/275/EEC in Case IV/M.984 DuPont/ICI, OJ C275, 11.09.1997, page 4 and Commission Decision C 2010/072/EU in Case M.5638 Huntsman/Tronox Assets, OJ C72, 20.03.2010, page 9.

21 Commission Decision C 97/275/EEC in Case IV/M.984 DuPont/ICI, OJ C275, 11.09.1997, page 4, paragraph 36.

22 Commission Decision C 97/275/EEC in Case IV/M.984 DuPont/ICI, OJ C275, 11.09.1997, page 4, paragraph 38.

applications and within the same chemical process. Ultimately, the Commission left the issue open.[23]

(42) As to the differences in manufacturing processes, the Commission found that due to the different production equipment the switching between sulphate and chloride-based processes is not possible from a supply-side perspective. In addition, from a demand-side perspective, the Commission found that while chloride and sulphate-produced TiO_2 can be used interchangeably for around 80% of all applications, there are nevertheless certain specific applications where either chloride or sulphate-produced TiO_2 is preferred. In particular, it was found that sulphate-based TiO_2 grades cannot be substituted by chloride-based grades for certain speciality applications, such as inks and fibres.[24]

(43) As regards by-products, the Commission has so far neither analysed the market for copperas nor the market for filter salts.

5.2.2. Relevant geographic markets

(44) Regarding the geographic market definition, the Commission considered in previous decisions, without referring specifically to the TiO_2 for printing ink applications, that "*the relevant geographic market for titanium dioxide is considered at least the Community*",[25] because of absence of any national barriers, limited impact of transport costs, the capability of the main TiO_2 suppliers to serve Western European customers from a few plants and the limited variation of prices across Member States.

(45) With regard to TiO_2 trade flows, the Commission observed main trade flows between the EEA and Northern America. In 1997, more than 20% of the TiO_2 used in the EEA was imported, and 16% came from Northern America (12% came from one US chloride-based supplier). The other main importers were Eastern European suppliers as "*penetration from Asia/Pacific and other world areas has been less significant so far*."[26]Against this background, the Commission assessed the question whether Northern America should be included in the relevant geographic market.[27]

(46) The Commission noted that trade flows appeared to be driven by different production technologies in the EEA (sulphate based) and Northern America (chloride based) and currency fluctuations. The Commission found that chloride-based TiO_2 accounted for the major part of the Northern America market, whereby the EEA market was still mainly served by sulphate-based TiO_2. In view of different prices and conditions of competition in the EEA and Northern America as well as local EEA distribution and large stock held by suppliers, the Commission concluded "*that the EEA is still a separate market.*"[28]

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[23] Commission Decision C 97/275/EEC in Case IV/M.984 DuPont/ICI, OJ C275, 11.09.1997, page 4, paragraphs 38-39, Commission C 2010/072/EU in Case M.5638 Huntsman/Tronox Assets, OJ C72, 20.03.2010, page 9, paragraphs 15-16-18.

[24] Commission Decision C 97/275/05/EEC in Case IV/M.984 DuPont/ICI, OJ C75, 11.09.1997, page 4, paragraph 34.

[25] Commission Decision C 90/304/EEC in Case No IV/M.23 ICI/Tioxide, OJ C304, 04.12.1990, page 27, recital 12.

[26] Commission's Decision C 97/275/EEC in Case IV/M.984 DuPont/ICI, OJ C275, 11.09.1997, paragraph 44.

[27] Commission's Decision C 97/275/EEC in Case IV/M.984 DuPont/ICI, OJ C275, 11.09.1997, paragraph 44.

[28] Commission's Decision C 97/275/EEC in Case IV/M.984 DuPont/ICI, OJ C275, 11.09.1997, paragraph 44.

(47) In its most recent case, the Commission observed that TiO_2 customers source from suppliers located in countries other than the one where their own manufacturing plant is located and several customers import TiO_2 from (chloride) plants in the USA. In that case the Notifying Party argued that Chinese capacity and worldwide exports from China were increasing, while the market investigation appeared to only identify imports from Japan and Singapore. Ultimately, the Commission left the precise geographic market definition open.[29]

5.3. Notifying Party's views

5.3.1. Relevant product markets

(48) According to the Notifying Party, there is one overall market for TiO_2 composed of differentiated products. The Notifying Party claims that with the exception of nano/ultrafine grades,[30] there is no significant difference in the production costs of different grades as the production process, the machinery and the inputs are essentially the same […]*. Although TiO_2 suppliers manufacture different grades, TiO_2 grades are generally suitable for use in many end-applications.

(49) The Notifying Party states that most TiO_2 manufacturers can produce or readily switch to producing most grades and thus can serve most end-use applications. The Notifying Party also claims that suppliers can easily transfer the production of a specific grade across different plants and within a plant can usually produce different grades on the same production line while facing limited downtime.[31] In addition, manufacturers can easily develop new grades, as the whole process (formulation and testing phases) usually takes between 3 and 12 months. Given the maturity of the TiO_2 industry, the Notifying Party submits that there are very few patented innovations and all manufacturers have proprietary know-how that in principle allows all of them to produce equivalent products. The differences in know-how can however provide advantages as regards the quality and the consistency of the product, as well as production cost efficiency.[32]

(50) As regards the difference in the manufacturing process, the Notifying Party acknowledges that switching production from chloride to sulphate and vice versa is not possible. However, they maintain that chloride and sulphate TiO_2 can be used interchangeably for around 80% of all applications[33] and therefore no such segmentation is warranted for the purpose of defining the relevant markets in this case.

(51) Finally, according to the Notifying Party, from the demand-side most TiO_2 grades are suitable for any use and the different positioning of grades in relation to different applications is the result of marketing strategy decisions, rather than real differences between the products. Even though the Parties themselves internally segment their customers' demand by end-use applications, the Notifying Party submits that such segmentation is not appropriate for the purpose of defining the market in this case.[34]

(52) In its response to the Decision opening the proceedings, the Notifying Party claimed that there is no distinct market for TiO_2 for printing ink applications, mainly in view

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29 Commission Decision C 2010/072/EU in Case M.5638 Huntsman/Tronox Assets, OJ C72, 20.03.2010, page 9, paragraph 22.

30 The Parties' activities do not overlap in nano/ultrafine grades as Huntsman is absent from this segment.

31 Form CO, paragraph 128.

32 Form CO, paragraph 105.

33 Form CO, paragraph 119.

34 Form CO, paragraphs 104, 121, and 303.

of the supply-side and demand-side substitutability between ink grades and grades for other applications.[35] However, in its response to the Statement of Objections, the Notifying Party did not provide further evidence to contest the product market definition set out by the Commission.

5.3.2. Relevant geographic markets

(53) The Notifying Party submits that the TiO_2 market is global irrespective of any segmentation among the various end-applications.[36]

(54) First, there are significant trade flows between the different world regions, representing 30% of the global TiO_2 demand. EEA exports amount to 8% of global demand, North America's exports to 11%, and China's exports are 9% of global demand. The Notifying Party states that in 2012 31% of the TiO_2 demand in the EEA was imported.[37]

(55) Second, a high price correlation can be observed between world regions. There are only minimal price differences which reflect costs of freight and duties between regions. Price differences between the EEA and North America are influenced by the Euro-Dollar exchange rate fluctuations. The Notifying Party provided further explanations of this in its Economic Submission.[38]

(56) Third, the Notifying Party submits that the larger TiO_2 customers are typically global companies and their quality standard is similar across the world. Most customers source from a variety of global suppliers having lists of approved global suppliers. Consolidation of the customer base has increased the customers' buyer power. The Notifying Party submits that both Huntsman and Sachtleben apply a global approach to their customers and tend to enter into global agreements with major customers with similar terms for delivery in different regions.[39]

(57) Fourth, the Notifying Party submits that there are no significant regulatory or other constraints limiting the supply of TiO_2 into or within the EEA, and that existing tariffs (ranging from 5.5% to 6.5%) do not prevent global trade flows. The mandatory REACH registration[40] does not prevent TiO_2 imports into the EEA, since a large number of non-EEA manufacturers already offer their products in compliance with REACH legislation. Furthermore, TiO_2 is transported in a dry form with a virtually unlimited lifetime. Transport costs amount to 5% for movements between world regions and 4% for movements within a region.

(58) Fifth, the Notifying Party submits that there is no local manufacturing or local distribution network needed. DuPont, the largest TiO_2 supplier globally has consistently shipped its products from its plants in North America to the EEA. Ukrainian and Asian suppliers have entered the EEA without first establishing a distribution network; instead they employ third party distributors or even sell directly to their customers. For the EEA, the Notifying Party estimates that 15-20% of the total EEA TiO_2 demand is sold via distributors.[41]

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35 Notifying Party's response to the Decision opening the proceedings, paragraph 77.
36 Form CO, paragraph 140.
37 Form CO, paragraphs 144-151.
38 Form CO, paragraphs 154-157.
39 Form CO, paragraphs 158-160.
40 See OJ L 396, 30 December 2006.
41 Form CO, paragraphs 170-177.

(59) In its response to the Statement of Objections the Notifying Party did not challenge the Commission's conclusion that the market for TiO_2 for printing ink applications is EEA-wide.

5.3.3. Competitive assessment

(60) In the official form for standard merger notifications ("Form CO"), the Notifying Party firstly maintained that competition on the global TiO_2 market would not be harmed by the Transaction. In fact, Huntsman submits that the merged entity's share worldwide would remain significantly lower than the share of DuPont, the largest global player on the TiO_2 market. Secondly, the merged entity would face competition from major producers, such as Cristal Global, formerly called the National Titanium Dioxide Company of Saudi Arabia ("Cristal"), Kronos International Inc. ("Kronos") and Tronox Inc. In addition, Eastern European producers, such as Cinkarna Celje ("Cinkarna"), Precheza a.s. ("Precheza"), Zakłady Chemiczne "Police" S.A ("Police"), and Ukrainian producers are important alternative suppliers. Thirdly, Chinese producers play an increasingly prominent role in the global TiO_2 industry and already account for approximately 31% of the TiO_2 market globally. According to Huntsman, the merged entity will continue to be subject to strong competitive constraints post-merger.[42]

(61) In its response to the Statement of Objections, the Notifying Party maintained that even within a narrowly defined EEA-market for TiO_2 for printing ink applications, the merged entity would be strongly constrained by a number of elements, such as: (i) the attractiveness of the inks segment to any sulphate-based manufacturer of TiO_2 and, therefore, the inevitable, imminent and massive expansion of Chinese TiO_2 supplies in the inks segment in the EEA; and (ii) the expansion of Kronos' sales in the inks segment. In addition, Huntsman submitted that customers in the inks segment have significant countervailing buyer power, which they can use in particular to facilitate and accelerate the expansion of Chinese suppliers and of Kronos.[43]

(62) The Notifying Party maintains that the Transaction would not lead to any significant impediment of effective competition.

5.4. The Commission's assessment

(63) In its assessment of the Transaction, the Commission conducted a market investigation to assess the impact of the Transaction on the internal market.

(64) Specifically, during pre-notification, the Commission held 16 conference calls with a number of TiO_2 customers and TiO_2 suppliers.

(65) In phase I of the market investigation, the Commission contacted 155 TiO_2 customers with 62 replies received. This covers participants active in the EEA or globally in the markets for different applications for TiO_2 where the overlaps between the Parties' activities could lead to market shares above 20% depending on the product and market definition (namely coatings, plastics, cosmetics, pharmaceuticals, food, printing ink, fibres). These replies include among others the responses from the three largest printing ink manufacturers covering together 60% of

[42] Form CO, paragraph 253-259.

[43] Notifying Party's response to the Decision opening the proceedings, paragraph 26-32.

demand in the EEA for TiO_2 for printing ink applications. Furthermore, the Commission contacted 20 TiO_2 manufacturers from which it received 7 replies[44].

(66) During the market test of the commitments, the Commission contacted 72 customers of TiO_2 for printing ink applications. It received 29 replies among which were the responses of the three largest printing ink manufacturers covering together 60% of demand in the EEA for TiO_2 for printing ink applications. Furthermore, the Commission contacted 20 TiO_2 manufacturers from which it received 9 replies. The Commission also conducted 4 teleconference calls with TiO_2 suppliers with production capacities in the EEA.

(67) During phase II of the market investigation, the Commission sent questionnaires to 66 printing ink manufacturers and received 26 replies. All three of the largest printing ink manufacturers responded to the investigation. The Commission also contacted 20 TiO_2 suppliers and received 7 replies. In addition, the Commission organised 13 conference calls with various printing ink manufacturers, including the three largest printing ink manufacturers, one Chinese TiO_2 supplier and one Chinese distributor.

(68) Based on the Notifying Party's submission, Commission precedents and its own market investigation, the Commission first analysed the scope of the relevant product market[45] and in particular the question as to whether the TiO_2 market should be subdivided according to the production technology and/or application and/or grade. The Decision opening the proceedings concluded on a preliminary basis that, as far as the distinction between sulphate and chloride-based production processes is concerned, there is a certain degree of demand substitutability as concerns the mass applications, whereas such substitutability is limited for specialty applications, namely printing inks, cosmetics, pharmaceuticals, food ("CPF") and fibres.[46] As concerns the subdivision of the market according to the grades/applications, the Decision opening the proceedings concluded on a preliminary basis that as far as the specialty applications are concerned, namely printing ink, CPF and fibres, the market should be defined at the level of each application.[47] The phase II market investigation confirmed these findings and therefore the Statement of Objections concluded that the product market definitions set out in the Decision opening the proceedings are valid. Following the Parties' response to the Statement of Objections, the Commission maintains its view that the TiO_2 markets should be subdivided according to the application.

(69) Against this background, the Commission conducted a competitive assessment on the various affected markets, namely the TiO_2 for printing ink applications (section 6), TiO_2 for cosmetics, pharmaceuticals and food (section 7), TiO_2 for fibres (section 8),

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44 The response rate of TiO_2 manufacturers is somewhat lower due to the fact that chloride-based suppliers typically have little knowledge of the printing ink segment, which was the focus of the investigation.

45 According to the Commission Notice on the definition of relevant market for the purposes of Community Competition Law ("Notice on market definition"), when defining relevant product markets, the Commission identifies two main competitive constraints on the supplier of a given product or service, that is; (i) demand side substitutability (the extent to which products or services are substitutable from the customers' perspective); and (ii) supply side substitutability (the extent to which products or services are substitutable from the suppliers' perspective). To this end, the Commission analyses "*whether competition from these other products and areas affect or restrain sufficiently the pricing of the parties' products in the short term*", OJ, C 372, 9.12.1997, page 5.

46 Decision opening the proceedings, paragraph 40.

47 Decision opening the proceedings, paragraph 86.

other markets for TiO_2 (section 9) and by-products of TiO_2 production: ferrous sulphate and filter salts (section 10).

6. MARKET FOR TiO_2 FOR PRINTING INK APPLICATIONS

(70) The market for TiO_2 for printing ink applications represents around 3.5% of the overall TiO_2 market globally and in the EEA, ranging between 170 to 200 kt worldwide and […]* kilotons ("kt") in the EEA per year during the period 2010 to 2013.[48]

(71) Huntsman and Sachtleben are the main players in this market, both worldwide and in the EEA. The sales price of Huntsman and Sachtleben was between 2 750 and 3 000 EUR/tonne of TiO_2 depending on different world regions in 2012.[49] TiO_2 for printing ink applications represents […]*% of Huntsman's TiO_2 sales in volume globally and in the EEA, […]*% of Sachtleben's TiO_2 sales in the EEA and […]*% worldwide.[50]

(72) Customers in the market for TiO_2 for printing ink applications are manufacturers of various types of printing ink and are referred to in this Decision as "ink manufacturers" or "customers".

(73) This section first addresses the relevant product markets, assessing demand-side and supply-side substitutability including a quantitative correlation analysis of the prices of TiO_2 for printing ink and coatings applications. Second, the relevant geographic markets are analysed, in particular with regard to international trade flows and different market dynamics of the TiO_2 markets in different world regions. The competitive assessment follows, where the structure of supply and demand and the purchasing patterns are assessed. Thereafter, the competition between the main producers of TiO_2 for printing ink is evaluated. This assessment considers the Notifying Party and its competitors from Western Europe, as well as the Eastern European and Chinese TiO_2 producers. Then the different barriers to entry are described. The section continues with an assessment of the possibilities of the merged entity to increase prices after the Transaction, evaluates buyer power of TiO_2 customers and finally closes with potential efficiency gains.

6.1. Relevant product markets

(74) In order to be able to conclude on the product market definition for TiO_2 for printing ink applications, this chapter assesses first whether ink manufacturers can switch between chloride and sulphate-based TiO_2 and, second, whether all kinds of TiO_2 grades can be used for all kinds of applications. Third, it is assessed whether every TiO_2 supplier can produce every kind of TiO_2 grade. Finally the correlation of prices for TiO_2 for printing ink and for coatings applications is analysed.

6.1.1. EEA printing ink manufacturers do not consider chloride-based TiO_2 grades as a substitute to sulphate-based TiO_2 grades

6.1.1.1. The majority of EEA printing ink manufacturers use sulphate-based TiO_2 grades

(75) The majority of suppliers of TiO_2 for printing ink applications in the EEA, namely the Parties, Kronos, the Eastern European and the Ukrainian suppliers, together holding [80-90]*% of the sales to the EEA market,[51] are sulphate-based suppliers.

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48 Form CO, paragraphs 250 and 329; Huntsman, reply to the RFI of 26 February 2014.

49 Parties, reply to the RFI of 22 November 2013.

50 Form CO, paragraphs 250 and 329; Huntsman, reply to the RFI of 26 February 2014.

51 Huntsman, reply to the RFI No 13 of 26 February 2014.

Consequently, the sulphate grades dominate the TiO_2 sold for this application in the EEA.[52]

(76) The market investigation indicated that the vast majority of the EEA printing ink manufacturers[53] only purchase sulphate grades.[54] Indeed, only three customers, together accounting for less than 1% of the EEA demand for TiO_2 for printing ink applications[55] use both sulphate and chloride grades. In all cases the use of chloride grades is limited and usually used for specific printing applications. For instance, one of these customers uses chloride grades for "*some solvent and UV inks*",[56] or for "*some specific water based product or plastisol product type where the usage of chloride TiO_2 is not detrimental for final application and whiteness grade is not topic*".[57] Similarly, another customer indicated that the choice of chloride-based grades depends on the specific requirements of each ink application. Therefore, the use of chloride-based grades rather than sulphate-based grades in the production of printing ink appears to be an exception and linked to specific types of inks, such as UV inks.[58]

(77) None of the printing ink manufacturers has ever managed to switch from sulphate to chloride grades as concerns the production of their main inks for which mainly Huntsman's TR52 sulphate grade and Sachtleben's RDI-S sulphate grade are used.[59] For instance, one printing ink manufacturer attempted to switch from sulphate to chloride grades in the past, but failed to sell the chloride-based ink formulation to its customers and switched back to sulphate grades.[60] Another customer, [...]*, reported switching in the past from sulphate to chloride for one specific application. Currently [...]* "*uses only a small amount of chloride-based TiO_2 for its printing ink*",[61] which represents a very small portion (below 5%) of [its]* total demand.[62]

6.1.1.2. Sulphate-based TiO_2 is better suited to match the requirements of the printing ink manufacturers in the EEA

(78) According to the responses of market participants during the market investigation, printing ink manufacturers based in the EEA appear to have a strong preference for sulphate grades.[63] This is mainly due to the specific technical attributes of sulphate-

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52 The Notifying party does not sell chloride-based TiO_2 grades to printing ink suppliers in the EEA.

53 This includes all the respondents to the questionnaires addressed to customers which have activities in the EEA and excludes distributors.

54 See responses to question 4 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II".

55 See responses to question 21 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II".

56 […]*, response to question 8 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II" [ID 2337].

57 […]*, response to question 9 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II" [ID 2337].

58 […]* and […]*, responses to questions 8 and 9 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II"[IDs: 1958 and 2337].

59 See responses to question 12 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II".

60 […]*, response to question 12 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II" [ID 2336].

61 Agreed minutes of conference call with [...]* of 22 May 2014, paragraph 29 [ID 2219].

62 According to [...]*, sheetfed and UV applications, which together represent less than 5% of [...]*'s demand, can use both chloride and sulphate-based ink interchangeably. [...]*, response to question 9 of questionnaire "Q7 - Questionnaire for Customers - $TiIO_2$ for Printing Ink - Phase II" [ID 1982]*.

63 See responses to questions 4 and 5 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II".

based TiO_2, namely the softness of the crystal, which ensures a lower abrasiveness and makes it more adapted for printing ink applications. The major ink manufacturers commented on the characteristics needed with regard to abrasiveness as follows: [...]* stated that "*lower abrasiveness is required*" for TiO_2 for printing ink[64] while [...]* mentioned that " *Sulphate-based products are required in printing ink applications, as they are less abrasive versus the used printing cylinders and anilox rollers in gravure and flexo printing processes*."[65] Similarly, [...]* explained with regard to chloride-based TiO_2 that "*Chloride Titanium process will increase the hardness of the particle sizes and the following ink quality could go damage the Customer's printing cylinders.*"[66] This was also confirmed by [...]* explaining that "*TiO_2 from chloride is rejected due to abrasion of the "Doctor blade"; no chance in rotogravure application mainly used in Europe*".[67]

(79) According to the market investigation, the preference of sulphate-based TiO_2 for printing ink applications has to do with the printing technique for which the specific ink is used. Major ink manufacturers explained that the EEA printing ink market is dominated by the use of rotogravure printing.[68] Rotogravure is a technique of printing using metal cylinders/rolls, as opposed to flexographic printing which relies on the use of plastic/rubber cylinders. Since chloride grades are more abrasive than sulphate grades, sulphate grades are preferable for rotogravure, where ink is in contact with metal sheets that could be damaged if the crystal is too hard. In this context [...]* explained that "*[f]lexographic printing is more tolerant of chloride grades, although even then it is not the first choice for printing ink. Rotogravure printing […] requires soft crystal (i.e. sulphate) due to the use of metal sheets which can get damaged if the crystal is too abrasive.*"[69]

(80) Outside the EEA, especially in Asia and the USA, TiO_2 printing ink manufacturers seem to be more prone to use chloride, since different printing technologies are used, such as flexographic printing in the USA. This difference could be explained by the fact that historically, there has been a large availability of sulphate capacity in the EEA. Over 60% of the installed TiO_2 capacity in Europe is sulphate-based.[70] On the contrary, in other world regions, such as Asia and the USA, there is a prevalence of flexographic printing and therefore chloride-based TiO_2 is used to a greater extent. Nevertheless, even printing ink manufacturers located in the USA have difficulties with chloride grades, especially for printing inks designed for rotogravure printing process. For example, Sachtleben reports the experiment of the global customer […]* in the USA in 2011 stating that […]* "*looked at chloride TiO_2 grades but had*

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64 [...]*, response to question 17 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I" [ID 2303].

65 [...]*, response to question 7 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I" [ID 1352].

66 [...]*, response to question 6 of questionnaire "Q7 – Questionnaire for Customers – TiO_2 for Printing Ink – Phase II" [ID 2334]*.

67 [...]*, response to question 10 of questionnaire "Q7 – Questionnaire For Customers – TiO_2 For Printing Ink – Phase II" [ID 2476].

68 [...]*, response to question 10 of questionnaire "Q7 – Questionnaire For Customers – TiO_2 For Printing Ink – Phase II" [ID 2476] and agreed minutes of the conference call with [...]*,of 19 November 2013, paragraph 4 [ID 1351].

69 Agreed minutes of conference call with [...]* of 2 June 2014, paragraph 3 [ID 2293].

70 Form CO, paragraph 334.

milling and transferring problems (requiring a lot of manipulation), especially on gravure. It also destroys chrome on cylinders. Only flexo grade can use chloride."[71]

6.1.1.3. The majority of the EEA printing ink manufacturers would not switch to chloride-based TiO_2 grades in case of small but significant and non-transitory increase in price (SSNIP)

(81) According to the responses of market participants during the market investigation, the overwhelming majority of ink manufacturers[72] would not switch to chloride grades should the price of ink grades increase by 5-10% on a permanent basis.[73] Only two customers[74] would switch partially. One of the two customers that would be ready to switch under certain circumstances to chloride grades - although only partially - is [...]*, one of the largest printing ink manufacturers. [...]* noted that it uses chlorides grades for one application which was designed around a specific chloride grade and would consider switching more should the economics of chloride grades justify such switching. Specifically, [...]* noted that "*[i]n case chloride grades were consistently 20% cheaper than sulphate ones (which by far they are not), [...]* would try to find ways to use more of such grades.*"[75] It follows that even for [...]* such switching is purely hypothetical. Three customers indicated they would switch their entire TiO_2 purchase from sulphate-based grades to chloride-based grades. However, two of these respondents are distributors and not ink manufacturers.

(82) Similarly, EEA printing ink manufacturers do not consider chloride suppliers as close competitors of the Parties in the market for TiO_2 for printing ink applications.[76] In this context, none of the customers indicated they would use chloride-based TiO_2 suppliers in their pricing negotiations with Huntsman and and/or Sachtleben as a threat to obtain better conditions.[77]

(83) Finally, sulphate-based TiO_2 grades are on average cheaper than chloride-based TiO_2 grades which may limit any substitution from sulphate to chloride grades. Indeed, the average price of chloride-based TiO_2 grades for coatings, plastics and paper, that are the applications which can use both chloride-based and sulphate-based TiO_2, tends to be 3-5% higher than the sulphate-based pigment.[78]

6.1.1.4. There is no supply-side substitutability between sulphate-based and chloride-based TiO_2

(84) According to the Notice on market definition, an indication of supply side substitutability may reside in the suppliers' ability to switch production in the short term without incurring significant additional costs. On the other hand, when supply-

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71 Sachtleben's internal document, *Examples of Chinese TiO_2 grades in printing inks*, 11 November 2013, page 2.

72 12 out of 17.

73 See responses to question 15 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II".

74 Out of the 17 that replied to this question.

75 Agreed minutes of conference call with [...]* of 2 June 2014, paragraph 4 [ID 2293].

76 See responses to questions 5, 6 and 38 of questionnaire "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II", as well as responses to questions 41-48 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I".

77 See responses to questions 37 and 37.1 of questionnaire "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II".

78 Agreed minutes of conference call with Kronos of 13 February 2014, paragraph 9 [ID 1065].

side substitutability would entail the need to adjust significantly existing tangible and intangible assets, additional investments, strategic decisions or time delays, it will not be considered at the stage of market definition.[79]

(85) In terms of the production process, sulphate and chloride-based TiO_2 production plants use different equipment, different raw material and different chemical processes. The chloride-based process requires feedstock with high titanium content, which is 25% more expensive than the feedstock used for the sulphate process.[80] It is estimated that the sulphate-based technology is more labour-intensive, while the chloride one is more automatised. The sulphate process requires more steps from the ore to the TiO_2 crystal implying more maintenance and more housekeeping to handle the spent acid and iron sulphates. Historically, the chloride technology, generating less waste (as a closed loop system) and requiring less labour, has been considered as less cost intensive. Indeed, while it requires more capital expenditure at the set-up phase, the operational costs are lower. As a result, the sulphate-based production margins are typically lower than the chloride-based production margins, as the cost of handling waste resulting from the sulphate-based TiO_2 production process substantially lowers the margin. [81]

(86) In terms of production costs, there is also a significant gap between sulphate-based and chloride-based technology. Indeed, the production process of chloride-based TiO_2 is substantially more cost efficient than the sulphate-based process (about 1 010 USD/t chloride versus 1 700 USD/t for sulphate).[82]

(87) As regards the possibility for chloride producers to switch to a sulphate-based TiO_2 production process, none of the respondents that currently operate chloride-based plants would be willing to set up a sulphate-based plant, even if there was a price increase in sulphate-based TiO_2 grades.[83] In fact, as explained by one of the respondents during the market investigation, the investment required to set up a sulphate-based TiO_2 plant with a capacity of 150 kt would be very high, approximately EUR 150 million and would take about 2 years.[84] In any case, in view of the existing environmental regulations, building a new sulphate-based plant in the European Union would be extremely difficult, if not impossible.[85]

(88) Finally, the lack of supply-side substitutability between chloride-based and sulphate-based TiO_2 is also confirmed by the Parties' own internal documents where neither of them perceives chloride-based TiO_2 suppliers as a competitive constraint in the EEA market for TiO_2 for printing ink applications, although this may be different in other geographical areas. For instance, in its internal documents, Sachtleben considers […]* as competitors in the Asian market for TiO_2 for printing ink applications,

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79 Notice on market definition, page 5.

80 Huntsman's internal document, reply to the RFI No 16, *Docs responsive to questions 3 and 4 – Q.3.00001286*, page 6.

81 Agreed minutes of conference call with Kronos of 13 February 2014, paragraph 6 [ID 1065].

82 Agreed minutes of conference call with Kronos of 13 February 2014, paragraph 9 [ID 1065].

83 See responses to question 6 of questionnaire "Q2 and Q2 bis – Questionnaire for Competitors Titanium Dioxide Phase I".

84 Grupa Azotv Zakladv Chemiczne Police, response to question 7 of questionnaire "Q2 - Questionnaire for Competitors Titanium Dioxide Phase I".

85 See responses to question 7 of questionnaire "Q2 - Questionnaire for Competitors Titanium Dioxide Phase I".

where chloride-based grades are used,[86] whereas no such competitive constraint is evidenced in the Parties' European customer reports.[87]

(89) Therefore, the Commission takes the view that chloride-based suppliers would not be able to switch to sulphate-based production technology should the prices of sulphate-based TiO_2 increase.

6.1.1.5. Conclusion

(90) Therefore, the Commission takes the view that there is no demand-side substitutability between chloride-based TiO_2 grades and sulphate-based TiO_2 grades.

6.1.2. There is no demand-side substitutability between TiO_2 for printing ink applications and TiO_2 for other applications

6.1.2.1. Various TiO_2 applications require different grades

(91) The market investigation provided indications that while some multi-purpose grades are used in mass applications, TiO_2 is typically produced in a multitude of grades designed to fit the specificities of particular applications. This is in particular the case for specialty applications such as printing inks, CPF and fibres. As concerns printing ink applications, one customer specifically stated that "*[f]or printing inks, we do not have a general purpose TiO_2.*"[88]

(92) During the market investigation a majority of TiO_2 customers indicated that no universal TiO_2 grade exists that would suit the technical requirements of all end-applications because the desired characteristics of TiO_2 vary by end-application.[89] In this context, one ink manufacturer noted: "*[i]n printing inks applications only selected types of rutile titanium could be used and from my knowledge they are produced specifically for printing inks*".[90] Another ink manufacturer explained that "*[f]or application in printing inks, higher dispersibility is needed and weathering resistance is not important. Printing inks use different grades compared to architectural applications and plastics.*"[91]

(93) Despite its claims within the framework of these proceedings, the Notifying Party seems to admit that TiO_2 is not a commodity[92] and that demand substitution between various grades is limited. Indeed, within the framework of an antitrust litigation in the USA[93] it was stated: "*Huntsman denies that all $Ti0_2$ is homogeneous or that it is a solely commodity chemical. There are some speciality/differentiated applications. Each pigment's characteristics are determined by crystal size but also by the addition of additives and coatings which provide different pigment grades with*

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86 Sachtleben's internal document, *Printing Inks - Segment monthly management report*, January 2014.

87 For Sachtleben see Annex 54 of the Form CO and for Huntsman see reply to the RFI No 16 of 13 March 2014, *Huntsman Customer Reports, Inks 2010 to 2014*.

88 [...]*, response to questions 14 and 15 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I" [ID 1625].

89 See responses to question 13 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I". 47 TiO_2 customers out of 50 that replied to this question responded that there is no universal TiO_2 grade that would fit all applications.

90 [...]*, response to question 13.1 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I" [ID 1579].

91 [...]*, response to question 13.1 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I"; [ID 2303].

92 The term "commodity" is meant to indicate a product supplied in the market without qualitative differentiation, fungible with other products in the same market.

93 Gilardi & Co. LLC., *Titanium Dioxide Antitrust Litigation Website, Home* page, 2014,, available at: http://www.tio2antitrustlitigation.com/ , visited on 02.07.2014.

different attributes which make them more suitable for targeted end uses. By way of example some grades developed for a particular application such as architectural coatings may be readily substitutable for one another. However coatings grades developed for architectural coatings would not be substitutable for a coatings grade required by the automotive industry."[94]

(94) Therefore, the Commission takes the view that various TiO_2 applications require different grades.

6.1.2.2. TiO_2 for printing ink applications requires specific technical characteristics which are different from the requirements of TiO_2 for coatings and other applications.

(95) The printing ink application is one of the "specialty applications"[95] which typically requires TiO_2 grades specifically designed to meet particular technical specifications.

(96) In the course of the market investigation, the majority of customers confirmed that TiO_2 used for printing ink applications has different characteristics from TiO_2 used in other end-applications.[96] In addition, even within the overall printing ink application, the technical requirements set by different printing ink applications are not homogeneous and there are different grades designed to suit a specific application. The main distinction made by the TiO_2 industry is usually between surface/exterior printing and reverse/interior printing (lamination). Certain grades are more suitable for surface/exterior printing ink applications (such as Sachtleben's RDI-S and Huntsman's TR52) in view of their high glossiness and durability; whereas other grades (such as Sachtleben's RDE2 and Huntsman's TR50) are designed to meet the requirements for interior printing ink (used in lamination/inside packaging) for which opacity and ease of dispersion matter more[97] (consequently, less refined products can be used for the latter). This distinction is consistent with the way both Parties subdivide their printing ink application product portfolio.[98]

(97) Even though TiO_2 for printing ink applications may appear to be homogeneous white powder, there are a number of characteristics that identify and differentiate printing ink grades from grades used in other applications. In particular, as outlined by the majority of customers who responded to the market investigation, printing ink applications have specific requirements in terms of the type of TiO_2 crystal (rutile crystal is needed to obtain ink with good brightness/glossiness and low abrasiveness), dispersibility (ease of particle dispersibility is needed to obtain high opacity) and particle size (narrow particle size is needed to obtain good tinting strength and ink quality).[99]

(98) Specifically, as regards the distinction between TiO_2 for printing ink applications and coatings, the majority of customers considered that TiO_2 used for coatings (architectural, industrial and thin-film) and TiO_2 for printing ink have different

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94 Huntsman, reply to the RFI No 16 of 13 March 2014.

95 See section 5.1.

96 See responses to question 17 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I".

97 Agreed minutes of the conference call with [...]* of 21 March 2014, paragraph 9 [ID 2167], Sachtleben's internal document, *[…]* Meeting, Sachtleben TiO_2 market overview and Printing Ink Segment Presentation*, dated 17 April 2012, page 23 and Huntsman, reply to the RFI No 21 of 18 March 2014, page 9.

98 Sachtleben, reply to the RFI No 16 of 13 March 2014, and Huntsman, reply to the RFI No 16 of March 13 2014.

99 See responses to question 17 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide-Phase I".

characteristics.[100] This was also confirmed by TiO_2 suppliers who indicated that TiO_2 for ink applications has different technical features from TiO_2 for coating applications,[101] the former being characterized by high opacity, high glossiness and ease of dispersibility.[102]

(99) The different demand profile of printing ink application appears to be confirmed by the Parties' own commercial organisation and internal documents. Indeed, contrary to their claims in the current proceedings, the Parties themselves analyse the customer profile of the printing ink application as separate from other end applications and specifically from coatings.

(100) For instance, one of the Sachtleben's regional sales managers in an internal correspondence stated "[…]*".[103] In its own monthly business reports, [internal marketing strategy in relation to printing inks]*.[104] [internal marketing strategy in relation to printing inks]*.[105]

(101) Similarly, Huntsman differentiates between inks and coatings in its global revenue reports, [Huntsman market monitoring]*. Moreover, Huntsman [Huntsman marketing strategy]*. In [Huntsman internal document]*, Huntsman set the following goal: "[…]*".[106] [Huntsman marketing strategy]*.[107] This indicates that Huntsman sees TiO_2 for printing ink applications as a separate market from other applications, devises a strategy specific to this segment and set specific market shares targets for it.

(102) In its internal documents, Huntsman defines inks to be one of the "*differentiated markets*", which are "[…]*."[108] In differentiated markets, "[…]*".[109] Therefore, Huntsman clearly acknowledges that the market for ink applications has different dynamics compared to the "*standard markets*",[110] and has high quality requirements for which customers are […]*. More specifically, as regards inks, Huntsman explains that there is […]*.[111] The existence of a […]* is also recognised by Sachtleben who is the […]*.[112]

(103) Finally, the differentiation of the TiO_2 market by end applications, and specifically between coatings and inks, is in line with the way third party industry organizations and consulting firms report on the market. Indeed, ICIS Chemical Business ("ICIS"), a chemical industry news and market intelligence company and TZ Minerals

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100 See responses to question 16 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide- Phase I".

101 See responses to question 25 of questionnaires "Q2 and Q2 bis - Questionnaire For Competitors Titanium Dioxide- Phase I".

102 See responses to question 28 of questionnaires "Q2 and Q2 bis - Questionnaire For Competitors Titanium Dioxide- Phase I".

103 Sachtleben's internal document, Mr […]* email, *TiO_2 for […]* and major ink customers*, 01 April 2013.

104 Sachtleben's internal document, *Monthly business review – TiO_2 pigments 2013-2014*.

105 Sachtleben's internal document, *Strategy statement printing ink 2010-2012.*

106 Huntsman's internal document, *Global revenue reports; Inks – 5 year marketing plans; Inks – strategy overview; Inks sector strategy*.

107 Huntsman reply to the RFI No 14 of 11 March 2014.

108 Huntsman's internal document, […]*, *Differentiated*, 23.04.2014, page 2.

109 Huntsman's internal document, […]*, *Differentiated*, 23.04.2014, page 2.

110 Huntsman's internal document, *Delivering Transform: Inks Strategy Overview*, page 4.

111 Huntsman's internal document, […]*, *Differentiated*, 23.04.2014, page 2.

112 Sachtleben's internal document, *Printing ink strategy statement 2010-2012*, page 13.

International Pty Ltd ("TZMI"),[113] an independent consulting company in the opaque mineral, metal and chemical sectors, both analyse the TiO_2 industry based on the application, specifically singling out the printing ink grades.[114]

(104) Therefore, the Commission takes the view that TiO_2 for printing ink has specific properties and is tailor-made for ink manufacturing. This allows the producers of TiO_2 for printing ink to achieve a price premium over standard TiO_2 grades.

6.1.2.3. The majority of the EEA printing ink manufacturers, including the biggest EEA ink manufacturers, use dedicated TiO_2 grades

(105) The leading TiO_2 manufacturers, namely the Parties and Kronos, all produce dedicated sulphate-based TiO_2 grades specifically designed to meet the requirements of printing ink manufacturers. Consequently, the majority of EEA printing ink manufacturers use dedicated sulphate-based TiO_2 grades. For instance Sachtleben, the leading supplier of TiO_2 for printing ink applications in the EEA in terms of sales, refers to the following grades as "*our printing ink grades*" as opposed to the "*coating grades*":[115]

[113] TZMI is a global, independent consulting company covering the mineral sands, titanium dioxide and coatings industries.

[114] Huntsman's internal documents: […]*.

[115] Sachtleben's internal document, email g*raphics Chinacoat 2012*.

Table 1 – Sachtleben's TiO_2 "printing ink grades"

SACHTLEBEN RDI-S	*premium rutile grade pigment for high quality, high-gloss, and high-opacity inks across the printing ink field.*
SACHTLEBEN RDO	*new rutile grade pigment with ease of dispersion and additional opacity for flexo and gravure inks.*
SACHTLEBEN RDE2	*rutile pigment for lamination and reverse printing inks. It is widely used in packaging applications.*
SACHTLEBEN RDDI	*rutile pigment for matt surface and reverse printing inks when excellent hiding power is required.*

Source: Sachtleben's, reply to the Request for Information (RFI) No 21 of 18 March 2014, email, G*raphics Chinacoat* 2012, [ID 02096-15249].

(106) Similarly, Huntsman, the second largest supplier of TiO_2 for printing ink applications in the EEA in terms of sales, refers to TR52 as its leading ink grade, and to TR 50, RXL and HD2 as its ink grades.[116] […]*.[117]

(107) Kronos, the EEA's third largest supplier of TiO_2 for printing ink applications also confirmed that its grades being sold to ink manufacturers have been developed to specifically target printing ink manufacturers' needs*: "[w]e have specific products designed for printing inks, but they have also found use in coating applications, in particular thin-film coatings and high gloss coatings.*"[118]

(108) Finally, the Parties' top four EEA customers of TiO_2 for printing ink applications,[119] […]*, tend to use exclusively dedicated ink grades.[120]

(109) This was also confirmed during the market investigation where a majority of printing ink manufacturers[121] confirmed that they would not switch to coatings grades should the price of the printing ink grades increase by 5-10% on a permanent basis.[122]

(110) Therefore, the Commission takes the view that the majority of EEA ink manufacturers use dedicated TiO_2 for printing ink applications.

6.1.2.4. If any, there is only one-way substitutability between ink grades and coatings grades

(111) As explained in the previous section, printing ink manufacturers tend to use grades which have been specifically developed to perform well in this application. In contrast, general coatings manufacturers (except for some high end coatings) are more tolerant and generally have less stringent/lower requirements as to the specifications and the quality of the grades. This is why general coatings are referred to as "mass" or "commodity" applications and can use a multitude of grades,

116 Huntsman reply to the RFI No 16 of 13 March 2014, […]*.

117 Huntsman's internal document, email, […]*.

118 Kronos, response to question 10.1 of questionnaire "Q10 - Questionnaire For Competitors - TiO_2 For Printing Ink - Phase II" [ID 2077].

119 Annex 50 of the Form CO.

120 […]*, responses to question 30 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide-Phase I" [ID 1352, 2303, 1625 and 1579].

121 14 out of the 16 ink manufacturers that replied to this question.

122 See responses to questions 20 of questionnaire "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II".

including multi-purpose grades or grades of lower quality produced by Asian suppliers.[123]

(112) Consequently, the market investigation indicated that coatings manufacturers have a wide choice of grades since TiO_2 suppliers typically produce grades that can be used in the production of a large number of different coatings,[124] "*Architectural coatings manufacturers can use any form of TiO_2 and multiple source their requirements from a number of TiO_2 suppliers.*"[125]

(113) Conversely, printing ink manufacturers use dedicated ink grades rather than general coating grades. A Sachtleben engineer remarked to an ink manufacturer, "[…]*"[126] while [...]* explained that "*[… w]e have tested standard paint grades in our formulations and they don't work.*"[127]

(114) This is also supported by those EEA printing ink manufacturers that are also active in the production of coatings.[128] The majority of them have explained that whereas they can use printing ink grades for the production of coatings, coating grades are not used for the production of printing ink.[129]

(115) This is in line with the fact that the majority of the EEA sales to printing ink manufacturers concern dedicated ink grades and that, consequently, coating grades do not appear to be a valid alternative to ink grades for printing ink manufacturers.

(116) The Notifying Party's most important dedicated inks grades are TR52, TR50, TR92 and R-XL as well as the chloride grade TR93. For Huntsman, TR52 and TR50 together represent more than […]*% of Huntsman's sales to ink applications in the EEA and around […]*% worldwide.

Figure 1 - Main grades of Huntsman sold for ink applications

[…]*

Source: Huntsman, reply to RFI No 21 of 18 March 2014, Annexes 6, 7, 8 and 9.

(117) Sachtleben's most important dedicated inks grades are RDI-S, RDE2, RDO, together representing […]*% of Sachtleben's sales to ink applications in the EEA and […]*% worldwide.

Figure 2 - Main grades of Sachtleben sold for ink applications

[…]*

Source: Sachtleben, reply to RFI No 21 of 18 March 2014, Annex 40.

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123 See responses to question 14 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I" and agreed minutes of conference call with […]* of 29 November 2013, paragraph 12 [ID 1369].

124 Form CO, paragraph 271 ff and Huntsman's internal document, *Coatings*, 5 May 2013.

125 Huntsman's internal document, *Coatings*, 5 October 2013.

126 Sachtleben's internal document, email, […]*.

127 [...]*, response to question 16.1 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I" [ID 2303].

128 Namely: [customers].

129 See responses to questions 16 and 17 of questionnaire "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II".

(118) It follows that each of the Parties' top two grades by volume sold to printing ink manufacturers in 2012 were dedicated ink grades, respectively […]* for Sachtleben, and […]* for Huntsman.

(119) The equivalent of Huntsman's RDI-S' is TR52, while the equivalent of RDE2 is TR50.[130] RDO, which is the result of a project for improvement of RDI-S, can also be counted among the main ink grades of Sachtleben.[131] […]* which is mainly used for "*lamination and reverse printing inks*" as acknowledged by marketing documents.[132] In addition, most volumes of these grades are used in ink applications, supporting further the dedication of these grades to ink applications. […]*.

Figure 3 – Sachtleben's grades usually used in ink applications: share of volumes sold for ink applications out of total volumes of these grades

[…]*

Source: Sachtleben, reply to RFI No 21 of 18 March 2014, Annex 40.

Figure 4 - Huntsman's grades usually used in ink applications: share of volumes sold for ink applications out of total volumes of these grades

[…]*

Source: Huntsman, reply to RFI No 21 of 18 March 2014, Annexes 6, 7, 8 and 9.

(120) Likewise […]* to […]*% of TR52 and […]* to […]*% of TR50 were sold to ink manufacturers.

(121) The Notifying Party emphasised that the use of TR52 outside the ink segment is marginal; ink applications represent […]*% of the use of TR52. There are customers in the coatings segment who appreciate the easy dispersibility, high gloss, bluish undertone and high opacity in their formulations and products. These properties are important in pigment particle size-sensitive coating formulations from air-drying high-gloss emulsions and waterborne paints to high-temperature cured-stoving enamels (industrial coatings, thin-film can coatings). Thus, there is an overlap between high-end coating requirements and those of printing inks.

(122) Therefore, the Commission takes the view that there is limited one-way substitutability between ink grades and coating grades in a sense that some coating customers use printing ink grades, but not the other way around.

6.1.2.5. None of the EEA printing ink manufacturers would switch to coating grades in case of a small but significant and non-transitory increase in price (SSNIP)

(123) To assess the scope of the relevant market and in particular the claim of the Notifying Party that the market for TiO_2 for printing ink applications is part of the overall market for TiO_2 for coating applications the Commission tested whether ink-grade customers would switch to coating grades in response to an SSNIP. All EEA printing ink manufacturers, including the Parties' top four customers in this application, namely […]* indicated that they would not switch to grades usually used for other applications such as coatings in case of a 5-10% price increase of the TiO_2

130 Sachtleben's internal document, *Pigmentary TiO_2 comparison, Sachtleben and Huntsman Pigments*, page 10.

131 Sachtleben, reply to question 6 of the RFI No 21 of 18 March 2014, page 8.

132 Sachtleben, Annex 29 of the RFI No 21 of 18 March 2014, *White pigments for flexible packaging inks*, page 3.

grades for printing ink applications.[133] This is all the more indicative of the lack of substitutability given that these manufacturers include companies which are also active in the production of coatings and who could easily switch as they already have coating grades in their purchase portfolio.

(124) Therefore, the Commission takes the view that none of the EEA printing ink manufacturers would switch to coating grades in case of an SSNIP.

6.1.2.6. Conclusion

(125) Therefore, the Commission takes the view that there is no demand-side substitutability between TiO_2 ink grades and coating grades.

6.1.3. There is no supply-side substitutability between TiO_2 for printing ink applications and TiO_2 for coating applications

6.1.3.1. The production of TiO_2 for printing ink applications requires specific know-how

(126) According to the Notifying Party, sulphate-based TiO_2 for coatings and printing ink applications is produced through the same manufacturing process, as all the front-end steps and most of the finishing steps are common to both coatings and inks grades.[134] The Notifying Party explains that there are no patents or other IP rights associated with the production of TiO_2 for printing ink applications and claims that all companies active in the TiO_2 industry and in the coatings segment in particular, can produce ink grades.[135]

(127) However, the Notifying Party acknowledges that there is know-how required for the production of printing ink grades. […]*[136] […]*. Second, the Notifying Party recognises the key know-how linked to the production of ink grades concerns the calcination phase in the front-end process, as well as the coating and milling phases, which lie in the finishing process.[137] In the finishing process, while overall the same physical processing steps are used for coatings and ink grades the main difference lies in […]*.[138] This was further confirmed in its response to the Decision opening the proceedings stating that *"The Parties agree that the development and the supply of TiO_2 for printing ink applications require some specific manufacturing know-how and technology associated with those applications"*.[139] Moreover, in its response to the Statement of Objections, the Notifying Party claims again that *"Huntsman has never denied the role of specific know-how"* for the production of *TiO_2* for printing ink applications[140]. Finally, the existence of specific know-how for the production of TiO_2 for printing ink applications was acknowledged by Huntsman in its submission of remedies, the core content of which is the assignment of all know-how necessary for the development and manufacture of TR52.[141]

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133 See responses to questions 19 and 20 of questionnaire "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II".

134 Annex 5 of the Form CO.

135 Notifying Party's response to the Decision opening the proceedings, paragraph 92.

136 Annex 5 of the Form CO, article IV, paragraph 4.5 and Schedule A-8 of the Disclosure Letter.

137 Huntsman, reply to the RFI No 21 of 18 March 2014, page 13ff.

138 Huntsman, reply to the RFI No 21 of 18 March 2014, page 13ff.

139 Notifying Party's response to the Decision opening the proceedings, paragraph 87.

140 Reply to the Statement of Objections, paragraph 137-138.

141 Notifying Party's commitments submitted pursuant to Article 8(2) Of Regulation (EC) No 139/2004 of 28 July 2014.

(128) This is further confirmed by the Notifying Party's own internal documents, which acknowledge the existence of specific printing ink know-how. […]*.[142] In particular, a memorandum prepared by the company […]* about the Rockwood business states that Sachtleben "*maintains a competitive advantage through* […]*".[143]

(129) The market investigation also confirmed the existence of supply-side specificities linked to the production of TiO_2 for printing ink applications. Indeed, while the majority of competitors indicated that sulphate-based TiO_2 production equipment and the process are the same overall for all applications, there are some manufacturing specificities of the production of TiO_2 grades for printing ink applications that require a specific know-how starting from the very choice of the raw material.[144] Kronos, a TiO_2 manufacturer, stated that "*[a]ll steps in production can be critical to the final characteristics of an ink grade. Feedstock uses can impart impurities which impact brightness and whiteness. Calcination can impact product hardness; different surface treatments can impact dispersion, durability and stability, milling impacts particle size and distribution.*"[145] Police, another TiO_2 supplier explained that "*[a]ccording to our knowledge the most important differences are in surface coating (including organic surface coating) and milling (including micronisation and eventually separation of agglomerates). Probably some organic raw material are also different.*"[146]

(130) The choice of feedstock (slag/ilmenite) determines the TiO_2 (im)purity level, which is inversely proportionate to the degree of brightness and whiteness of the printing ink produced on this basis.[147] Kronos, a TiO_2 manufacturer stated in relation to the market test of the remedies submitted on 28 March 2014: "*HT produces TR-52 using slag based feedstocks which Kronos does not use. Kronos' SP operations are based on ilmenite feedstock. Kronos cannot change from using ilmenite to SP slag feedstock without enormous capital costs (tens of millions of $). Some technical properties (namely brightness and undertone) of TR-52 are derived from the slag feedstock and would be different and maybe unacceptable to customers if made on an ilmenite base.*"[148] In the front-end section of the production process, the calcination phase appears to be crucial as it has an impact on the hardness of the product.[149] However, the finishing-end of the production process for ink grades, including the milling and coating steps, appears to be the critical stage of the process. In fact, the [production process]* determines the TiO_2 particle size and distribution, which in turn affect the opacity and overall quality of the printing ink.[150] The surface

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142 Huntsman's internal document, reply to the RFI No 16 of 13 March 2014, *Pigments and Additives*, May 2013.

143 Sachtleben's internal document, […]*, *confidential information memorandum, Rockwood – Pigments And Additives*, April 2013, page 75.

144 See responses to questions 8 and 9 of questionnaire "Q10 - Questionnaire For Competitors - TiO_2 For Printing Ink - Phase II".

145 Kronos, response to question 9 of questionnaire "Q10 - Questionnaire For Competitors - TiO_2 For Printing Ink - Phase II" [ID 2077].

146 Grupa Azotv Zakladv Chemiczne Police, response to question 9 of questionnaire "Q10 - Questionnaire For Competitors - TiO_2 For Printing Ink - Phase II" [ID 2080].

147 Form CO, paragraphs 133 and 456.

148 Kronos, response to question 13 of questionnaire "Q6 – Market Test Of Commitments – Competitors" [ID 1688].

149 Kronos, response to question 9 of questionnaire "Q10 - Questionnaire For Competitors - TiO_2 For Printing Ink - Phase II" [ID 2077].

150 Sachtleben's internal document, […]*, *Sachtleben TiO_2 market overview and Printing Ink Segment Presentation*, 17 April 2012, page 20.

treatment/coating is very important as it has an impact on the dispersion/durability and stability of the ink.[151]

(131) The existence of specific know-how therefore limits any supply-side substitutability between coatings and ink grades, in particular as concerns those TiO_2 suppliers that do not possess the relevant know-how for the production of TiO_2 for printing ink applications. In this context Precheza explained that for a supplier not active in printing ink grades but active in thin-film coatings it would still take "*approximately 3 - 5 years and huge investment to new technology.*"[152] In relation to the market test of the remedies submitted on 28 March 2014, an Eastern European supplier, Cinkarna, when asked whether, in theory, it would be able to take over the TR-52 business, stated that, in any case "*Huntsman will not only need to indicate the raw materials used (and the ratio between titanium slag and titanium ilmenite), but also disclose the exact steps in the production process: namely provide detailed recipes and production procedures, check whether the TiO_2 basis produced in the front-end is of sufficient quality, provide detailed information to achieve adequate particle size and surface treatment (whether TR-52 is coated with alumina, silica etc.). Every step of the production process can have a big influence on the end product, in particular the product basis: if the basis is slightly changed from the original one, quality differences may appear.*"[153] This further indicates that the production process for TiO_2 for printing ink applications is specific.

(132) Therefore, even if a sulphate-based TiO_2 supplier had all the production equipment necessary for starting the production of printing ink grades and had experience in carrying out the main production steps, the specific know-how for ink would be a major barrier to supply-side substitutability. The difficulty of starting production of TiO_2 for printing ink applications is evidenced by the fact that none of the TiO_2 suppliers who do not produce TiO_2 for printing ink applications has managed to successfully enter the TiO_2 for printing ink applications market in the last 5 years. For instance, two Eastern European suppliers, namely Cinkarna and Precheza, who are not currently active in TiO_2 for printing ink, tried to sell their grades to ink manufacturers but failed. Their grades were rejected because they did not meet the high quality requirements set by customers. Precheza introduced a printing ink TiO_2 grade on the market, but stopped the production after some years.[154] Similarly, the Polish supplier Police tried to enter the printing ink market but without success, reporting that:" *[…] customers in this market have high quality requirements and therefore, it is difficult to compete with the big players on quality and build a strong position.*"[155] In particular, Police stated that entering the printing ink segment is "*always difficult as each customer has their own recipes and technical requirements*".[156] The TiO_2 manufacturer Cristal also reported that the "*TiO_2 market for printing inks is a very specific segment of the TiO_2 business of which Cristal has limited knowledge. Cristal tried in the past to enter the printing inks business, but has never been successful. This may be due to specific technical requirements from*

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151 Form CO, paragraph 92.

152 Precheza, response to question 28.2 of questionnaire "Q10 - Questionnaire For Competitors - TiO_2 For Printing Ink - Phase II" [ID 2057].

153 Agreed minutes of the conference call with Cinkarna of 8 April 2014 [ID 2044].

154 Agreed minutes of the conference call with Precheza of 11 April 2014, paragraph 10 [ID 2204].

155 Agreed minutes of the conference call with Grupa Azotv Zakladv Chemiczne Police of 9 April 2014, paragraph 11 [ID 2170].

156 Grupa Azoty Zaklady Chemiczne Police, response to question 33 of questionnaire "Q2 - Questionnaire For Competitors Titanium Dioxide" [ID 923].

customers in this segment."[157] The same goes for Chinese suppliers who at this stage, despite numerous attempts,[158] have not successfully developed a grade that is of comparable quality to the printing ink grades of Huntsman and Sachtleben.

(133) The fact that know-how is a barrier to supply-side substitutability for TiO_2 suppliers active in other TiO_2 segments was also confirmed by the market test of the commitments of 22 March 2014. Indeed, the majority of TiO_2 suppliers that responded to the market test expressed the view that the proposed divestment of know-how could be an attractive package to a potential purchaser and could generate a credible player in TiO_2 for printing ink applications[159] implicitly confirming that the printing ink know-how has value and is the reason why other suppliers could not at this stage enter this segment. Similarly, it surfaced during the market test that to take on this know-how the suppliers that are not currently active in this segment would have to perform substantial adaptations to their production process involving not insignificant investments. Precheza, commented that "*this would involve substantial investments and would require a switch of current portfolio*"[160] while Police considered "*it difficult to take a decision involving considerable investments*".[161]

(134) Therefore, the Commission takes the view that the production of TiO_2 for printing ink applications requires specific know-how.

6.1.3.2. None of the TiO_2 manufacturers that are currently not active in TiO_2 for printing ink applications would switch its production to ink grades in case of a small but significant and non-transitory increase in price (SSNIP).

(135) To assess the scope of the relevant market and in particular the claim of the Notifying Party that all TiO_2 suppliers could and would start producing TiO_2 for printing ink applications should the prices increase post-merger, the Commission tested whether sulphate-based TiO_2 suppliers which are currently not active in the production of TiO_2 for printing ink applications would switch their production towards this segment in response to an SSNIP.[162]

(136) The smaller sulphate-based suppliers, such as Precheza and Cinkarna, would not switch due to the high costs for developing such grades, the need for a special and expensive production line for the finishing process and inadequate scale indicating that a minimum 100 kt capacity is required to start that production.[163] Cinkarna specifically stated that "*[t]he costs of development are too high*" in order to switch to producing printing ink grades.[164] Precheza argued that it would also not be willing to switch as "*[t]his kind of production is benefited only for bigger producers whose*

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157 Agreed minutes of the conference call with Cristal of 9 April 2014, paragraph 2 [ID 2364].

158 […]*, a TiO_2 manufacturer, reported to have tested hundreds of Chinese grades, see agreed minutes of the conference call with […]* of 2 June 2014, part IV [ID 2293].

159 See responses to questions 2, 3, 5, 31, 37 of "Q6 – Market Test Of The Commitments – Competitors".

160 Agreed minutes of the conference call with Precheza of 11 April 2014, paragraph 5 [ID 2204].

161 Agreed minutes of the conference call with Grupa Azotv Zakladv Chemiczne Police of 9 April 2014, paragraph 6 [ID 2170].

162 See responses to question 34 of questionnaire "Q10 - Questionnaire For Competitors - TiO_2 For Printing Ink - Phase II".

163 See responses to question 34 of questionnaire "Q2 - Questionnaire For Competitors Titanium Dioxide- Phase I" and questionnaire "Q2 -bis- Questionnaire For Competitors Titanium Dioxide- Phase I".

164 Cinkarna, response to question 34 of questionnaire "Q2 - Questionnaire For Competitors Titanium Dioxide- Phase I" [ID 0572].

production capacity is higher than 100 000t per year. Special expensive end-production line is needed."[165]

(137) Therefore, in view of the high barrier to supply-side substitutability consisting of the existence of specific know-how required for the production of TiO_2 for printing ink applications, the Commission takes the view that there is no supply-side substitutability between TiO_2 grades for printing ink applications and other sulphate-based TiO_2 grades for other applications.

6.1.3.3. Conclusion

(138) In light of the above, the Commission takes the view that there is no supply-side substitutability between TiO_2 ink grades and coating grades.

6.1.4. Quantitative analysis of TiO_2 prices for printing ink and coating applications[166]

6.1.4.1. The Notifying Party's submissions

(139) The Notifying Party submitted an economic report as well as several follow-up documents and responses to Requests for Information ("RFIs") (together referred to as the "Economic Submissions").[167] In these Economic Submissions the Notifying Party argues that: (a) the data show that many grades are sold for both ink applications and coatings applications; (b) the "natural experiment" which occurred in 2010-2012 (an unexpected increase in demand coupled with a temporary shortage of capacity, which led to a temporary increase in prices) shows that prices of ink grades and coatings grades evolved in parallel and remained at similar levels to one another, despite being subject to different demand/supply shocks; and (c) these co-movements are not explained by changes in variable costs.

(140) The Notifying Party uses correlation analysis to support its argument about the co-movement of prices for ink grades and coating grades as well as to argue that "*grades used for coatings and inks applications are part of the same relevant market and exert a strong competitive constraint on one another, since market prices are determined by global demand and supply conditions for at least all inks and other coatings applications*".[168]

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165 Precheza, response to question 34 of questionnaire "Q2 - Questionnaire For Competitors Titanium Dioxide- Phase I" [ID 0861].

166 See Annex 1 for a detailed description of the Commission's quantitative analysis.

167 The Economic Submissions by the Notifying Party contain a number of stand-alone submissions including : (i) *The relevant market for TiO_2 pigments sold for inks and/or coatings applications in the EEA*, 8 January 2014, submitted on 10 January 2014, completed on 15 and 16 January 2014 with the underlying data, Stata code and spreadsheets, (ii) *Response to Questions regarding the [economic] paper as contained in the RFI of 15th January 2014*, dated and submitted on 22 January 2014, completed on 28 January 2014 with the underlying Stata code, (iii) *Clarifications regarding prices and costs data previously submitted to the European Commission*, dated and submitted on 13 February 2014, as well as complementary pieces of analysis submitted as part of responses to RFIs including (iv) Annex 7 of reply to the RFI of 31 January 2014, dated and submitted on 4 February 2014, completed on 5 February 2014 with the underlying Stata code; complementary data sent on 4 February 2014, (v) Reply to the RFI of 10 February 2014, dated and submitted on 11 February 2014, (vi) Replies to RFI No 19 and RFI No 20, of 19 March 2014, (vii) Replies to RFI No 22 and RFI No 23, of 27 March 2014, (viii) Replies to RFI No 27 and RFI No 28, of 14 April 2014, (ix) Replies to RFI No 30, of 19 May 2014 and (x) Replies to RFI No 31, of 27 May 2014. The various Economic Submissions are referred to in this document by their date.

168 Notifying Party, *Economic Submission of* 10 January 2014, page 3.

6.1.4.2. The Commission's assessment

(141) The Commission found several shortcomings in the Parties' Economic Submissions. In particular, the Economic Submissions fail to control for the effects of common supply and demand components on the price series, they do not adequately solve the issues related to the non-stationary nature of the price series, there is no robust evidence that the demand shock in 2010-2012 was asymmetric between ink and coating grades,[169] and the variable costs may not reflect the real opportunity cost present in the market.[170] These shortcomings severely undermine the results and the conclusions of the Economic Submissions.

(142) The Commission refined the quantitative analysis presented by the Notifying Party in two steps. First, it evaluated the merits of the correlation analysis from the point of view of relevant market definition and set out necessary conditions which needed to be fulfilled by a price correlation analysis in order to even be considered as a tool for market definition. Second, it used these necessary conditions to refine the correlation analysis performed in the Economic Submissions with a more in-depth assessment of the impact of common demand shocks and changes in common costs on the correlation and co-movement of the prices of ink and coating grades. As opposed to the period of 2010-2013 covered in the Economic Submissions, the Commission's analysis covered the longer period of 2006-2013 which enabled the period before the TiO_2 shortage of 2010-11 to be covered and provided more robust results.[171]

Price correlation analysis as a tool for relevant market definition

(143) Price correlation analysis is a technique that has been used in a number of cases by the Commission as one of the tools to define the relevant market.[172] The basic idea behind this approach is that prices for two different products that belong to the same relevant market should typically move in the same direction (co-movement in time) because of demand and/or supply-side substitution. For example, assuming that products A and B are in the same market, if the price of product A were to increase, then consumers would substitute to product B, thus also leading to an increase in the price of product B at the same time as constraining the initial increase in the price of product A. The prices of products A and B would therefore move together, due to the fact that consumers can switch between the two if relative prices change.

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169 In the Economic Submission submitted on 10 January 2014 the Parties use estimates of global sales figures for 2010-2012 as evidence of asymmetric demand shocks for ink and coating grades. The Commission has been unable to verify the information provided by the Parties in their responses to RFI No 30 of 14 May 2014 and RFI No 31 of 22 May 2014 to substantiate their estimates of annual global sales data and to verify the robustness of these estimations that were based on an extensive set of assumptions.

170 The Commission analysis of market dynamics found a discrepancy between the variable costs in the Transaction Data and the feedstock price reported in the market intelligence. See Annex 2.

171 The key documents of the Economic Submissions were submitted during Phase I of the investigation and included a correlation analysis only for the period of 2010-2013. A comprehensive data request (RFI No 18 of 14 March 2014 and RFI No 21 of 18 March 2014) at the beginning of Phase II of the investigation allowed the Commission to develop a correlation analysis for an extended period, including the years 2006-2009.

172 See Commission Decisions 92/33/EEC in case M.190 Nestlé/Perrier OJ L356, 05.12.1992, C 2013/312/EU in case M.6850 Marine Harvest/Morpol, OJ C312, 26.10.2013, C 2013/212/EU in case M.6756 Norsk Hydro/Orkla, OJ C212, 02.06.2013, C 2013/279/EU in case M.6607AS Airways/American Airways, OJ C279, 27.09.2013, C 2014/109/EU in case M.6541 Glencore/Xstrata, OJ C109, 11.04.2014 and C 2013/106/EU in case M.6360 Nynas/Shell/ /Harbug Refinery, OJ C106, 12.04.2013.

(144) While the idea that demand and/or supply substitution will lead to price co-movement is correct, a mechanical acceptance of high price correlation coefficients as decisive evidence that two products belong to the same relevant market can lead to misleading results.

(145) Indeed, price correlation may lead to *false positives*. For example, a high correlation coefficient may still be consistent with two products belonging to separate relevant markets.[173]

(146) Therefore, the Commission considers that the use of price correlation analysis to quantify the degree of co-movement of prices over time, and indicating that the underlying products belong to the same relevant market, is best suited as a "separation" test rather than an "inclusion" test. Specifically, price correlation analysis has a greater power in defining whether two products do not belong to the same relevant product market, rather than defining whether they belong to the same relevant market.[174,175] The Commission considers that the appropriate test for the purpose of relevant market definition is the SSNIP-test by a hypothetical monopolist.

(147) Additionally, for a price correlation analysis to provide insights that are meaningful both statistically and economically the following necessary prerequisites need to be met:[176]

(a) common components of the price series have to be controlled for.

(b) price series have to be stationary.

(c) price series have to consist of a minimum total number of observations and of a minimum number of subsequent observations.[177],[178]

The Commission's Price Correlation Analysis

(148) The Commission used transaction-level data (Transaction Data)[179] submitted by the Parties[180] to conduct an in-depth price correlation analysis to assess whether TiO_2

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173 See Annex 1 for precise definitions of technical terms and further details of the arguments, including the identification of instances when price correlation may lead to *false negatives*.

174 More specifically, a low correlation coefficient, suggesting that the two products are not in the same relevant market, is less prone to the false positive problem.

175 This is the approach adopted by the Commission in a number of recent cases: See Commission Decision C 2013/312/EU in case M.6850 Marine Harvest/Morpol, OJ C312, 26.10.2013, C 2013/212/EU in case M.6756 Norsk Hydro/Orkla, OJ C212, 26.07.2013, C 2013/279/EU in case M.6607US Airways/American Airlines, OJ C279, 29.12.2013, C 2014/109/EU in case M.6541 Glencore/Xstrata, OJ C109, 11.04.2014 and C /2013/106/EU in case M.6360 Nynas/Shell/ /Harbug Refinery, OJ C106, 12.04.2013.

176 Note that the three conditions listed above are necessary but not sufficient conditions. Even if all the three conditions hold, high correlation coefficients for price series could still not be informative for the relevant product market definition.

177 In particular, if the number of observations is small, outliers have a stronger adverse impact on any estimated statistics. Furthermore, missing data, leading to time series with gaps, may include different patterns or outliers that are not captured by the estimated statistics, leading to biased estimates. These biases can be minimised if the sample size is large and there are no gaps in the time series.

178 The minimum number of observations and the minimum number of subsequent observations depend on the maximum time-frame of the dataset and on the frequency of the observations.

179 The Transaction Data includes: (1) for each included transaction: the name of the supplier, the name of the customer, the country and geographic region of the customer, the customer group it belongs to, the year and month of the transaction, the grade involved, the application (best estimate of the Parties) for which the grade was used, the quantity and price involved, the associated variable production costs and

grades for printing ink and coating applications belong to the same relevant product market. In particular, the Commission performed the price correlation analysis on the monthly price of the ten most purchased products among the Parties' ink and coating grades in the EEA, for the period from January 2006 to February 2014. In order to determine the link between ink and coating grades the Commission assigned to each grade the application it was predominantly used for during the given period.

(149) The Commission adopted the following methodology in order to control for the prerequisites necessary for conducting an economically meaningful price correlation analysis described in recital (147):

(a) Used partial correlation analysis to control for common demand and supply components that influence both price series.[181]

(b) Tested for the price series' stationarity and perform the price correlation analysis on the first differences of non-stationary price series.

(c) Only looked at price series containing a certain minimum number of consecutive observations (24) and a certain minimum number of total observations (48) – this is to avoid distortions identified in recital 147(c).

(150) Despite the Commission's attempts to meet the three pre-requisites outlined above, in the current case the price correlation analysis suffers from the following key limitations:

(a) The assessment of the production and input costs for the partial correlation analysis revealed that the set of inputs and the unit prices of these inputs varied significantly across plants.[182] This implies that the averages of the costs do not properly control for common supply components.

(b) The Commission's analysis of the market dynamics[183] reveals a discrepancy between the input cost figures provided by the Parties and the movement of the feedstock price described in market intelligence reports. This discrepancy questions the validity of the input costs data as an instrument to reflect the actual opportunity-cost faced by suppliers (as reflected in market prices).

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transportation costs, the name, country and geographic region of the plant where the grade was produced, the production process (chloride vs. sulphate-based) involved and the currency in which the transaction was completed together with the relevant exchange rate (to Euro); (2) for each date (month-year)-plant pair: the price (Euro/unit of raw material) of each input and the cost (Euro/metric tonne of final product) of each input; (3) for each date (month-year)-plant pair: nominal and actual production capacity figures, production figures and utilisation rates.

180 These transaction-level data were submitted in two steps. First, data covering the period of 2010-2013, used in the first economic submission "*The relevant market for TiO_2 pigments sold for inks and/or coatings applications in the EEA*" (dated 8 January 2014, submitted on 10 January 2014), was submitted on 15 and 16 January 2014. Second, data for the 2006-2009 period and for January-February 2014 were submitted in reply to the RFI No 18, completed 4 April 2014 and in reply to the RFI No 21, completed by 4 April 2014.

181 Partial correlation analysis is a correlation analysis performed on the time series that have been cleaned from the impact of common shocks.

182 This variation in production and input costs is due to the various inputs being used in different proportions in different production processes across plants. The reply to question 1 of the RFI No 10 of 31 January 2014 presents a detailed account of input costs for Huntsman and indicates the variation across plants.

183 See Annex 2.

(c) The analysis of market dynamics underlined the presence of strong common demand components in the market. However, the Commission was not able to find any suitable proxy for the demand factors.

(d) Price correlation may not fully capture the substitutability between ink grades and coating grades. The qualitative evidence on product market definition revealed at most the presence of one-way substitution, if any substitution exists, between ink grades and coating grades (due to the fact that ink grades can be employed in coating applications, but coating applications cannot be employed in ink applications).[184] However, price correlation is not able to distinguish between one-way and two-way substitution, which poses a further limitation to the analysis.

(151) To address the specific issue of cost components varying across plants, the Commission performed three analyses:

(a) Inter-company price correlation: the (partial) correlation coefficients for any two price series of the two Parties were calculated, based on capacity and cost information across plants and Parties;

(b) Intra-company price correlation: the (partial) correlation coefficients for any two price series for the same Party were calculated, based on capacity and cost information across plants for the same Party;

(c) Intra-plant price correlation: the (partial) correlation coefficients for any two price series for products produced in the same plant were calculated, including the least variation across the capacity and the costs assigned to different grades.

(152) In addition, the Commission developed an analysis where grades used for both applications (ink/coating) were split into "sub-grades" according to their application (ink/coating) in each sales transaction. In this alternative setup, the Commission looked at the correlation between the price series of subgrade pairs belonging to the same grade (e.g. TR52-ink vs. TR52-coating).

(153) Overall, the Commission's price correlation analysis provides conclusions that are consistent with and do not contradict the strong indications from the qualitative assessment of product market definition, according to which there is no demand-side substitution from ink to coating grades, and there is no supply-side substitution from coating grades to ink grades for those suppliers that only produce coating grades but not ink grades. In fact, the average correlation coefficient between ink and coating grades is lower than the average correlation coefficient between the coating grades produced by Huntsman and Sachtleben in most specifications. However, the analysis offers few robust results and in the Commission's view should be seen as uninformative for the purposes of defining the relevant product market in the current case because it is not able to properly control for demand shocks and also faces significant difficulties in adequately controlling for common costs shocks.

6.1.4.3. Conclusion

(154) Therefore, the Commission takes the view that the quantitative analysis of TiO_2 prices for printing ink and coating applications does not invalidate the Commission's findings on the scope of the product market for TiO_2 for printing ink applications.

[184] See section 6.1.2.4.

6.1.5. Conclusion on product market definition

(155) In the light of the above, the Commission considers that TiO_2 for printing ink applications constitutes a separate relevant product market.

6.2. Relevant geographic markets

(156) When defining relevant geographic markets, the Commission identifies the areas which constitute a real alternative source of supply for parties' customers should the merged entity increase prices. To this end, the Commission analyses whether the customers of the parties would switch their orders to companies located elsewhere in the short term and at a negligible cost.[185]

(157) The elements to be taken into account in this analysis are the existence of any impediments to trade flows, such as high transportation costs, tariffs or other regulatory barriers as well as any other element which may imply that customers would not be able to switch to alternative sources of supply.

(158) The Statement of Objections concluded that the geographic market for TiO_2 for printing ink applications is EEA-wide. The Commission maintains its views for the reasons set out below.

6.2.1. Import duties and transport costs are no barriers to international TiO_2 trade

(159) As concerns the regulatory barriers such as tariffs, there are import duties in the Union and in other countries for different types of TiO_2 depending on the purity level. The duties vary between 5.5% and 6.5% in the Union and between 5-12% in other countries such as the USA. In this context the market investigation confirmed that import duties are not a significant barrier to trade.[186] The limited imports of TiO_2 for printing ink applications into the EEA can rather be explained by either the lack of sulphate capacity (imports from the USA) or the lack of the availability of a suitable product (imports from Asia where there is sufficient sulphate capacity).[187] This is also evidenced by the fact that during the first half of 2012, the Union unilaterally suspended the import duties for TiO_2[188] which did not result in an increase in imports of TiO_2 into the EEA during that period.

(160) As concerns the transport costs, the market investigation provided indications that they are not a significant barrier to trade (usually below 5% of the TiO_2 price).[189] However, any competitor willing to export to the Union would need to take into account the transport costs as the prices are typically cost, insurance, freight ("CIF") until European ports, the customers only bearing the costs of transport from the European port to its plant. [190]

(161) Therefore, the Commission takes the view that import duties and transport costs do not constitute barriers to TiO_2 trade flows.

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185 Notice on market definition, paragraph 29.

186 See responses to question 25 of questionnaire "Q1- Customers Titanium Dioxide".

187 See section 6.3.7.

188 Huntsman's internal document, *Suspension of EU Import Duty on 90% Purity Rutile TiO_2,* 30 April 2014.

189 See responses to questions 25 and 33 of questionnaire "Q1-Customers Titanium Dioxide".

190 Agreed minutes of conference call with […]* of 2 June 2014, paragraph 18.

6.2.1.1. The trade flows of overall TiO_2

(162) The EEA has sufficient capacity to cover its annual overall TiO_2 demand. Between 2010 and 2013, the EEA's annual overall TiO_2 demand was […]* kt, […]* kt, […]* kt and […]* kt, respectively.[191] The nameplate capacity of all EEA TiO_2 suppliers amounts to 1 549 kt.[192] The estimated production in the EEA between 2010 and 2012 was 1 350 kt, 1 383 kt and 1 085 kt, respectively.[193] For printing ink, the EEA's annual demand between 2010 and 2013 was […]* kt, […]* kt, […]* kt and […]* kt, respectively.[194]

(163) In 2012, the latest data available to the Commission, 69% of the EEA's overall TiO_2 demand was satisfied by domestic production and 5% came from other European sources outside the EEA. Out of the 26% overall TiO_2 imported from outside Europe, the largest share (14%) of the EEA's demand came from North America. Imports from the Asia/Pacific region amounted to 7% of the EEA demand. 5% was imported from Latin America and 1% from Africa and the Middle East. The EEA exported 399 kt and imported 342 kt TiO_2 in 2012. Except for the NAFTA region, the EEA is a net exporter vis-à-vis every other world region.[195]

(164) Available trade flow statistics do not distinguish between sulphate-based and chloride-based grades. In view of the fact that North America uses almost exclusively the chloride-based production technology, it can be assumed that all imports into the EEA from that region are chloride-based grades. Asian imports can be assumed to be predominantly sulphate-based grades, since the sulphate-based production technology is dominant in Asia. With over 60% of the installed TiO_2 capacity in Europe being sulphate-based TiO_2,[196] inks manufacturers turn to imported TiO_2 only if the price is substantially more advantageous. Indeed, the ink manufacturers which are active in the EEA purchase most of the sulphate-based TiO_2 for printing ink from EEA TiO_2 suppliers,[197] except for insignificant volumes imported.

(165) Given that the large majority of ink manufacturers prefer sulphate-based TiO_2 for technical reasons[198] imported sulphate-based TiO_2 would have to be sourced in Asia. However, the market investigation has indicated that, currently, Chinese suppliers are not in a position to deliver the quality required by European ink manufacturers, as they do not seem to have the know-how for the production of printing ink grades yet.[199] This is reflected in the modest imports of Chinese TiO_2 into Europe, in particular with regard to printing ink grades.

(166) As shown in Table 2, in 2008 and 2009, Chinese imports of overall TiO_2 to the EEA were very modest, representing around […]*% of the EEA's overall annual demand (amounting to […]* to […]* kt). In 2010 and 2011, the Chinese imports of overall TiO_2 increased to […]*% ([…]* kt) and further to […]*% ([…]* kt) of the EEA's

191 Form CO, paragraph 259 and Huntsman, Annex 1 of_reply_to_RFI No 29 of 13 May 2014.

192 As stated in recital (32) above, no new sulphate-based capacity was added in the European Union during the last decade.

193 Huntsman's internal document, *Docs responsive to questions 3 and 4*, 30 April 2014.

194 Form CO, paragraph 259 and Huntsman, Annex 140606 of reply to the RFI No 13 of 26 February 2014.

195 Form CO, paragraphs 146 and 149.

196 Form CO, paragraph 334.

197 See responses to question 21 of questionnaires "Q1 - Questionnaire for Customers Titanium Dioxide Phase I" and "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II".

198 See section 6.1.1.

199 Agreed minutes of conference call with […]* of 19 November 2013, paragraph 4-5 [ID 2219].

overall TiO_2 demand. In 2012, however, the Chinese share in EEA's TiO_2 imports decreased again to […]*% ([…]* kt).[200]

Table 2 - Chinese imports of overall TiO_2 to the EEA

2008		2009		2010		2011		2012	
kt	%	kt	%	kt	%	kt	%	kt	%
[…]*	[0-5]*	[…]*	[0-5]*	[…]*	[5-10]*	[…]*	[5-10]*	[…]*	[5-10]*

Source: Form CO, paragraph 259.

(167) Internal assessments by the Notifying Party of Chinese exports confirm this observation. Following a period of growth since 2008, reaching a peak in 2011, Chinese exports to Europe began to decrease. This decrease continued during the first half of 2013.[201]

(168) Therefore, the Commission takes the view that import duties and transport costs do not explain the limited imports of TiO_2 from China to the EEA.

6.2.2. TiO_2 for printing ink applications trade flows

(169) With regard to trade flows of TiO_2 by application, the Notifying Party estimates the following development of Chinese imports:

Table 3 - Chinese imports of TiO_2 in the EEA by application

Chinese Imports to the EEA by Application									
Application	2010			2011			2012		
	China Imports to EEA (kt)	%	Total EEA Application Demand (kt)	China Imports to EEA (kt)	%	Total EEA Application Demand (kt)	China Imports to EEA (kt)	%	Total EEA Application Demand (kt)
Coatings (incl. Inks)	[…]	[5-10]	[…]	[…]	[5-10]	[…]	[…]	[5-10]	[…]
Inks	[…]	[0-5]	[…]	[…]	[0-5]	[…]	[…]	[0-5]	[…]
Plastics	[…]	[0-5]	[…]	[…]	[5-10]	[…]	[…]	[0-5]	[…]
CPF	[…]	[10-20]	[…]	[…]	[10-20]	[…]	[…]	[10-20]	[…]
Other	[…]	N/A	[…]	[…]	N/A	[…]	[…]	N/A	[…]
Total TiO2	[…]	[5-10]	[…]	[…]	[5-10]	[…]	[…]	[5-10]	[…]

Source: Form CO, paragraph 259.

(170) In 2010, the EEA imported […]* kt of Chinese TiO_2 for printing ink, representing [0-5]* % of EEA demand ([…]* kt). In 2011, the imported volume of TiO_2 for printing ink increased to […]* kt ([0-5]*% of EEA demand of […]* kt). In 2012, the imported amount remained at […]* kt ([0-5]*% of EEA demand of […]* kt).[202] This is consistent with statements of several customers, namely that they tested numerous Chinese samples, in particular during the TiO_2 shortage in 2010-2012, but without success.[203]

(171) The evidence collected through market investigation indicates that the printing ink manufacturers active in the EEA purchase TiO_2 predominantly in the EEA. This includes the four largest TiO_2 customers for printing ink in the EEA, namely [...]*,

200 Form CO, paragraph 259.

201 Huntsman's internal document, […]*, *Analysis of Chinese Imports and Exports, Data to end July 2013*, 23 January 2013.

202 Form CO, paragraph 259.

203 Agreed minutes of conference call with […]* of 2 June 2014, paragraph 9 [ID 2293].

[...]*, [...]* and [...]*.[204] Other printing ink manufacturers import only small amounts of TiO_2 into the EEA.[205]

(172) While imports of Chinese printing ink grades in the USA are higher, they are still rather limited in absolute figures and remained constant: between 2010 and 2012, the USA imported […]* kt per year from China of TiO_2 printing ink grades. Since the demand for TiO_2 printing ink grades is lower in North America (2012: […]* kt[206]) than in the EEA (2012: […]* kt) and declined during 2010 to 2012, the Chinese import share represented [10-20]*% of the USA demand.[207]

6.2.3. Independent industry sources and Parties' internal documents report on TiO_2 regionally

(173) According to independent industry sources the TiO_2 market in general is divided in three main regions: Europe/Middle East/Africa (EMEA), the Americas and Asia/Pacific.

(174) ICIS, a global market intelligence provider for the chemical, energy and fertilizer industries, has tracked TiO_2 prices for 15 years, and it collects and publishes TiO_2 prices of three regions: Europe, Asia and Northern America.[208] Although TiO_2 prices tend to follow the same drivers and have similar volatility, there are differences between the prices in the three world regions. Overall price differences depend on supply/demand dynamics in a given region. The production process does not play a significant role, since price differences can occur in regions where the same process is used: "*TiO_2 prices in different regions are fairly independent and there are little arbitrage opportunities. There is some global interaction but it is not the main driver. The TiO_2 market is not a global commoditized market like petrochemicals.*"[209]

(175) Likewise, the Titanium Dioxide Manufacturers Association ("TDMA") distinguishes three main regions for its global statistics program[210] and the Parties themselves regularly refer in their internal documents to those three regions.[211]

6.2.4. The demand characteristics and the competitive landscape in the TiO_2 for printing ink applications differ across the world regions

(176) In Asia, despite some high quality imports from Western suppliers (Huntsman and Sachtleben), local Chinese suppliers have the largest market share as the lower quality TiO_2 is sold in China and in other Asian countries where it is fit for printing ink applications.[212]

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204 [...]*, response to questions 21 and 21.1 of questionnaire "Q7 - Questionnaire for Customers - TiO2 for Printing Ink - Phase II" [ID 2307] and [...]*, response to question 21 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I". See responses to question 21 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II".

205 See responses to question 21 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II".

206 Sachtleben's internal document, *Printing Inks Strategy*, Duisburg 24 October 2012, page 7 [ID 00247-00891].

207 Form CO, paragraph 259.

208 Agreed minutes of conference call with ICIS of 23 January 2014, paragraph 3, [ID 1375].

209 Agreed minutes of conference call with ICIS of 23 January 2014, paragraph 10, [ID 1375].

210 Sachtleben's internal document, *TDMA: TiO_2 Statistics program definitions and reporting procedures 2013*, 06 May 2014.

211 Sachtleben's internal document, […]*, Duisburg, Germany, 4 December 2013, page 5 and Huntsman's internal document, […]*.

212 Huntsman's internal document, […]*.

(177) In North America, the overall demand for TiO_2 for printing ink is smaller than in the EEA.[213] In North America 80% of packaging printing is done by flexographic printing, which can more easily adapt to more abrasive chloride-based inks.[214] In view of the dominant domestic production technology, chloride-based suppliers are more present as compared to Europe where only limited amounts of chloride-based TiO_2 is sold for printing ink applications.[215]

(178) In the EEA, contrary to North America, rotogravure printing is the dominant printing technique for packaging printing (60-70% share versus 30-40% for flexographic printing).[216] The rotogravure technique is more sensitive to abrasive ink pigments and therefore not adapted for chloride-based grades. Ink manufacturers which are active in the EEA consequently prefer low-abrasive, sulphate base grades.[217]

(179) Furthermore, for packaging printing which is the predominant application of TiO_2 for printing ink, lamination/reverse printing is more common in North America while in the EEA surface printing is used more. Given that lamination/reverse printing technology is less sensitive to gloss, there is a higher share of Chinese suppliers to North America than to the EEA.[218]

(180) Finally, due to regionally different ink formulations caused by different printing techniques, the same TiO_2 grade has to be tested and technically approved by all regional test laboratories of an ink manufacturer and it may be that a grade is suitable in the USA while it would not perform well in Europe. [219] Indeed, the fact that the USA printing ink demand characteristics are very different from the market in the Union was also confirmed by [...]*'s legal counsel explaining, on behalf of [...]*, that *"the market for TiO_2 in the US is different from Europe, the inks [...]* manufactures in the US are different and the substrates that [...]*'s customers use are different as well. TiO_2 that [...]* buys in Europe (including possible future purchases from Chinese suppliers) can therefore not be used in the US and vice versa. That's why [...]* has a separate category leader in the US for TiO_2."*[220]

(181) Therefore, the Commission takes the view that the regional markets for TiO_2 are different for reasons of different printing techniques used.

6.2.5. Negotiations between suppliers and printing ink manufacturers have regional scope

(182) According to the responses to the market investigation, price negotiations take place on a regional basis.[221] This holds true even for the large printing ink manufacturers, which are active in several world regions: usually they have framework agreements on a global level while the main negotiations and the price setting takes place at a regional level. Indeed, [...]* explained that "*[...]*'s prices are negotiated separately for each region, and [...]*'s purchasers share their regional pricing information*

213 Sachtleben's internal document, […]*, Duisburg, Germany, 4 December 2013, page 5.

214 Sachtleben's internal document, *Printing Ink Customers Table*, 06 May 2014.

215 See section 7.3.1.

216 Agreed minutes of conference call with […]* of 2 June 2014, paragraph 3 [ID 2293].

217 See responses to questions 7 and 10 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II".

218 Agreed minutes of conference call with […]* of 22 May 2014, paragraph 25 [ID 2219].

219 Agreed minutes of conference call with […]* of 2 June 2014, paragraph 12 [ID 2293].

220 E-mail of […]* (legal counsel for […]*) to […]* of the Commission of 27 June 2014, [ID 2371].

221 See responses to question 26 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I".

internally" [222] and "*[i]nvoiced prices negotiated regionally i.e. Americas, Europe and Asia Pacific*".[223] […]*.[224] […]*.[225]

(183) In addition, TiO_2 suppliers announce their price increases on a regional basis. For instance, Sachtleben […]*.[226] Similarly, an internal Sachtleben document […]*.[227] Finally, during an antitrust case which was pursued in the USA against several TiO_2 suppliers, Huntsman commented on regional price increases as follows: "*[i]t is admitted that Huntsman's intended price increases are frequently made worldwide with regional announcements made within a short period of one another or even simultaneously. The amounts of the increases per region are not necessarily the same, however. It is denied that USA prices are a benchmark for Huntsman prices elsewhere.*"[228]

(184) Rebates are usually granted […]*. For instance, […]*.[229] The regional rebate schemes are reflected […]*[230,231][…]* in the evidence collected through market investigation. [232] […]*.[233]

(185) […]*.[234]

(186) […]*.[235]

(187) Finally, the Parties' sales force is accordingly organised from global to regional level ensuring representation in all regions of customer activity.[236,237] This is confirmed by the Notifying Party's organisation chart[238] and the following statement: "*The Pigments Division 's TiO_2 sales and marketing organization is divided into four regions: (i) Europe, (ii) North America, (iii) Asia-Pacific and (iv) Africa, Latin America and Middle East. Each region is managed by a Regional Sales Director, supported by Area Sales Managers.*"[239]

(188) Therefore, the Commission takes the view that prices and conditions of the TiO_2 supply are established on a regional level rather than on a global level.

6.2.6. Price levels differ across geographic regions

(189) The price levels for overall TiO_2 vary among world regions and do not necessarily follow the same patterns. TZMI observes that "*[a]lthough there is a substantial*

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222 Agreed minutes of conference call with […]* of 2 June 2014, paragraph 28 [ID 2293].

223 Sachtleben's internal document *Liquid Inks Raw Material Strategy Workshop TiO_2 Review*, 11 February 2013, page 21.

224 Huntsman's internal document […]*, 22 January 2012, page 1.

225 Sachtleben's internal document […]*, 29 August 2011, page 1. [ID 00247-00794].

226 Sachtleben's internal document, […]*, 6 September 2011, page 1.

227 Sachtleben's internal document, […]*, 6 June 2011, page 4.

228 Huntsman's internal document, *United States District Court District Of Maryland, Case No.: lO-cv-00318-RDB*, page 33.

229 Huntsman's internal document, […]*, 12 March 2012, page 1.

230 Sachtleben's internal document, […]*, 17 December 2013.

231 Huntsman's internal document, […]*, 17 January 2014.

232 See responses to questions 25, 25.1., 26 and 26.1 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II".

233 Huntsman's internal document, […]*, 17 January 2014.

234 Sachtleben's internal document, […]*,17 December 2013, page 1.

235 Sachtleben's internal document, [...]* page 1.

236 Huntsman's internal document, […]*, 17 January 2014.

237 Sachtleben's internal document, *Organigramme: Division Functional Segments*, 06 May 2014.

238 Huntsman, Annex 01 of reply to the RFI No 14 of 11 March 2014, page 6.

239 Huntsman, Annex 06 of reply to the RFI No 14 of 11 March 2014, page 4.

amount of international trade in TiO_2, with approximately 60% of the world's output by value now crossing international borders to reach end use customers, there remain significant regional variations in TiO_2 prices. Moreover, the regional price differentials change over time. For example, there is no fixed relationship between TiO_2 prices in, for example, North America and Asia-Pacific, although historically prices in Asia-Pacific markets have been lower than in North America."[240] Kronos explained that TiO_2 prices are regional: "*[t]here are regional price differences, but this is not specific to ink. The variations are consistent for all end use markets.*"[241] Indeed, Kronos itself announces regional price increases: "*[e]ffective March 1, 2013, or as permitted by contract, prices for all Kronos(R) titanium dioxide products sold in Western Europe and Turkey will be increased by a minimum of 200 Euro per metric ton (or equivalent in other currencies).*"[242]

(190) [Pricing of printing inks grades across regions]*.

Table 4 - Prices paid by […]* **to Huntsman in different regions in 2013**

[…]*

Source: Huntsman's internal document, […]*, page 45.

(191) However, the Transaction Data covering the period of 2006-2013 also indicates that there are […]* differences in prices of various grades across regions even if transport costs are controlled for. Figure 6 below illustrates monthly average prices (net of transport costs) of Huntsman's ink grade TR52 across four geographic regions (Europe, NAFTA, ALM and APAC).[243,244]

240 Huntsman's internal document, *TZMI: Pigment price forecast, Q3/2010*, November 2010, page 21.

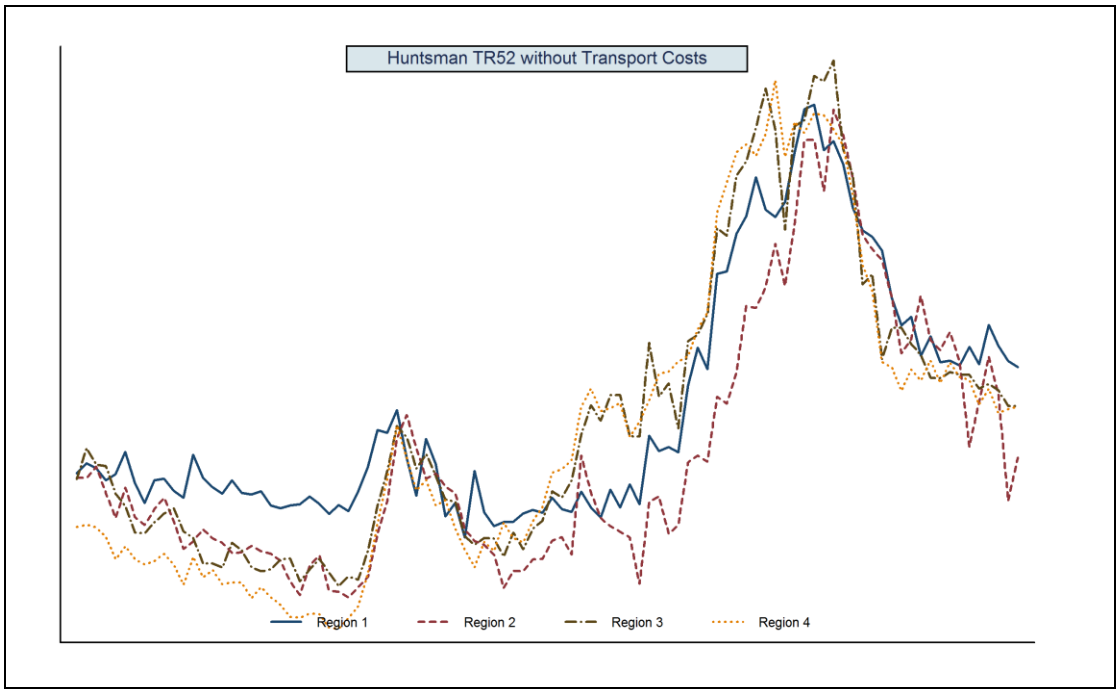
241 Kronos, response to question 24.2 of questionnaire "Q10 - Questionnaire For Competitors - TiO_2 - Phase II" [ID 2077].

242 Reuters Press Release, *Kronos Worldwide, INC. announces a price increase for all Titanium Dioxide products sold in Europe*, 18 February 2013, available at: http://www.reuters.com/article/2013/02/18/idUSnHUG6D3Qpa+1d4+ONE20130218 , visited on 03 July 2014.

243 Net of transport costs prices are the prices that the suppliers receive in reality after they take care of transport costs, and are the adequate measures to compare the opportunity costs of selling in various regions.

244 NAFTA includes Canada, Mexico and the USA (North American Free Trade Agreement), ALM includes Africa and Latin America, APAC includes Asia-Pacific.

Figure 6 - TR52 price evolution across geographic regions



Source: Transaction data provided by the Notifying Party.

(192) Figure 6 indicates that […]* difference in prices (net of transport costs) can occur across geographic regions […]*. For instance, monthly average prices for grade […]*, and monthly average prices for the same grade in […]*. [245]

(193) Therefore, the Commission takes the view that different world regions have different price dynamics.

6.2.7. Geographic proximity of suppliers plays a role for customers

(194) The evidence collected through market investigation indicates that several ink manufacturers (including one large ink manufacturer) prefer their TiO_2 supplier to be situated in the same region to ensure a shorter lead time during supply and to have local technical service.[246,247]

(195) Larger ink manufacturers do not usually emphasise geographic proximity of their TiO_2 supplier, as a global presence of their TiO_2 supplier is more important for them. Both smaller and larger ink manufacturers confirm that the lead time for Chinese TiO_2 is significantly longer than for TiO_2 purchased in the EEA. [248, 249]

(196) Therefore, the Commission takes the view that lead time of supply and geographic proximity to suppliers is particularly important for small and medium sized TiO_2 purchasers.

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245 The Transaction data indicate that price of […]*. For example, monthly average prices for […]*.

246 See responses to question 21 of the questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II".

247 See responses to questions 21, 30, 35 of the questionnaire ""Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II".

248 See responses to questions 78 and 79 of the questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II".

249 See responses to questions 21, 30, 35 of the questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I".

6.2.8. Conclusion on geographic market definition

(197) In light of the above, the Commission takes the view that the geographic market for TiO_2 for printing ink applications is EEA-wide.

6.3. Competitive assessment

6.3.1. Notifying Party's views

(198) Throughout the present proceedings, the Notifying Party has submitted that the market for TiO_2 for printing ink applications is competitive, that today and post-merger the Parties will face competitive pressure from both chloride and other sulphate suppliers, and in particular from Chinese TiO_2 suppliers who have ample sulphate-based capacity.[250]

(199) The Notifying Party submitted that the market for TiO_2 in general and for TiO_2 for printing ink applications in particular is characterised by the ease of entry and expansion.[251] Accordingly, the Notifying Party argued that no significant investments in capacity would be required, since the market, in particular the sulphate-based market, is characterised by substantial over-capacity.[252] The supposedly high degree of supply-side substitutability would in any event make it easy for TiO_2 suppliers to counter any capacity constraint by enabling them to switch volumes to the production of TiO_2 for printing ink applications.[253] It would therefore be easy and attractive for any sulphate-based manufacturer to enter or expand in the market for TiO_2 for printing ink applications

(200) The Notifying Party indicated in its response to the Statement of Objections that Chinese suppliers in particular would be able to constrain the merged entity in a timely manner[254] and that Kronos would be able to defeat any hypothetical price increase.[255]

(201) The Notifying Party also considers that customers face low barriers to switching[256] and that major customers have a significant buying power.[257]

6.3.2. Framework of analysis

(202) Under Article 2(2) and (3) of the Merger Regulation, the Commission must assess whether a proposed concentration would significantly impede effective competition in the internal market or in a substantial part of it, in particular through the creation or strengthening of a dominant position.

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250 Form CO, paragraphs 178 ff , 326, 330, 332-334, Notifying Party's response to the decision opening the proceedings, paragraphs 5, 76-77, 104 ff.

251 Form CO, paragraph 327, Notifying Party's response to the decision opening the proceedings, paragraphs 5, 76-77, 83ff, Notifying's response to the Statement of Objections, paragraphs 93 ff.

252 Notifying Party's response to the decision opening the proceedings, paragraphs 5 and 101, Notifying Party's response to the Statement of Objections, paragraphs 93 ff.

253 Form CO, paragraph 327, Notifying Party's response to the decision opening the proceedings, paragraphs 5, 76-77, 83 ff, Notifying's response to the Statement of Objections, paragraphs 93 ff.

254 Notifying's response to the Statement of Objections, paragraphs 150 ff.

255 Notifying's response to the Statement of Objections, paragraphs 271 ff.

256 Form CO, paragraph 331, Notifying Party's response to the decision opening the proceedings, paragraphs 5, 76-77, 78 ff.

257 Form CO, paragraphs 264, 324 and 331, Notifying Party's response to the decision opening the proceedings, paragraphs 76-77 and 114, Notifying's response to the Statement of Objections, paragraphs 314 ff.

(203) The Merger Regulation recognises that in oligopolistic markets, it is all the more necessary to maintain effective competition.[258] This is in view of the more significant consequences that mergers may have on such markets. For this reason, the Merger Regulation provides that under certain circumstances, concentrations involving, first, the elimination of important constraints that the parties had exerted on each other, and, second, a reduction of competitive pressure on the remaining competitors, may result in a significant impediment to effective competition, even in the absence of a likelihood of coordination between the members of an oligopoly.[259]

(204) The Horizontal Merger Guidelines[260] distinguish between two main ways in which mergers between actual or potential competitors on the same relevant market may significantly impede effective competition, namely non-coordinated and coordinated effects. Non-coordinated effects may significantly impede effective competition in a market by removing important competitive constraints on one or more sellers, who consequently have increased market power. The most direct effect of the merger will be the loss of competition between the merging firms. For example, if prior to the merger one of the merging firms had raised its price, it would have lost some sales to the other merging firm. The merger removes this particular constraint. Non-merging firms in the same market can also benefit from the reduction of competitive pressure which results from the merger, since the merging firms' price increase may switch some demand to the rival firms, which in turn, may find it profitable to increase their prices. The reduction in these competitive constraints could lead to significant price increases in the relevant market.[261]

(205) The Horizontal Merger Guidelines list a number of factors, which taken separately are not necessarily decisive, but which may influence whether significant non-coordinated effects are likely to result from a merger, such as the large market shares of the merging firms, the fact that the merging firms are close competitors, the limited possibilities for customers to switch suppliers, or the fact that the merger would eliminate an important competitive force. Not all these factors need to be present for such effects to be likely, and the list is not exhaustive.[262]

(206) The conclusions of the investigation are that the Transaction would lead to a significant increase in market power by combining two entities already holding significant market shares and creating a dominant player (see section 6.3.3).[263] Indeed, the analysis of the current competitive conditions on the EEA market for TiO_2 for printing ink applications shows that the merger would eliminate competition between close competitors (see section 6.3.5)[264] in a market with few alternative suppliers (section 6.3.6 focuses on Kronos, section 6.3.7 on Chinese suppliers, and sections 6.3.8, 6.3.9 and 6.3.10 on the other TiO_2 suppliers),[265] without customers having meaningful possibilities to switch away from the merged entity to other suppliers (see section 6.3.4),[266] and in a market characterised by high barriers to

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258 Recital 25 of the Merger Regulation.

259 Recital 25 of the Merger Regulation.

260 Commission's Guidelines on the assessment of horizontal mergers under the Council Regulation on the control of concentrations between undertakings ("Horizontal Merger Guidelines"), OJ C 31, 5 February 2004.

261 Horizontal Merger Guidelines, paragraphs 22, 24 and 25.

262 Horizontal Merger Guidelines, paragraphs 26-38.

263 Horizontal Merger Guidelines, paragraph 27.

264 Horizontal Merger Guidelines, paragraph 28.

265 Horizontal Merger Guidelines, paragraph 31.

266 Horizontal Merger Guidelines, paragraph 31.

entry (see section 6.3.11).[267] From a dynamic perspective, Kronos and other non-Chinese suppliers are unlikely to have the ability and incentive to exert a sufficient competitive constraint on the merged entity (see sections 6.3.12.3, 6.3.12.4 and 6.3.12.5). As regards Chinese suppliers, even if they were to have the ability and incentive to enter the EEA market, it is unlikely that their entry will be sufficiently swift and sustainable to deter or defeat the exercise of market power by the newly-created dominant undertaking to deter or defeat the anti-competitive effects of the merger (see section 6.3.12.6).[268] As a result, post-merger, the merged entity would be in a position to increase prices. It could in particular price discriminate between customers (see section 6.3.12.7). Furthermore, even if the merged entity were to lose some volumes to its competitors having the relevant know-how, it may still consider it profitable (see section 6.3.12.8) or even have an incentive to reduce output below the pre-merger levels, e.g. through a plant closure, thereby raising market prices (see section 6.3.12.9).[269]

6.3.3. Structure of supply

6.3.3.1. Capacity

(207) In terms of capacity, the merged entity will become the largest sulphate-based TiO_2 supplier globally, with eight plants totalling 677 kt of capacity:

(a) Sachtleben has two plants in Germany (Duisburg and Uerdingen, respectively 100 kt and 107 kt) and one in Finland (Pori, 130 kt); and

(b) Huntsman has one plant in France (Calais, 95 kt), one in Spain (Huelva, 80 kt), one in Italy (Scarlino, 80 kt), one in Malaysia (Teluk Kalung, 60 kt) and one in South Africa (Umbogintwini, 25 kt).

(208) The other suppliers, including suppliers located in China, will remain far behind. Specifically, apart from the Parties, only the following suppliers have sulphate-based capacity over 100 kt, namely two Chinese suppliers (Sichuan Lomon Corporation – "Sichuan Lomon", ca. 200 kt, and Shandong Doguide Group - "Shandong Doguide" Co. Ltd., c.a. 160 kt), and Kronos which has four sulphate-based plants totalling 146 kt.[270] The rest of the sulphate-based TiO_2 capacity is fragmented and held mostly by small-scale Chinese suppliers, as well as by small players in Eastern Europe (64 kt in Slovenia held by Cinkarna, 50 kt in the Czech Republic held by Precheza, 42 kt in Poland held by Police, 110 kt in Ukraine held by Crimea Titan PJSC ("Crimea Titan"), 50 kt in Ukraine held by PJSC Sumykhimprom ("Sumykhimprom")). Japanese suppliers (60 kt held by each Ishihara Sangyo Kaisha, Ltd. ("ISK"), Sakai Chemical Industry Co., Ltd. ("Sakai") and Tayca Corporation – ("Tayca")) and Korean suppliers (60 kt held by Cosmo Chemical Corporation, Ltd. ("Cosmo")) suppliers have also limited sulphate-based capacity.[271]

(209) Last, some of the largest TiO_2 suppliers only have chloride-based capacity, such as DuPont (1,160 kt) or Tronox (430 kt).[272]

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267 Horizontal Merger Guidelines, paragraphs 70 and 71.

268 Horizontal Merger Guidelines, paragraphs 74-75.

269 Horizontal Merger Guidelines, paragraph 32.

270 Form CO, paragraph 215 and Annex 11 of the Form CO. Kronos has four plants: two in Germany (Leverkusen and Nordenham), one in Norway (Frederikstad) and one in Canada (Varennes).

271 Form CO, paragraph 215 and Annex 11 of the Form CO.

272 Form CO, paragraph 215 and Annex 11 of the Form CO.

(210) In its reply to the Statement of Objections, the Notifying Party indicates that "*the TiO_2 industry has been operating at below its installed capacity for most of the last two decades*"[273] and that "*global capacity in the TiO_2 industry is still expected to grow in the coming years*".[274] The Commission does not contest that there is overcapacity in the overall TiO_2 industry, and that capacity is not the main barrier to entry or expansion in the EEA market for TiO_2 for printing ink applications. Nonetheless, as will be shown in section 6.3.11, this market is still characterized by high barriers to entry, the most important of which being the know-how characterizing TiO_2 grades for printing ink applications (as evidenced for example in sections 6.3.7, 6.3.8 and 6.3.10).

6.3.3.2. Sales of TiO_2 for printing ink applications in the EEA

(211) In terms of sales, the market for TiO_2 for printing ink applications in the EEA is even more concentrated than the capacity figures indicate. Given the limited imports of TiO_2 for printing ink applications in the EEA[275] and the fact that part of the competitors' capacity is used for anatase or other specific applications such as cosmetics, pharmaceuticals and food, the Parties' market shares based on sales are particularly high. As Table 5 below shows, Sachtleben and Huntsman, the two market leaders, together controlled [70-80]*% of the market in 2013, followed by Kronos ([10-20]*%). All the remaining suppliers sell marginal volumes (less than [0-5]*% individually, Chinese suppliers accounting for [0-5]*% all together).[276]

Table 5 - TiO_2 for printing ink applications, 2010-2013, EEA market shares (volume, % of sales)

Printing inks	EEA							
	2010		2011		2012		2013	
Huntsman	[…]* kt	[30-40]* %		[30-40]* %	[…]* kt	[30-40]* %	[…]* kt	[30-40]* %
Sachtleben	[…]* kt	[40-50]* %		[30-40]* %	[…]* kt	[30-40]* %	[…]* kt	[30-40]* %
Combined	[…]* kt	[70-80]* %	[…]* kt	[70-80]* %	[…]* kt	[70-80]* %	[…]* kt	[70-80]* %
Kronos	[…]* kt	[10-20]* %	[…]* kt	[10-20]* %	[…]* kt	[5-10]* %	[…]* kt	[10-20]* %
Police	[…]* kt	[0-5]* %	[…]* kt	[0-5]* %	[…]* kt	[0-5]* %	[…]* kt	[0-5]* %
Cristal	[…]* kt	[0-5]* %	[…]* kt	[0-5]* %	[…]* kt	[0-5]* %	[…]* kt	[0-5]* %
DuPont	[…]* kt	[0-5]* %	[…]* kt	[0-5]* %	[…]* kt	[0-5]* %	[…]* kt	[0-5]* %
Tronox	[…]* kt	[0-5]* %	[…]* kt	[0-5]* %	[…]* kt	[0-5]* %	[…]* kt	[0-5]* %

273 Notifying Party's response to the Statement of Objections, paragraph 99.
274 Notifying Party's response to the Statement of Objections, paragraph 109.
275 See section 6.2.1.3.
276 Huntsman, reply to the RFI No 3 of 12 November 2013.

Cinkarna	[…]* kt	[0-5]* %	[…]* kt	[0-5]* %	[…]* kt	[0-5]* %	[…]* kt	[0-5]* %
Precheza	[…]* kt	[0-5]* %	[…]* kt	[0-5]* %	[…]* kt	[0-5]* %	[…]* kt	[0-5]* %
ISK	[…]* kt	[0-5]* %	[…]* kt	[0-5]* %	[…]* kt	[0-5]* %	[…]* kt	[0-5]* %
Total Chinese	[…]* kt	[0-5]* %	[…]* kt	[0-5]* %	[…]* kt	[0-5]* %	[…]* kt	[0-5]* %
Total Ukraine	[…]* kt	[0-5]* %	[…]* kt	[0-5]* %	[…]* kt	[0-5]* %	[…]* kt	[0-5]* %
Cosmo (Korea)			[…]* kt	[0-5]* %			[…]* kt	[0-5]* %
Sakai/Tayca	[…]* kt	[0-5]* %	[…]* kt	[0-5]* %	[…]* kt	[0-5]* %	[…]* kt	[0-5]* %
Total India			[…]* kt	[0-5]* %		[0-5]* %	[…]* kt	[0-5]* %
TOTAL	**41** kt		**43** kt		**40** kt		**42 kt**	

Source: Form CO; Huntsman, Reply to RFI of 26 February 2014.

6.3.4. Structure of the demand and purchasing patterns

(212) On the demand-side the market is also concentrated, with the top 3 customers representing 60-65% of the EEA market ([...]*: around 30%, [...]*: around 15-20%, [...]*: around 15-20%)[277] and 70-75% of the Parties' sales to the EEA market for TiO_2 for printing ink applications.[278]

(213) Customer demand in the EEA market for TiO_2 for printing ink applications is characterised by multisourcing.[279] The reason for multisourcing mainly lies in the necessity to ensure the security of supply given that TiO_2 is one of the main inputs for the production of printing ink.[280] One respondent mentioned in the market investigation that "*from risk management perspective, multisourcing is always preferred*",[281] another indicated that this is necessary to face "*force majeure announcements*".[282] Multisourcing is also a way to secure competitive prices.[283]

(214) On average, EEA printing ink manufacturers have two to three approved TiO_2 grades from different suppliers for a given printing ink formulation.[284] For example, one of the main common customers of the Parties has its supplier portfolio structured as follows: one major supplier from which they source more than half of their

277 Form CO, paragraph 331; Sachtleben's internal document, *SCM Pori*: *Presentation of main customers*, 2012, pages 2, 6 and 13.

278 According to the Commission's computation.

279 See responses to questions 35 and 39 of questionnaire "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II".

280 Sachtleben's internal document, […]*, 24 October 2012, page 14 ("*TiO_2 raw material cost in white ink is average* [40-50]*%") and page 18 ("*TiO_2 is a major cost factor in white inks manufacturing*").

281 Agreed minutes of conference call with [...]* on 22 May 2014, paragraph 14 [ID 2219].

282 [...]*, response to question 35 of questionnaire "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II" [ID 2310].

283 See responses to question 35 of questionnaire "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II".

284 See responses to question 39 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II".

purchases, and generally two challengers representing 20% and 10% of their purchases: "*Their tactic (strategy) is short term business arrangements where they change their major supplier (normally 50-70 % business share) on half year basis. Further they like to give for the challengers 20 % and 10 % shares. The first half of this year Huntsman was their major supplier. In latter part of this year we came to be their biggest supplier.*"[285]

(215) In terms of the supplier selection criteria, customers consider that quality, price and reliability of supply are the most important criteria when they select a TiO_2 supplier.[286] Although the brand as such is not an important criterion for customers when they select a TiO_2 supplier, it can be an indicator of quality level and quality consistency.[287]

(216) The TiO_2 grade approval process is relatively standard across the industry. Once a potentially suitable supplier/grade has been identified and the technical data sheet approved there is usually a first-stage laboratory test in the ink manufacturers' laboratories, and once laboratory tests generate successful results, the second stage is the production or industrial trials. During these trials, larger ink volumes are produced, tested and sent to customers for their own trials and validation.[288]

(217) However, qualifying a new printing ink grade is a delicate process and often yields unsuccessful results. In this context one customer explained that "*[q]*ualifying a new grade is a complex and time-consuming process: entails laboratory testing with numerous samples (grinding, milling etc.), trials within captive formulations, trials in application technology i.e. testing with customers' formulations, verifying compliance with HSE (Health, Safety, Environment), PSR (Product Safety & Regulatory) and REACH regulations, checks through production of bigger quantities and print trials. This process can therefore take a few months*".[289]

(218) Beyond the initial process (supplier identification if needed, submission of technical data and regulatory approvals such as REACH compliance), the whole testing part from laboratory trials to customer approval takes, according to respondents to the market investigation, between 3 months and 1 year, and around 6 months on average.[290] By way of example, another large ink customer which introduced Sachtleben's grade RDO, a development of RDI-S, in its portfolio in September 2013 indicated that it took one and a half years to approve this grade, although RDI-S had already been developed more than 30 years ago:[291] "*[t]he global process of qualification of a new Sachleben titanium we are using now together with the Huntsmann grade was 1 year and 6 months long starting from the first samples received and tested in our lab. and step by step, following the Supplier adjustments,*

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285 Sachtleben's internal document, *SCM Pori*: *Presentation of main customers*, 2012, page 13.

286 See responses to questions 32 and 78 of questionnaire "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II"; see also responses to questions 35 of questionnaire ""Q1 - Questionnaire for Customers Titanium Dioxide Phase I".

287 See responses to question 29 of questionnaire "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II".

288 See responses to question 33 of questionnaire "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II".

289 [...]*, response to question 33 of "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II" [ID 1982].

290 See responses to question 33 of questionnaire "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II".

291 Sachtleben, reply to the RFI No 21 of 18 March 2014, pages 7-9.

till the final production trials and Customers approval".[292] Nevertheless, the duration of this testing phase, in particular at the laboratory stage, highly depends on the readiness/quality of the grade and the scope of any necessary additional adjustments.

(219) While the laboratory testing at the laboratories seems to be the most challenging part of the process,[293] some customers highlighted the fact that there is an appreciable risk even after the laboratory approval,[294] as issues such as customer acceptance of the technical characteristics (opacity, gloss, viscosity, adhesion, stability, abrasion, etc.) and the behaviour of the grade in the different ink applications and solvents still need to be verified.[295] In addition, an important element is the consistency of the sample and the replication of the performance of the grade in industrial production conditions.

6.3.5. Huntsman and Sachtleben are close competitors in the EEA market for TiO_2 for printing ink applications

(220) In the EEA market for TiO_2 for printing ink applications Huntsman and Sachtleben are market leaders holding respectively [30-40]*% and [30-40]*% market shares in 2013 (according to the volume of sales). They are distantly followed by the number three supplier, Kronos ([10-20]*%). They are the only two TiO_2 suppliers, apart from Kronos, which specifically address the market for TiO_2 for printing ink applications in the EEA. Both of them market grades that are designed to fit the technical specifications of ink manufacturers. Other sulphate-based TiO_2 suppliers do not have dedicated grades for the ink manufacturers although they may make some opportunistic sales of their grades mainly used in other applications to the ink manufacturers. However, such sales would only be minimal and only used in some specific ink applications.[296]

(221) This structural leadership of Huntsman and Sachtleben reflects their technical and commercial advantage in the market for TiO_2 for printing ink applications compared to other sulphate-based TiO_2 suppliers. Their leading position and closeness of competition in this market have been extensively confirmed by the information the Commission obtained in its market investigation, as well as by the analysis of the Parties' internal documents.

6.3.5.1. Huntsman and Sachtleben are market leaders and close competitors

(222) The leadership of Huntsman and Sachtleben is first reflected in the size of their market shares. Second, it is widely recognised in the industry that Sachtleben and Huntsman have the two leading TiO_2 grades for this application, namely RDI-S and

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292 […]*, response to question 33 of "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II", [ID 2334].

293 Agreed minutes of conference call with […]* of 2 June 2014, paragraph 16, [ID 2293].

294 Agreed minutes of conference call with […]* of 18 June 2014, paragraph 17 [ID 2581].

295 See responses to question 33 of questionnaire "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II"; responses to question 66 of questionnaire ""Q1 - Questionnaire For Customers Titanium Dioxide- Phase I."; agreed minutes of conference call with […]* of 21 March 2014, paragraphs 13-15 [ID 2271]; agreed minutes of conference call with […]* of 2 June 2014, paragraph 14-16 [ID 2293]; agreed minutes of a conference call with [...]* of 19 November 2013, paragraph 15, [ID 1351].

296 Agreed minutes of conference call with Cinkarna on 8 April 2014, paragraph 2, [ID 2022] "*Cinkarna delivered small quantities of the grade RC813 to certain customers. […]* Currently, Cinkarna does not offer grades to printing ink producers.*"; Grupa Azotv Zakladv Chemiczne Police, response to question 29 of questionnaire "Q10 - Questionnaire For Competitors - TiO_2 For Printing Ink - Phase II": "*Our knowledge and presence on the ink market is very limited.*" [ID 2080]; See responses to questions 1 and 3 of questionnaire "Q10 - Questionnaire For Competitors – TiO_2 For Printing Ink - Phase II".

TR52, followed by Kronos' grade 2064. Indeed, during the market investigation, most EEA ink manufacturers mentioned Sachtleben, Huntsman and/or Kronos as the 3 largest TiO_2 suppliers for printing ink applications. Only a small minority of respondents mentioned other suppliers as being significantly active in the market.[297] Huntsman was clearly mentioned as Sachtleben's closest competitor and vice-versa.[298]

(223) In addition, they are both global players, supplying TiO_2 for printing ink applications worldwide.[299] All the other TiO_2 suppliers, apart from Kronos to a certain extent, lag behind both in terms of customer recognition and global positioning.[300] Both are based in Europe, have been working in the European market for years and have built long-lasting relationships with European customers.[301]

(224) The Parties' customer base also strongly overlaps: they are both suppliers of the largest printing ink manufacturers ([...]*, [...]*, [...]*, [...]*),[302] which together represent more than 60% of demand. Most customers that participated in the market investigation also indicated that they buy grades from both Parties.[303]

(225) The Parties' product portfolios are also very similar. Huntsman and Sachtleben are active in the printing ink market mainly through their respective grades TR52 and RDI-S,[304] RDI-S being considered as the best grade on the market, TR52 considered as similar or as its challenger.[305] This is confirmed by the market investigation: when asked which grades could be used in printing ink applications, almost all the respondents indicated grades of Sachleben and Huntsman.[306] Most of them also mention Kronos, but only half of them mention other suppliers (two mention Cinkarna, one Cristal, one Police, one DuPont, one Asian supplier), with certain reservations, however. In this context one customer explained that "*Furthermore Cinkarna 8130, Cristal Tiona 595 with limited usability only for selected applications / ink technologies*",[307] another indicated using "*in lower quality Kronos 2044 and DuPont R-902 R-960*".[308]

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297 See responses to question 29 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I".

298 See responses to questions 37 and 38 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I".

299 Form CO, paragraphs 250 and 329.

300 See responses to question 30 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I".; responses to question 1 of questionnaire "Q2 - Competitors titanium dioxide"; responses to question 21 of questionnaire "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II"; responses to question 16 of questionnaire "Q10 - Questionnaire For Competitors - TiO_2 For Printing Ink - Phase II".

301 See responses to question 50.1 of "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II"; Huntsman and Sachtleben, replies to the RFI No 21 of 18 March 2014; Form CO, paragraph 241.

302 Form CO, Annex 50.

303 See responses to question 1 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I".

304 Sachtleben, Annexes 6, 7, 8, 9 and 40 of reply to the RFI No 21 of 18 March 2014.

305 See responses to questions 31, 41 and 48 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I"; responses to questions 51 and 52 of questionnaire "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II".

306 See responses to question 31 of questionnaire ""Q1 - Questionnaire for Customers Titanium Dioxide Phase I".

307 [...]*, response to question 31 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I" [ID 1352].

308 […]*, response to question 31 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I" [ID 855].

(226) RDI-S and TR52 have the strong advantage of being "multi-purpose grades", namely which can fit most printing ink applications, and are in addition particularly well suited for surface printing ink[309] which is more stringent in terms of gloss.[310] This large usability is confirmed by the Parties' marketing documents, where RDI-S is described by Sachtleben as "*our premium rutile-grade pigment for high quality, high-gloss, and high-opacity inks across the packaging ink field*". Sachtleben's internal documents also confirm RDI-S' ability to serve all ink applications: "*Sachtleben TiO_2 pigments are suitable for use in various solvent-, water- and oil-based inks and also in UV curable inks*", "*[o]ur pigments have been tested and used in several kinds of resin systems. White inks made from Sachtleben pigments can be applied with flexo, gravure, screen printing, inkjet or offset methods.*"[311] A strategy document of a major customer provided by Sachtleben also shows that only Huntsman's TR52, Sachtleben's RDI-S (and its recent improvement RDO) and Kronos' 2064 are considered as "universal grades" for solvent-based inks. That TR52 and RDI-S are quality benchmarks in the printing ink applications is also confirmed by [...]*'s statement: "*[t]he entrant should bear the capabilities to achieve a level of Huntsman/Sachtleben.*"[312] Both Parties also have additional competing grades, respectively RDE-2 and TR50 which are mainly used for lamination/interior printing.[313]

(227) When analysing the strengths and weaknesses of various suppliers in the EEA market for TiO_2 for printing ink applications, it clearly appears that Sachtleben is praised for the quality of its products, followed by Huntsman and Kronos, the others being either not compared (e.g. DuPont, Cristal, Tronox) or considered as providing lower quality products (Eastern European suppliers, Ukrainian suppliers, Chinese suppliers in particular).[314] When questioned on the technical capabilities of TiO_2 suppliers for printing ink applications (namely whiteness, opacity, particle size, particle dispersibility, abrasiveness), most EEA customers consider that Sachtleben, Huntsman and Kronos have similar features, and all of them rank Sachtleben as the top supplier.[315] Beyond product quality, the Parties are also close competitors in terms of pricing, customer recognition and the reliability of supply.[316]

(228) The closeness of competition between the Parties in the EEA market for TiO_2 for printing ink applications is also evidenced in the Parties' internal documents. For instance, Sachtleben ranked the main TiO_2 suppliers regarding the key success factors required from a technical and commercial point of view in the market for

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309 Sachtleben, Annex 29 of reply to the RFI No 21 of 18 March 2014; Huntsman, Annex 20 of reply to the RFI No 21 of 18 March 2014, page 20.

310 Sachtleben's internal document, *2012_NPP_Inks Printing inks strategy*, 24 October 2012, pages 13 and 15; agreed minutes of conference call with […]* on 21 March 2014, paragraph 9 [ID 2271]*; [...]*, response to question 14 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I" [ID 1352].

311 Sachtleben's internal document, *2012_NPP_Inks Printing inks strategy*, 24 October 2012, page 13.

312 [...]*, response to question 44.1 of "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II" [ID 1982].

313 Sachtleben, reply to the RFI No 21 of 18 March 2014, page 10 and Annex 29 of reply to the RFI No 21 of 18 March 2014; Huntsman, reply to the RFI No 21 of 18 March 2014 and Annex 20 of reply to the RFI No 21 of 18 March 2014, page 20.

314 See responses to question 33 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I".

315 See responses to question 48 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I". Except […]* which rank Kronos first for whiteness.

316 See responses to questions 36 to 36.9 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I".

TiO_2 for printing ink applications (technical ability for the different ink applications, consistency of supply, service, price); the ranking showed that Sachtleben, Huntsman and Kronos have the best ranking possible on 8 to 11 criteria (out of 12), while the next ones, ISK and Tayca only reach the maximum on 6 and 4 criteria respectively (Figure 7).[317]

Figure 7 - Competition landscape analysis on the key success factors for TiO_2 for printing inks

[…]*

Source: Sachtleben's internal document, 2012_NPP_Inks Printing inks strategy, 24 October 2012, page 15.

(229) In addition, Huntsman and Sachtleben constantly benchmark themselves against each other while other suppliers, including Kronos seem to be in a second tier. Sachtleben describes Huntsman as the "[…]*",[318] while "[…]*" as it […]*."[319] Competition between Sachtleben and Huntsman is part of Sachtleben's business strategy: "[…]*",[320] therefore Sachtleben mentions Huntsman TR52 as one of its main threats.[321] Indeed, the grade has been "[…]*" and presents a "[…]*" which led to "[…]*".[322]

(230) Therefore, the Commission takes the view that Huntsman and Sachtleben are market leaders and close competitors in the EEA market for TiO_2 for printing ink applications.

6.3.5.2. Pre-merger Huntsman and Sachtleben exert a significant competitive constraint on each other

(231) The unique competitive relationship between the two market leaders described in the previous section translated into a competitive race in pricing and product innovation. For instance, in spite of its strong position through RDI-S, Sachtleben developed an improved grade ("RDO") with an ambition to "[…]*".[323] It also had the project of "[…]*" in June 2014 and planned "[…]*".[324]

(232) The product innovation race and price competition between Huntsman and Sachtleben resulted in customers switching between the Parties. For instance, […]*."[325] This quote indicates that Huntsman and Sachtleben compete in product innovation, and for products having comparable technical features, on price. This competition would be lost post-merger.

(233) Kronos also indicated that Huntsman and Sachtleben compete fiercely on prices: "*It appears that the market does not price more for this niche segment because competition primarily between Huntsman and Sachtleben, who dominate the printing ink segment, keeps prices for ink grades lower than they otherwise might be.*"[326]

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317 Sachtleben's internal document, […]*, 24 October 2012, page 15.
318 Sachtleben's internal document, […]*, 24 October 2012, page 11.
319 Sachtleben's internal document, […]*, 24 October 2012, page 11.
320 Sachtleben's internal document, […]*, 24 October 2012, page 25.
321 Sachtleben's internal document, […]*, 24 October 2012, page 25.
322 Sachtleben's internal document, […]*, 24 October 2012, page 20.
323 Sachtleben's internal document, […]*, 4 December 2013, page 13.
324 Sachtleben's internal document, […]*, 4 December 2013, page 14.
325 Huntsman's internal document, […]*, 21 November 2012.
326 Agreed minutes of conference call with Kronos of 13 February 2014, paragraph 22 [ID 1065].

(234) During the review of the Transaction by the Federal Trade Commission ("FTC") in the USA, […]*.[327]

(235) The fact that Huntsman and Sachtleben closely follow each other's prices, sale strategy, quality issues and the improvements of the other is also evident from their customer reports, which reflect their exchanges and negotiations with customers. […]*.[328] […]*.[329]

(236) In Huntsman's European customer reports for TiO_2 for printing ink, Sachtleben appears 71% of the time, compared to 14% for the next competitor (see Table 6 below). Likewise, Huntsman appears much more often than other competitors in Sachtleben's customer reports.[330]

Table 6 - Keyword search in Huntsman's customer reports for printing ink applications

Keyword[331]	Number of customer reports mentioning the keyword for printing ink applications			
	All	%Total	European	%European
Sachtleben & Co	[…]*	[…]*	[…]*	[…]*
Krefeld & Co	[…]*	[…]*	[…]*	[…]*
Kronos	[…]*	[…]*	[…]*	[…]*
Cristal	[…]*	[…]*	[…]*	[…]*
DuPont & Co	[…]*	[…]*	[…]*	[…]*
Tronox	[…]*	[…]*	[…]*	[…]*
Chinese & Co	[…]*	[…]*	[…]*	[…]*
Krym & Co	[…]*	[…]*	[…]*	[…]*
Cinkarna	[…]*	[…]*	[…]*	[…]*
Precheza	[…]*	[…]*	[…]*	[…]*
Sumykhimprom	[…]*	[…]*	[…]*	[…]*
Zaklady & Co	[…]*	[…]*	[…]*	[…]*
JP & Co	[…]*	[…]*	[…]*	[…]*

Source: Commission's computation based on Huntsman's customer reports.[332]

327 Huntsman, reply to the RFI No 16 of 13 March 2014. *Outline of a Huntsman phone call with the FTC.*

328 Huntsman, reply to the RFI No 16 of 13 March 2014, *Huntsman customers reports (Inks 2010 to 2014) (e.g. AO0000522, AO0000531, AO0000532, AO0000541, AO0000786, AO0000792, AO0000930, AO0001007, AO0001345, AO0001871, AO0001920, AO0001940, AO0002392).*

329 Huntsman, reply to the RFI No 16 of 13 March 2014, *Huntsman customers reports (Inks 2010 to 2014), AO0000531, 31 January 2013.*

330 Annex 54 of the Form CO.

331 "& Co" refers to a combination of different keywords that have been used by the Commission in order to account for different terms identifying the same supplier. The choice of these terms was carried out in accordance with the Parties' response to question 18 of the RFI No 8 dated 15 January 2014.

332 Hunstman, reply to the RFI No 8 of 15-16 January 2014, *Huntsman customers reports (Inks 2010 to 2013).*

(237) These customer reports show that the Parties benchmark themselves against each other and react to the pricing of the other to obtain volume with the customers. For example, one of Huntsman's report notes that a customer "[…]*".[333]

(238) An analysis prepared by Sachtleben on its main customers shows that Huntsman is always present as a main supplier in relation to those large accounts. […]*.[334] […]*,[335] […]*.[336]

(239) A strategy document of […]*.[337] […]*.[338]

(240) During the Phase II market investigation a majority of customers indicated that they use the Parties against each other as a threat to obtain better prices or conditions, for example by indicating that they would switch part or whole of their purchases to the other party.[339] The analysis of the Parties' volumes and internal documents confirm that customers regularly play them off against each other, by switching volumes from one to the other. This is the case in particular for large customers, as shown in Figures 8 and 9 for […]*. More specifically, Figures 8 and 9 illustrate the switching of volumes between Huntsman and Sachtleben, showing that when one customer increases its demand with either Huntsman or Sachtleben, the demand of the other supplier is automatically decreased by approximately the same volume.

Figure 8 - […]* **– Purchases of TR52 and RDI-S for European operations**

[…]*

Source: European Commission's computations, Huntsman and Sachtleben's sales volumes.[340]

Figure 9 - […]* **– Purchases of TR52 and RDI-S for European operations**

[…]*

Source: Commission computations, Huntsman and Sachtleben's sales volumes.[341]

(241) […]* sourcing strategy is described by Sachtleben as based on multisourcing according to a pattern whereby they have one main supplier and one to two other active suppliers which provide lower volumes and […]* regularly switches volumes between them to allow for continuous competition. Huntsman and Sachtleben are the two suppliers competing to be the number one supplier of […]*.[342]

(242) Similarly, […]* is described as being able to switch volumes from one to the other and as using this negotiation argument: "[…]*".[343]

(243) Finally, the fourth largest printing ink manufacturer in Europe, [...]*, recently introduced Sachtleben in its supplier portfolio which led to a price decrease by its previously only supplier, Huntsman: "*Currently [...]* purchases 50% of its demand*

333 Huntsman's internal document, […]*, 15 January 2013.
334 Sachtleben's internal document, *SCM Pori*: *Presentation of main customers*, 2012, page 2.
335 Sachtleben's internal document, *SCM Pori*: *Presentation of main customers*, 2012, page 16.
336 Sachtleben's internal document, *SCM Pori*: *Presentation of main customers*, 2012, page 9.
337 Sachtleben's internal document, […]*, 11 February 2013, page 22.
338 Sachtleben's internal document, […]*, 11 February 2013, pages 22-23.
339 See responses to questions 39 and 40 of questionnaire ""Q1 - Questionnaire for Customers Titanium Dioxide Phase I".
340 Huntsman and Sachtleben, replies to the RFI No 18 of 14 March 2014.
341 Huntsman and Sachtleben, replies to the RFI No 18 of 14 March 2014.
342 Sachtleben's internal document, *SCM Pori*: *Presentation of main customers*, 2012, page 13.
343 Sachtleben's internal document, *SCM Pori*: *Presentation of main customers*, 2012, page 6.

from Huntsman and 50% from Sachtleben (since September 2013)".[344] "*[...]* introduced Sachtleben in order to have competition for the grades it purchases. So far, this competition worked very well and resulted in a price decrease (4.3%) from Huntsman as a result of the threat that [...]* would switch more volumes to Sachtleben*".[345]

(244) This analysis demonstrates that Huntsman and Sachtleben closely compete with each other both on product innovation and price, acting as competitive forces in the market, and are used by customers as negotiating tools to obtain better conditions and prices.

(245) Therefore, the Commission takes the view that Huntsman and Sachtleben exert a significant competitive constraint on each other in the EEA market for TiO_2 for printing ink applications.

6.3.6. Kronos is a more distant competitor

(246) With large TiO_2 sulphate-based capacities located mainly in the EEA, Kronos is the third biggest player in the EEA market for TiO_2 for printing ink applications, although currently lagging far behind the Parties with a [10-20]*% market share in 2013.

(247) Similarly to the Parties, Kronos has a dedicated printing ink grade which is marketed as such: "*KRONOS 2064 displays low abrasiveness and is an outstanding pigment for high-gloss gravure and flexographic inks. It is characterized by high tinting strength and hiding power. A high degree of gloss can be achieved when used in both waterborne and solvent-based systems*".[346]

(248) During the market investigation, half of the respondents active in the market for printing ink in the EEA identified TiO_2 grades from Kronos, and chiefly 2064, as close substitutes to Huntsman's TR52 and Sachtleben's RDI-S. Other customers considered that Kronos still has room for improvement in terms of quality and price.[347] For example, one customer uses Kronos "*only for one application. At the moment Kronos is not a real alternative for all grades*", while another considers that "*the situation actually is blocked and no further test are in place because they can offer only a single use grade (not multi-purpose grade) which could be used only in Flexographic inks*". More generally, only half of the customers indicating that Huntsman and Sachtleben offer multi-purpose grades consider that Kronos is also able to provide these kinds of grades.[348] Similarly, one customer mentions Kronos to be "*equal to other supplier pigments [namely the Parties] as a technical standpoint*", and another acknowledges that Kronos' "*technical features are similar [to the Parties], approved for all our printing inks*".[349]

(249) It follows that almost half of the customers, representing the majority of the demand (as they include large customers such as [...]*, [...]* and [...]*) are purchasing

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344 Agreed minutes of a conference call with […]* on 21 November 2013, paragraph 4 [ID 1372].

345 Agreed minutes of a conference call with […]* on 21 November 2013, paragraph 11 [ID 1372].

346 Kronos, *KRONOS 2064*, available at: http://kronostio2.com/en/products/rutile-pigments-for-coatings/kronos-2064 , visited on 24 June 2014.

347 See responses to questions 42-43 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I".

348 See responses to question 41.1 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II".

349 See responses to question 54 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II".

printing ink grades from Kronos, while most of the remaining ones have either approved or tested them.[350] Nevertheless, the volumes purchased from Kronos are much lower and some customers, especially the large ones, tend to use Kronos as a "*wild card*".[351] Kronos also considers itself as "*pretty small*" compared to "*Huntsman and Sachtleben, who dominate the printing ink segment*", and it "*has currently no plans to increase its market share in ink*".[352]

(250) This is also confirmed by internal documents provided by the Parties, such as monthly management presentations reporting on competition on the market for TiO_2 for printing ink applications.[353] According to Sachtleben's internal strategy documents assessing competition on this market, although Kronos is considered by customers as comparable to the Parties in terms of high gloss, high opacity, dispersibility, abrasion, opacity, customer service, consistency of supply and quality, it is still lagging behind in terms of fineness (for ink jet applications) and price.[354]

(251) The fact that, despite its know-how, Kronos does not have the same standing in the market is evidenced by the fact that Kronos' market shares both globally ([5-10]*% in 2013) and in the EEA ([10-20]*% in 2013) are low and have been stable over the last few years. One customer mentioned "*[it is] more confident to use the qualified TIO_2s from both Huntsman & Sachtleben*",[355] while another specifies that "*no further test are in place because they can offer only a single use grade (not multi-purpose grade) which could be used only in flexographic inks*".[356] In addition, some customers mentioned that Kronos' prices can be somewhat higher than those of the Parties, for example, "*[Kronos] had the least competitive offer when compared to Huntsman and Sachtleben*".[357] Indeed, market analysts also acknowledge the high cost structure of Kronos' plants, and the possibility of their shutdown: "*IBMA finds KRO's [Kronos'] European-based plants as strong shutdown candidates given their high cost structure, but notes that such a move could be costly given labor issues*."[358]

(252) Therefore, the Commission takes the view that Kronos is a more distant competitor to the Parties in the EEA market for TiO_2 for printing ink applications, having the know-how and a suitable product, but generally lacking a strong multi-purpose grade (that is, suitable for all printing ink applications), equivalent to TR52 or RDI-S, as well as a competitive price offer in the EEA.

6.3.7. Chinese suppliers currently have a very limited presence in the EEA

6.3.7.1. There is sufficient sulphate-based TiO_2 capacity in China

(253) Chinese suppliers together represent approximately a third of the global TiO_2 production (2 400 kt overall) and have mainly sulphate-based capacity.[359] There are

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350 See responses to question 54 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II".

351 Sachtleben's internal document, […]* – *Liquid Inks Raw Material Strategy Workshop – TiO_2 Review*, 11 February 2013, page 23.

352 Agreed minutes of a conference call with Kronos of 13 February 2014, paragraphs 22 and 23 [ID 1035].

353 Sachtleben's internal document, *Printing inks management reports 2011-2014*.

354 Sachtleben's internal document, *2012_NPP_Inks Printing inks strategy*, 24 October 2012, page 15.

355 See responses to question 54 of questionnaire "Q10 – Questionnaire For Competitors - TiO_2 - Phase II".

356 See responses to question 54 of questionnaire "Q10 – Questionnaire For Competitors - TiO_2 - Phase II".

357 Agreed minutes of conference call with […]* of 29 November 2013, paragraph 18 [ID 1518].

358 Huntsman's internal document, Wells Fargo Securities, *Equity Research, Interview of Jim Fisher of IBMA by, LLC*, "*TiO_2: postponing wake up call ' til H2 2014 if then*", 15 January 2014, page 7.

359 Form CO, paragraph 338 and Huntsman's internal document, TZMI, *Pigment Cost Study 2013*.

many local TiO_2 suppliers in China; however, in 2013, only eight of them had a sulphate-based capacity of 100 kt or more.[360]

(254) The largest TiO_2 suppliers and exporters, in particular for coatings and plastics applications, include the following companies:[361]

- Sichuan Lomon, the largest Chinese TiO_2 supplier which had 5 plants and 200 kt of sulphate-based capacity in 2012. It represented 12-14% of the overall TiO_2 volume exported from China in 2011, namely around 60 kt.
- Shandong Doguide (formerly known as Dongjia Group), the second largest Chinese TiO_2 supplier with 2 plants and 160 kt of sulphate-based capacity in 2012. It represented 11% of the overall TiO_2 volume exported from China in 2011, namely around 48 kt.
- China National Bluestar, which had a plant of 136 kt of sulphate-based capacity in 2012. It represented 4% of the overall TiO_2 volume exported from China in 2011, namely around 20 kt.
- Henan Billions, with 120 kt of sulphate-based capacity in 2012. It represented 12% of the overall TiO_2 volume exported from China in 2011, namely around 51 kt.

(255) The other four Chinese suppliers with a capacity of 100 kt each are: Pangang Group, Anhui Goldstar, Shandong Dawn and Jiangsu Taibai Group.[362]

(256) Therefore, the Commission takes the view that there is sufficient sulphate-based TiO_2 capacity in China.

6.3.7.2. Chinese TiO_2 suppliers face limited objective barriers to trade and offer lower prices

(257) Furthermore, as shown in section 6.2.1.1, import duties and transport costs do not represent significant barriers to international TiO_2 trade, although they have to be taken into account as entry costs. Indeed, in spite of import duties and transport costs, Chinese TiO_2 suppliers for printing ink applications are generally more competitive than European suppliers in terms of price. The situation is summarised by one customer, for which "*[t]he main driver […] is the net price difference of 10% between European sulphate-based TiO_2 and Chinese sulphate-based TiO_2*".[363]

(258) According to the 2012 TZMI data provided by the Notifying Party[364] analysing different factors composing TiO_2 manufacturing costs on a plant-by-plant basis, the key difference between the Parties' plants in the EEA and Chinese suppliers' plants resides in the lower fixed costs, which are probably due to lower personnel costs. However, the price difference between the Parties and the Chinese suppliers cannot be explained solely by the difference in costs, which suggests that Chinese suppliers may have lower margins than the Western suppliers, Huntsman and Sachtleben in particular. This in turn has impact on the profitability of Chinese exports into the EEA. In addition, besides pure cost considerations, according to one large Chinese supplier, Henan Billions, the competitiveness of Chinese suppliers depends on various factors, and in particular exchange rate fluctuations and import duties. In

360 Form CO, paragraph 215.
361 Form CO, paragraph 205-214.
362 Form CO, paragraph 215.
363 Agreed minutes of conference call with […]* of 2 June 2014, paragraph 15 [ID 2293].
364 Huntsman's internal document, *TZMI*: *Comparative cost and profitability study*, 2012 data.

particular, it mentions that "*EUR/USD exchange rate fluctuations have a big influence on Henan Billions' competitiveness in Europe because the Chinese Yuan is linked to USD, and not to EUR. There are moments when Henan Billions is unable to offer very competitive price to European customers.*"[365] This is also confirmed by one customer explaining that "*Chinese grades are paid in USD, Western suppliers in EUR, so convenience depends a lot also on currency. Exchange ratio lately is more favourable buying in USD.*"[366] Furthermore, while import duties "*do not determine whether Henan Billions will import into Europe or not, [but] they do have an influence on its competitiveness*".[367]

(259) It follows that while Chinese suppliers face limited objective trade barriers to expansion in the EEA market, these various elements added up have an influence on their competitiveness compared to local European suppliers.

(260) Therefore, the Commission takes the view that Chinese TiO_2 suppliers face limited objective barriers to trade and offer lower prices.

6.3.7.3. Chinese suppliers have a very limited presence in the EEA market for TiO_2 for printing ink applications

(261) Despite the limited objective trade barriers, the presence of Chinese suppliers in the EEA market is rather limited. The Notifying Party submits in the Form CO that Chinese exports of TiO_2 significantly increased between 2008 and 2011 (from 95 kt to 424 kt),[368] with a surge in 2011. Nevertheless, this increase concerns the global demand in TiO_2, and is not specific to the EEA demand in TiO_2 for printing ink. In addition, there has been a recent decrease in the quantities exported into Europe which the Notifying Party explains by the weakening of global and European demand. The fact that the level of Chinese imports into the Union was particularly high during the first half of 2011 (78 kt compared previous years) can be explained by the TiO_2 temporary shortage as acknowledged by the Notifying Party and the need for customers to source a product, even if it was of lower quality. The Notifying Party also indicates that the level of Chinese imports in the first half of 2012 largely exceeded the average figure for the first half of the three previous years (35 kt).[369] A comparison with the three previous years gives a biased view, as the level of exported volume has been relatively stable if not decreasing since 2011. In addition, the first half of 2012 was characterised by a suspension of import duties in the EEA.[370]

(262) Overall, it can be observed that Chinese suppliers have a limited presence in the EEA market for TiO_2 in general and even more so in the market for TiO_2 for printing ink applications. Indeed, in 2013 Chinese imports represented 6% of the overall TiO_2 demand in the EEA and 4% of the EEA demand for TiO_2 for printing ink. The market investigation also indicated that a minority of EEA respondents from the demand side currently purchase TiO_2 grades for printing ink applications from Chinese suppliers, while most of them have either tested but not approved, or not

365 Agreed minutes of conference call with Henan Billions of 26 June 2014, paragraph 22 [ID 2440].

366 [...]*, response to question 77 of questionnaire"Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II" [ID 2337].

367 Agreed minutes of conference call with Henan Billions of 26 June 2014, paragraph 23 [ID 2440].

368 Form CO, paragraph 190.

369 Form CO, paragraph 190.

370 Huntsman, Annex 2 of reply to the RFI No 21 of 18 March 2014, page 9.

even tested grades from Chinese suppliers.[371] In respect of those who purchase TiO_2 from China, these imports represent a very small part of their purchases.[372]

(263) The imports of TiO_2 for printing ink applications have been stable over the last 3 years, after a slight increase from 2% to 4% ([…]*) during the TiO_2 shortage in 2010-2011. The graph below shows that, in the printing ink segment, the level of Chinese imports into the EEA is the lowest in terms of the proportion of the overall EEA demand in specific segments.

Figure 10 - Chinese imports into the EEA in percentage of the EEA demand by TiO_2 market

[…]*

Sources: Form CO, paragraphs 259, 299, 305, 329, 345; Huntsman, Reply to RFI of 26 February 2014.

(264) The Parties' internal documents also show qualitatively that the Chinese presence in the EEA market for TiO_2 for printing ink applications has evolved over time: it increased during the 2011 shortage, but has remained limited and stable since 2011.[373]

(265) Sachtleben's internal documents indicate that customers looked for other TiO_2 suppliers during the 2011 shortage, including Chinese suppliers, although no major volumes came to Europe: "*[c]ustomers claim that they are actively testing Chinese material but according to statistics no major business from China has been occurred.*"[374] At that time the customers were ready to accept a lower quality as the availability of the product was a problem, this also resulted in downscaling of the customers' production capacities: "*[t]he producers are trying to use cheaper Chinese material and in addition they are shutting down their extra capacity. In addition they are reducing their stocks*"; "[…]*".[375]

(266) While at that time this increase of Chinese presence was also linked to the fact that a lot of Chinese material was available,[376] after 2011 Chinese suppliers seemed to be more focused on Asia. Indeed, Sachtleben reports indicate from March 2012 to October 2012 that "*Chinese producers are very active in ASIA*".[377] When prices decreased, customers went back to their quality, reliable and nearby suppliers (mainly Huntsman, Sachtleben and Kronos in the EEA), as competition in Europe appeared to happen more particularly between Sachtleben, […]*[378] – "[…]*[379] […]*,[380] […]*[381] ("[…]*").[382]

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371 See responses to question 71 of questionnaire "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II".

372 See responses to questions 21, 56 and 57 of the questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I".

373 Sachtleben's internal documents, *Printing Inks - Segment monthly management report.*

374 Sachtleben's internal document, *Printing Inks - Segment monthly management report*, July 2011.

375 Sachtleben's internal document, *Printing Inks - Segment monthly management report*, September 2011.

376 Sachtleben's internal document, *Printing Inks - Segment monthly management report*, September 2011.

377 Sachtleben's internal documents, *Printing Inks - Segment monthly management report*, March 2012, April 2012, May 2012, August 2012, October 2012.

378 Sachtleben's internal documents, *Printing Inks - Segment monthly management report*, September 2011, October 2011, November 2011, March 2012, May 2012, August 2012, October 2012.

379 Sachtleben's internal document, *Printing Inks - Segment monthly management report*, January 2013.

380 Sachtleben's internal document, *Printing Inks - Segment monthly management report*, November 2012.

381 In July 2012, Sachtleben acquired the TiO2 production assets and inventory of Crenox GmbH (Krefeld, Germany) from the insolvency administrator (form CO, paragraph 60).

382 Sachtleben's internal document, *Printing Inks - Segment monthly management report*, April 2012.

(267) As regards 2013, Sachtleben's internal documents indicate that some customers increasingly mentioned Chinese suppliers as a credible alternative, indicating that Chinese grades are improving in quality.[383] Nevertheless, this seemed to relate to regions other than the EEA (mostly Asia, but to some extent the USA)[384] and some ink applications only (lamination ink in particular).[385] In addition, no major switching has happened so far. [...]* moving part of its volumes in the USA to Lomon in Q1 2014 did not trigger any corresponding trend in the EEA.[386] More specifically, even though [...]* appears to have indicated to Sachtleben that the quality of Chinese TiO_2 seems to be sufficient, reliability of supply is still a hurdle, as shown by the important delivery delays and the fact that it kept buying from Sachtleben: "*[...]* USA was supposed to take major part of their TiO_2 consumption from China. According to them they have faced delivery problems specially from Lomon. They stated that deliveries are several weeks delayed. Same we have heard from India regarding Lomon*".[387]

(268) This analysis shows that Chinese suppliers slightly increased their sales in the EEA market for TiO_2 for printing ink applications during the TiO_2 shortage, when ink manufacturers were forced to find alternatives to their usual TiO_2. Nevertheless, since then, the Chinese share has remained stable – if not decreasing – at a low level ([0-5]*% of the EEA demand).

(269) Therefore, the Commission takes the view that Chinese suppliers have a very limited presence in the EEA market for TiO_2 for printing ink applications.

6.3.7.4. Chinese TiO_2 does not meet the quality requirements of customers in the EEA market for TiO_2 for printing ink applications

(270) The limited presence of Chinese suppliers in the EEA market for TiO_2 for printing ink applications seems to be the result of quality issues Chinese TiO_2 is still facing despite recent improvements, which is not compensated by the attractiveness of its lower prices mentioned in section 6.3.7.2.[388] Chinese suppliers currently do not offer grades with a quality comparable to the grades of Western suppliers, in particular regarding gloss, opacity and dispersibility,[389] which are the key technical criteria for printing ink manufacturers.[390]

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383 Sachtleben's internal documents, *Printing Inks - Segment monthly management report*.

384 Sachtleben's internal document, *Printing Inks - Segment monthly management report*, May 2013.

385 Sachtleben's internal documents, *Printing Inks - Segment monthly management report*, April 2013, May 2013.

386 Sachtleben's internal document, *Printing Inks - Segment monthly management report*, February 2014.

387 Sachtleben's internal document, *Printing Inks - Segment monthly management report*, February 2014.

388 Sachtleben's internal document, *Printing Inks - Segment monthly management report*, October 2011, November 2011, February 2012, November 2011, February 2013, May 2013, July 2013. Chinese prices were reported in 2013 to be at 1800-2000 USD / t, […]*.

389 See responses to question 58 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I", e.g. [...]* and […]*.; responses to question 72 of "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II" [ID 2310, ID 2337]; agreed minutes of conference call with […]* of 21 November 2013, paragraph 13 [ID 1372]; agreed minutes of conference call with […]* of 29 November 2013, paragraph 7 [ID 1518]; agreed minutes of conference call with […]* of 19 November 2013, paragraph 18 [ID 1351]; agreed minutes of conference call with […]* of 22 May 2014, paragraph 4 [ID 2219]; Sachtleben's internal document, *Examples of Chinese TiO_2 grades in printing inks*, page 3.

390 Form CO, paragraph 315; Huntsman, reply to the RFI No 21 of 18 March 2014, Annex 20 of reply to the RFI No 21 of 18 March 2014, page 20; Annex 21 of reply to the RFI No 21 of 18 March 2014, page 11; Sachtleben's internal document, *2012_NPP_Inks Printing inks strategy*, 24 October 2012, page 31; Boston Consulting Group, *Atlas in the TiO_2 market*, June 2013, page 215; responses to question 17 of

(271) This quality difference between European and Chinese suppliers was confirmed by the customer responses to the market investigation. For instance, one printing ink manufacturer stated that "*Chinese TiO_2 leads to different ink viscosity values due to a different oil absorption feature, so it can be used only where this is not detrimental for final ink*",[391] while another customer explained: "*we have done several tests with Chinese titanium types offered from [s]ome European traders but for technical reasons they were always rejected*".[392]

(272) More specifically, customers mention that "*the gloss, opacity, dispersibility [are] quite lower than the Western suppliers' grades*". Some are also confronted with abrasion issues *("the massive use of zirconium as component in the rutile sulphate chemical structure […] which will [damage] the cylinders of the customers printing machines*") and note that "*Chinese TiO_2 are less dispersible than the grades from Western suppliers [and] in general yellower than Western grades*".[393]

(273) In addition, customers explained that Chinese suppliers have difficulties in developing grades which would be suitable for several ink applications, which is one of the features of Western suppliers' grades. In this context one customer explained that it is "*much more difficult for the Chinese producers to develop a single TiO_2 grade which would work in all these ink formulations and constitute a real alternative to the Western grades*".[394]

(274) Huntsman and Sachtleben are aware of the quality gap between the Chinese TiO_2 and their products. In an internal document summing up the results of testing carried out by Sachtleben in November 2013, Sachtleben concludes that Chinese TiO_2 is not comparable to its grades and is poorer in particular in terms of dispersibility, gloss, opacity, dispersion stability. More specifically, the document indicates that "[…]*".[395]

(275) Similarly, Kronos explained that at the present stage, the quality of the product is the main reason why despite the lower prices the Chinese product has troubles gaining traction in Europe. Explaining that the Chinese threat is ineffective Kronos noted that "*[n]ormally our superior quality is sufficient to win the business*"[396] and that the Chinese suppliers "*have yet to reach our [Kronos'/Western suppliers] quality on a consistent basis.*"[397]

(276) Figure 11 below compares the grades of three important Chinese suppliers for use in surface printing ink. Sachtleben concludes that three grades by Lomon, Shandong Doguide (Dongjia) and Bluestar have glosses 94%, 92%, 81% lower than RDI-S, and

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questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I"; responses to questions 51 and 52 of questionnaire "Q10 - Questionnaire For Competitors - TiO_2 For Printing Ink - Phase II".

391 […]*, response to question 58.3 of questionnaire "Q1 - Questionnaire For Customers Titanium Dioxide - Phase I", [ID 877].

392 […]*., response to question 22.1 of questionnaire ""Q1 - Questionnaire For Customers Titanium Dioxide - Phase I".", [ID 1579].

393 See responses to questions 71, 72, 75 and 81 of questionnaire "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II".

394 Agreed minutes of conference call with […]* of 29 November 2013, paragraph 9 [ID 1518].

395 Sachtleben's internal document, *Examples of Chinese TiO_2 grades in printing inks*, 11 November 2013, page 3.

396 Kronos, response to question 33.1 of questionnaire "Q10 – Questionnaire For Competitors - TiO_2 - Phase II" [ID 2077].

397 Kronos, response to question 34.1 of questionnaire "Q10 – Questionnaire For Competitors - TiO_2 - Phase II [ID 2077].

even lower when compared to RDO. Likewise the dispersibility for all three grades is considered as "*not good*". This is due to "*less optimised particle size*" which leads to significantly lower optical properties and a need for customers to further process the grades though "*stronger milling and mixing vs. Sachtleben's grades*".

Figure 11 – Comparison of the technical properties of Sachtleben's RDI-S and RDO grades with grades provided by Chinese suppliers

[…]*

Source: Sachtleben's internal document, Examples of Chinese TiO_2 grades in printing inks, 11 November 2013, page 4.

(277) Likewise, Sachtleben graphically compared […]*, of a number of large Chinese suppliers ([…]*). The conclusion reached from the graph below is that for all these grades, […]* is of lower quality than RDI-S (see figure 12 below).

Figure 12 – Comparison of […]* of Sachtleben's RDI-S grade with grades provided by Chinese suppliers

[…]*

Source: Sachtleben's internal document, Examples of Chinese TiO_2 grades in printing inks, 11 November 2013, page 4.

(278) Given that the specifications of Chinese grades are not yet up to the standard required, the customers either use Chinese TiO_2 in a blend or in specific applications in which the shortcomings of the Chinese TiO_2 are less critical. For instance [...]* "*determined that on the basis of current quality, it could take [confidential] Chinese TiO_2 to blend with Western European TiO_2 without compromising [confidential] the quality of the ink produced*".[398] For [...]*, "*the Chinese TiO_2 is used pure (without blending with other TiO_2 grades) in one application, namely water-based ink for flexo packaging. This application involves ink for flexographic surface printing on cardboard paper where gloss is not needed*".[399]

(279) In addition, the use of Chinese TiO_2 may imply additional processing costs (e.g. use of high speed dissolver, milling) and some can even not be fixed. According to an internal Sachtleben report, "*customers are balancing between high quality products with cost efficient easy processing and cheaper lower quality [Chinese] grades with higher processing costs (high speed dissolver mixing grades vs. beadmilling grades)*".[400] Indeed, "*dispersion fineness and dispersion stability issues can be addressed by customers using efficient beadmilling*",[401] while "*opacity deficiency is practically not fixable, particularly in high quality surface printing, as the opacity is defined largely by the size distribution of the primary particles (crystals)*".[402] Finally, the report confirms that Chinese TiO_2 is particularly not suitable for some applications, as "*lower gloss of Chinese TiO_2 grades is a deficiency in high quality surface prints, not in lamination and reverse printing inks*".[403] The report further

398 Agreed minutes of conference call with […]* of 22 May 2014, paragraph 5 [ID 2219].

399 Agreed minutes of conference call with […]* of 2 June 2014, paragraph 7 [ID 2293].

400 Sachtleben's internal document, *Examples of Chinese TiO_2 grades in printing inks*, 11 November 2013, page 3.

401 Sachtleben's internal document, *Examples of Chinese TiO_2 grades in printing inks*, 11 November 2013, page 3.

402 Sachtleben's internal document, *Examples of Chinese TiO_2 grades in printing inks*, 11 November 2013, page 3.

403 Sachtleben's internal document, *Examples of Chinese TiO_2 grades in printing inks*, 11 November 2013, page 3.

confirms that "*one possibility reported by customers has been to blend Chinese TiO_2 grades with the higher quality material*".[404]

(280) Chinese suppliers themselves confirm that their quality is not yet sufficient for the EEA market. Indeed, Henan Billions, a supplier with whom some large European ink manufacturers have been working,[405] "*is aware that it is not yet of adequate quality to meet the stringent requirements of the European ink customers […]. The main issues at this stage are related to gloss, dispersibility and hiding power*".[406] More specifically, "*Henan Billions considers itself to be a relatively new player, still a "student", on the market for TiO_2 for printing inks (it has been active in this market segment for about 3 to 4 years and generally it takes years to develop a good grade, in particular in markets such as ink which are very special)*".[407] Huntsman and Sachtleben's grades are identified by Chinese suppliers as the quality benchmark: "*Henan Billions compares its grade 631 to the quality of RDI-S and TR-52 and has the ambition to achieve a similar quality as the Huntsman/Sachtleben grades. Currently there are many differences, in particular as concerns gloss.*"[408] This further demonstrates that the quality difference between European and Chinese suppliers is explained by the know-how gap that remains between them. Indeed, Henan Billions confirmed that "*there is therefore a specific know-how related to the production of TiO_2 for printing ink applications, but once you know how to do it, it is simple*".[409]

(281) The fact that Chinese suppliers do not yet have the adequate know-how that would allow them to compete in the EEA market for printing ink applications with a suitable product is also confirmed by the interest of some purchasers, including Chinese suppliers, in purchasing the TR 52 know-how from Huntsman for up to USD […]* million. Indeed, should Chinese suppliers be close in acquiring the know-how through their own means, there would be no rationale for them spending such amounts.

(282) It follows that the Chinese suppliers, despite having ample sulphate-based capacities, facing somewhat limited barriers to trade in the EEA and offering lower prices, still have a very limited presence in the EEA which points to the fact that the main barrier for them to increase their presence resides in the quality of their product which at this stage is not suitable to constitute a credible alternative to the Parties' landmark printing ink TiO_2 products. Indeed, should a suitable Chinese grade be on the market, given the price difference between Chinese and Western TiO_2 grades, customers would have already switched large volumes to the Chinese suppliers. The fact that no such switching has yet occurred is an additional indicator that no such grade is available on the market thus far. The fact that the product quality is the main barrier despite the lower costs is also confirmed by [...]* stating that switching is

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404 Sachtleben's internal document, *Examples of Chinese TiO_2 grades in printing inks*, 11 November 2013, page 3.

405 See responses to question 71.1 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II"; agreed minutes of conference call with Henan Billions of 26 June 2014, paragraph 4 [ID 2440].

406 Agreed minutes of a conference call with Henan Billions of 26 June 2014, paragraph 14 [ID 2440].

407 Agreed minutes of a conference call with Henan Billions of 26 June 2014, paragraph 17 [ID 2440].

408 Agreed minutes of conference call with Henan Billions of 26 June 2014, paragraph 18 [ID 2440].

409 Agreed minutes of conference call with Henan Billions of 26 June 2014, paragraph 19 [ID 2440].

"*technically driven - switching cost is not the driver. It is the product performance*".[410]

(283) Therefore, the Commission takes the view that Chinese TiO_2 does not meet the quality requirements of customers in the EEA market for TiO_2 for printing ink applications.

6.3.8. Eastern European suppliers do not have the critical size, nor the sufficient quality to compete with the Parties

(284) In Europe, in addition to the Parties and Kronos, there are three Eastern European suppliers that have sulphate-based capacities, namely Cinkarna, Precheza, and Police.[411] They are mostly active either in general coatings grades or specialise on niche markets, such as CPF.[412] As evidenced below, none of these suppliers have dedicated grades for the printing ink market.

(285) Contrary to the Notifying Party's claims that these suppliers hold a market share of approximately [5-10]*% in the EEA market for TiO_2 for printing ink applications, the market investigation revealed that their sales to this application are either even more limited or non-existent.[413]

(286) Indeed, according to its marketing documents, Precheza is mainly active in CPF and does not appear to be specialised in printing ink applications. Of the six "*titanium dioxide grades PRETIOX for paints*", all but one, RGZW, are not recommended for printing ink applications. Furthermore, while RGZW is only indicated as "*advisable*" for solvent-based printing inks, it is "*strongly recommended*" for several decorative and industrial coatings.[414] As a result this grade seems to be designed for coatings rather than for printing inks. This was also confirmed by Precheza during the market investigation: its previous attempts to sell grades to printing ink manufacturers were unsuccessful as it "*had quality problems and […] low profitability issues*".[415] Precheza further notes that "*it is difficult to be accepted by big players [customers] from [the] ink sector*".[416] Overall, Precheza explained that it "*no longer produces a printing inks grade as it found it difficult to produce, more expensive than the production of other grades and facing customers with tight specs.*"[417]

(287) Similarly, while Cinkarna indicated its RC 813, RC 833 and RC 86 grades are "*recommended*" for printing ink applications,[418] printing inks are not the main applications for these grades. RC 813 is for instance "*especially recommended*" for masterbatches (plastics) and white concrete, RC 833 is "*especially recommended*" for plaster paints, and RC 86 is "*especially recommended*" for dispersion paints and wallpaper coatings.[419] The fact that Cinkarna is not active in printing ink applications

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410 [...]*, response to question 43 of "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II" [ID 1982].

411 See section 9.2.2.

412 Huntsman, Annex 46 and 47 of reply to the RFI No 21 of 18 March 2014.

413 See responses to question 17 of questionnaire "Q2 and Q2 bis - Questionnaire For Competitors Titanium Dioxide- Phase I".

414 Huntsman, Annex 74 of reply to the RFI No 21 of 18 March 2014.

415 See responses to question 3 of questionnaire "Q10 - Questionnaire For Competitors - TiO_2 - Phase II".

416 See responses to questions 35 and 36 of questionnaire "Q10 - Questionnaire For Competitors - TiO_2 - Phase II".

417 Agreed minutes of a teleconference call with Precheza of 11 April 2014, paragraph 14 [ID 2440].

418 Huntsman, Annex 57 of reply to the RFI No 21 of 18 March 2014.

419 Huntsman, Annex 57 of reply to the RFI No 21 of 18 March 2014.

was also confirmed by Cinkarna during the market investigation stating that its "*grades do not match the requirements of the [printing ink] customers*".[420]

(288) Finally, the Polish supplier Police advertises it has grades suitable for gloss flexographic (R-001, R-003) and rotogravure (R-001, R-003 and R-213) printing ink applications.[421] However, those grades are clearly not dedicated to these applications, which indicates their limited suitability for the high requirements of printing ink manufacturers: for instance, R-001 and R-003 are also suited for white concrete, while R-213 is suited for filler, mastics and stoppers, as well as for sealants.[422] In addition, during the market investigation, Police explained that being a small supplier it tends to concentrate on mass markets rather than specialty applications: "*[our] production capacity is very low (probably the lowest in EEA), therefore [our] knowledge about niche markets (like printing inks, fibers and CPF) and products is very limited*".[423]

(289) This is further evidenced by an internal analysis of the competitive landscape carried out by Sachtleben, where none of the three Eastern European suppliers are considered as relevant competitors in the printing ink segment.[424] According to this document, Precheza's grades appear to have less gloss than Sachtleben's grades, making it less suitable for surface printing applications, and to have less opacity which is an issue for lamination applications, while Police and Cinkarna grades appear to have even less suitable opacity and abrasiveness for surface printing applications.[425]

(290) Furthermore, the Parties' SPA dated 17 September 2013 […]*,[426] […]*.

(291) The market investigation broadly confirmed that, while some large customers have tested or approved grades from Precheza, Cinkarna or Police, the large majority of customers have neither bought nor tested grades from these suppliers.[427] For instance, [...]* indicates that Cinkarna has "*only just recently been technically approved and pricing is not competitive with Huntsman / Sachtleben*".[428] Regarding Precheza, "*they are not technically approved*",[429] and [...]* has "*[n]o contact with*" Police.[430]

(292) Therefore, the Commission takes the view that Eastern European suppliers do not currently exercise a competitive constraint on the Parties in the EEA market for TiO_2 for printing ink applications.

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420 Cinkarna, response to question 3.1 of questionnaire "Q10 - Questionnaire For Competitors - TiO_2 - Phase II" [ID 2351].

421 Huntsman, Annex 69 of reply to the RFI No 21 of 18 March 2014.

422 Huntsman, Annex 52 of reply to RFI No 21 of 18 March 2014.

423 Grupa Azotv Zakladv Chemiczne Police, response to question 80 of questionnaire "Q10 - Questionnaire For Competitors - TIO_2 - Phase II" [ID 2080].

424 Sachtleben's internal document, *2012_NPP_Inks Printing inks strategy*, 24 October 2012, page 15.

425 Sachtleben's internal document, *2012_NPP_Inks Printing inks strategy*, 24 October 2012, page 15.

426 Huntsman, Annex 5 of the Form CO.

427 See responses to questions 56, 57 and 58 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II".

428 [...]*, response to question 56 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II" [ID 2307].

429 [...]*, response to question 57 of questionnaire ""Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II" [ID 2307].

430 [...]*, response to question 58 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II" [ID 2307].

6.3.9. Chloride-based TiO_2 suppliers have a very limited presence on the EEA market for TiO_2 for printing ink applications

(293) As indicated in section 6.1.1, chloride-based TiO_2 suppliers are not considered as part of the market as their grades would only fit a very small part of the EEA customers' requirements.

(294) The lack of competitive constraint from chloride-based suppliers in the EEA market for TiO_2 for printing ink applications is also recognised by the Parties' internal documents. For instance, in a strategy document of Sachtleben from 2012, where Huntsman and Kronos appear as the main competitors on the EEA market for TiO_2 for printing ink applications, the third competitor mentioned in this document is DuPont which is described as "*not focused to the inks market but their several agents and distributors are active, especially in APAC and Lat.Am. [read Latin America]*".[431] DuPont is therefore not present on the printing ink market in the EEA. At best, DuPont's grades are seen as suitable for lamination inks: its main grade "*R960 […] can be used in lamination inks without major issues with abrasion*".[432]

(295) Therefore, the Commission takes the view that chloride-based suppliers do not exercise a competitive constraint on the Parties in the EEA market of TiO_2 for printing ink applications.

6.3.10. Other suppliers have a very limited presence as they are either more expensive, or do not have the know-how

(296) Ukrainian suppliers (Crimea Titan, Sumykhimprom) are barely present in the EEA, with a combined market share below [0-5]*%, which has remained at a negligible level (below [0-5]*%) since 2010.

(297) Of all TiO_2 grades advertised by Crimea Titan, only one, TiOx-271, is "*recommended*" for printing ink applications, and none is "*highly recommended*".[433] However, printing ink applications are not mentioned in the TiOx-271 technical sheet, and it is "*highly recommended*" for other applications such as some architectural paints and thermosetting plastic.[434]

(298) According to the responses to the market investigation, the majority of customers have neither bought nor tested grades from Ukrainian suppliers.[435] Those customers that have tested grades from these suppliers consider that Ukrainian suppliers fail to meet quality requirements. One customer describes the test of a grade from Crimea Titan, where "*the opacity and viscosity in concentrate solvent ink was a disaster*".[436] For another large customer, [...]*, "*Crimea [is] a small supplier into [its] plant in Austria for a specific application and [it] buy through a distributor.*"[437] However, it

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431 Sachtleben's internal document, *2012_NPP_Inks Printing inks strategy*, 24 October 2012, page 11.

432 Sachtleben's internal document, *2012_NPP_Inks Printing inks strategy*, 24 October 2012, page 11.

433 Huntsman, Annex 68 of reply to RFI No 21 of 18 March 2014.

434 Huntsman, Annex 67 of reply to RFI No 21 of 18 March 2014.

435 See responses to questions 64 and 65 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II".

436 [...]*, response to question 67 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II" [ID 2334].

437 [...]*, response to question 66 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II" [ID 2307].

further specifies that "*[it does] not have a pan-European relationship with them so [it] cannot comment on their suitability for all applications*".[438]

(299) Similarly, the Parties' internal documents do not seem to attach much competitive weight to suppliers based in the Ukraine.[439]

(300) Finally, other non-Chinese[440] Asian suppliers are barely present on the EEA market for TiO_2 for printing ink applications, with a combined market share of less than [0-5]*%.

(301) The market investigation confirmed that, while some large customers may have tested or approved grades from Japanese or Korean suppliers, the large majority of customers have neither bought nor tested grades from these suppliers.[441] For instance, [...]* indicates that these suppliers are "*[too] expensive we would not test unless they we at least as competitive as our current suppliers*",[442] while [...]* indicated it had "*[n]ever received an offer from any Trader for Japanese or Korean producers*".[443]

(302) Therefore, the Commission takes the view that Ukrainian, Japanese, Korean and Indian suppliers do not exercise a competitive constraint on the Parties in the EEA market for TiO_2 for printing ink applications.

6.3.11. The market is characterised by high barriers to entry

(303) According to the Horizontal Merger Guidelines, when entry barriers are high, price increases by the merging firm would not be significantly constrained by entry.[444] This is the case in this market.

(304) The Notifying Party submitted in its response to the Statement of Objections that there are no barriers to developing a market presence in the inks segment. This lack of barriers to entry would be sufficient to constrain the merged entity. It argues that there is no capacity issue, that general coating grades manufactured by any sulphate producer are similar or at least share numerous characteristics with ink grades and that the development of a specific ink grade is easy.[445]

(305) However, the existence of spare capacity on the market does not lead to the conclusion that any competitor could readily produce grades for printing ink applications. As explained in the previous sections 6.3.7 – 6.3.10,most competitors are either unable to produce grades for printing ink applications of sufficient quality because they lack the required know-how, or do not have the incentive to produce grades for printing ink applications, due to their size and the costs of entering the market.

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438 [...]*, response to question 66 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II" [ID 2307].

439 See e.g. Sachtleben's internal document, *2012_NPP_Inks Printing inks strategy*, 24 October 2012, page 15.

440 These correspond to Japanese, Korean and Indian suppliers.

441 See responses to question 69 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II".

442 [...]*, response to question 69 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II" [ID 2307].

443 [...]*, response to question 69 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II".

444 Horizontal Merger Guidelines, paragraph 70.

445 Notifying Party's response to the Statement of Objections, paragraphs 90 ff.

(306) Entry into the EEA market for TiO_2 for printing ink applications implies a significant investment in terms of costs and time.

(307) In terms of costs, capacity expansions on the TiO_2 market via building greenfield capacity are very unlikely in the Western world in view of the high investment costs associated with such projects. New entry would require substantial sunk costs, in the range of hundreds of millions for a new sulphate-based plant.[446] Furthermore, environmental concerns limit the possibility for new sulphate plants in the EEA; Police mentions that "*environmental constraints limit its ability to easily increase its capacity*".[447] In that respect, by-products from sulphate-based plants such as copperas are a particular concern. Cinkarna indeed explains that it "*would not be able to produce TiO_2 using only ilmenite titanium as feedstock as such feedstock would result in copperas, a by-product produced during the process. Given that Cinkarna's plant is based in the middle of the city, such by-product is not allowed for environmental reasons*".[448] Furthermore, regarding building a new production facility, Kronos considers that "*the ink market is relatively small, and in our experience, a low profit market due to depressed pricing, which would not justify the investment*".[449] Cristal shares the same view, indicating that "*purchasing a sulphate plant in Europe is not particularly attractive, as it is high cost process, especially in Europe and has environmental issues*".[450]

(308) While Kronos indicates that it "*believe[s] most significant debottlenecking opportunities in [its] plants have already been completed*",[451] debottlenecking may still be possible in some European sulphate-based plants. However, this would also imply significant investments and granting of various environmental authorisations;[452] Kronos indicated for example that it is "*normally very expensive*",[453] Police mentioned a cost of EUR 5000 per additional ton[454] and indicates that "*cost of increasing its capacity in order to be able to produce additional 10 kilotons per year would be too high*".[455] Likewise, Cinkarna explained that it "*has no real possibility to debottleneck/expand its capacity as it is located in*

446 Kronos, response to question 83 of questionnaire "Q2 bis - Questionnaire For Competitors Titanium Dioxide- Phase I" [ID 1005]; agreed minutes of conference call with Kronos of 13 February 2014, paragraph 4 [ID 1065]; agreed minutes of conference call with Henan Billions, paragraph 78 [ID 2440]; Grupa Azotv Zakladv Chemiczne Police, response to question 23.1 of questionnaire "Q6 – Market Test Of The Commitments – Competitors" [ID 1726].

447 Agreed minutes of conference call with Grupa Azotv Zakladv Chemiczne Police of 9 April 2014, paragraph 4 [ID 2170].

448 Agreed minutes of conference call with Cinkarna of 8 April 2014 [ID 2022].

449 Kronos, response to question 36 of questionnaire "Q6 – Market Test Of The Commitments – Competitors" [ID 1688].

450 Agreed minutes of conference call with Cristal of 9 April 2014 [ID 2481].

451 Cristal, response to question 34 of questionnaire "Q6 – Market Test Of The Commitments – Competitors" [ID 2462].

452 Agreed minutes of conference call with Grupa Azotv Zakladv Chemiczne Police of 9 April 2014, paragraph 4 [ID 2170].

453 Kronos, response to question 34 of questionnaire "Q6 – Market Test Of The Commitments – Competitors" [ID 1688].

454 Grupa Azotv Zakladv Chemiczne Police, response to question 23.1 of questionnaire "Q6 – Market Test Of The Commitments – Competitors" [ID 1726].

455 Agreed minutes of conference call with Grupa Azotv Zakladv Chemiczne Police of 9 April 2014, paragraph 4 [ID 2170].

the centre of the city".[456] In Eastern Europe only Precheza seems to have the ability to further debottleneck its plant, thereby adding some albeit limited capacity.[457]

(309) In terms of time, TiO_2 suppliers consider that entering into the EEA market for TiO_2 for printing ink applications can take up to 5 years. One competitor explained that it would take "*at least 3 years including designing of the grade, application tests, process validation, building of the market*", another one indicated "*five years estimated*".[458]

(310) Even Huntsman in a reply to a Commission's RFI indicated that it would itself not be able to readily produce TR52 in another of its plants[459] or in another line in Calais. It would need […]*, although it already has the know-how.[460]

(311) In addition, even for suppliers already possessing production facilities that could be used to enter the market and therefore would need to incur the sunk costs (in this case related to the establishment of acquisition of a sulphate-based production facility), barriers to entry can take the form of access to important technologies.[461] In the case at hand, these mainly reside in the know-how associated with the production of printing ink grades, and the need for sulphate-based suppliers to adapt their processes to produce these grades (mainly during calcination and at the finishing stage, throughout coating).[462] This is in line with the responses the Commission received in the course of market investigation and which pointed out that printing ink manufacturers have very stringent requirements as to the specifications of the product.

(312) In addition, a critical scale, as well as the corresponding distribution and sales networks in the EEA,[463] are required to serve a market where large customers purchase high volumes and for security of supply reasons seem to be reluctant to rely on small players.[464] One customer explained that they would not want to account for more than 20% of any individual supplier's output.[465] In addition, from a suppliers' perspective, beyond the development costs, maintaining a large range of grades is not viable for small sulphate-based suppliers such as those from Eastern Europe, which typically have only one production facility.[466] One of the reasons is that they would have to amortize the inefficiencies coming from grade switching (cleaning, shorter batches, etc.).[467] This is in line with Huntsman's own production strategy to take

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456 Agreed minutes of conference call with Cinkarna of 8 April 2014, paragraph 8 [ID 2022].

457 Agreed minutes of conference call with Precheza of 17 February 2014, paragraph 7-9 [ID 1374].

458 See responses to question 35 of questionnaire "Q2 and Q2 bis - Questionnaire For Competitors Titanium Dioxide- Phase I".

459 Huntsman noted that it "*has evaluated proposals to dual source TR52 by producing the grade at another facility such as Scarlino. This has not been implemented as there has been sufficient capacity at the Calais facility to meet customer requirements*" (Form CO, paragraph 563).

460 Huntsman, reply to the RFI No 32 of 24 July 2014, page 10.

461 Horizontal Merger Guidelines, paragraph 71.

462 Form CO, paragraphs 82-94; see responses to questions 8 and 9 of questionnaire "Q10 – Questionnaire For Competitors - TiO_2 - Phase II".

463 Horizontal Merger Guidelines, paragraph 71.

464 See responses to question 31 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II"; see responses to question 20 of questionnaire "Q5 – Market test customers".

465 [...]*, response to question 31 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II" [ID 2307].

466 See responses to question 34 of questionnaire "Q2 and Q2 bis - Questionnaire For Competitors Titanium Dioxide- Phase I".

467 Agreed minutes of a conference call with Grupa Azotv Zakladv Chemiczne Police of 9 April 2014, paragraph 15 [ID 2170]; agreed minutes of a conference call with Precheza of 11 April 2014, paragraph

"*benefits from having longer production runs"*. Indeed, Huntsman itself "*aggregates grades at particular sites in order to maximise the efficiency of production*".[468] The Polish supplier, Police, explained during the market test that supplying 30 kt of TiO_2 to the printing ink applications market would correspond to 75% of its capacity, which it would consider to be too dangerous "*to concentrate to such an extent on the relatively small printing ink market.*"[469] Therefore, Police considered that to be able to sell 30kt of printing ink grades the supplier would have to have the capacity of "*about 100 000 tons (smaller plant is rather unprofitable)*".[470]

(313) The market test of the commitments of 28 March 2014 confirmed that the economic incentives for investing in a new grade for printing ink applications, even provided with the know-how, are not compelling for Western suppliers. Police mentioned in particular "*too low capacity of [its] plant; the necessity of costly expansion of our plant; potentially market risks after business reorientation*",[471] while Kronos indicated that "*having the necessary capacity to make 30K mt [kilotons] of ink grade may require the displacement (at least in part) of other grades and before this would be done we would need to understand the profitability impact of such a change*".[472]

(314) Finally, the EEA market for TiO_2 for printing ink applications has a specific customer base, composed in particular of large customers having stringent quality requirements. This also needs to be taken into account by a supplier willing to enter this market and needs to be balanced against the overall size of the market, which is comparatively small, and the price, which is not substantially higher than in other segments. This affects incentives of suppliers to invest in acquiring the know-how and investing in developing printing ink grades which is a burdensome and extremely time-consuming process. In this context Police explained that "*the TiO_2 market for printing ink applications is more stable than the general TiO_2 market as the printing ink market is not seasonal. However, customers in this market have high quality requirements and therefore, it is difficult to compete with the big players on quality and build a strong position. It would take years.*"[473]

(315) Therefore, the Commission takes the view that the EEA market for TiO_2 for printing ink applications is characterized by high barriers to entry, principally due to the specific production know-how, demanding customer base and high sunk costs.

6.3.12. Post-merger, the merged entity will be in a position to increase prices in the EEA market for TiO_2 for printing ink applications

(316) The larger the market share, the more likely a firm is to possess market power. And the larger the addition of market share, the more likely it is that a merger will lead to a significant increase in market power. The larger the increase in the sales base on

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4 [ID 2204]; Grupa Azotv Zakladv Chemiczne Police, response to question 19.2 of questionnaire "Q2 - Questionnaire For Competitors Titanium Dioxide - Phase I" [ID 923].

468 Form CO, paragraph 565.

469 Agreed minutes of a conference call with Grupa Azotv Zakladv Chemiczne Police of 9 April 2014, paragraph 10 [ID 2170].

470 Grupa Azotv Zakladv Chemiczne Police, response to question 36 of questionnaire "Q6 – Market Test Of The Commitments – Competitors" [ID 1726].

471 Grupa Azotv Zakladv Chemiczne Police, response to question 32 of questionnaire "Q6 – Market Test Of The Commitments – Competitors" [ID 1726].

472 Kronos, response to question 33 of questionnaire "Q6 – Market Test Of The Commitments – Competitors" [ID 1688].

473 Agreed minutes of conference call with Grupa Azoty Zaklady Chemiczne Police of 9 April 2014, paragraph 11 [ID 2170].

which to enjoy higher margins after a price increase, the more likely it is that the merging firms will find such a price increase profitable despite the accompanying reduction in output.[474]

(317) However, when entering a market is sufficiently easy, a merger is unlikely to pose any significant anti-competitive risk.[475] For entry to be considered as countervailing factor, it must be shown to be likely, timely and sufficient.[476]

(318) In the present case, the combined market shares of the Parties are well above 50%. Moreover, as will be explained in the following sections, at this stage of the investigation it appears that other suppliers lack the ability and/or incentives to enter/expand in the market in a timely manner. As a result, the merged entity's unmatched market power would be unlikely to be mitigated and price increases are likely to occur. In addition, customers are particularly vulnerable to price increases if they have difficulties switching to other suppliers because they face substantial switching costs or because there are few alternative suppliers, as is the case here.[477]

6.3.12.1. The Transaction leads to very high market shares

(319) Although market shares and additions of market shares only provide first indications of market power, they are normally important factors in the assessment of the likely impact of a merger. "*According to well-established case law, very large market shares – 50% or more – may in themselves be evidence of the existence of a dominant market position. However, smaller competitors may act as a sufficient constraining influence, if, for example, they have the ability and incentive to increase their supplies.*"[478]

(320) After the Transaction, the merged entity, combining the two largest and closest competitors, would hold [70-80]*% of the EEA market for TiO_2 for printing ink applications, which gives rise to a presumption of the existence of a dominant market position. Kronos, the third player would have [10-20]*% while every other supplier would have an individual market share lower than [0-5]*%.

(321) The potential detrimental effect of the merger is confirmed by concerns expressed by customers that responded to the Commission's questionnaire in relation to the effects of the Transaction on the EEA market for TiO_2 for printing ink applications. They expected competition reduction, price increases or capacity reductions.[479] A customer, [...]*, believes that the merger will be detrimental as "*we will go to a monopolist dominant position especially in the printing inks production segment*",[480] further explaining that it "*is very concerned about the consequences of the merger which will be very bad for printing ink manufacturers […]* since the only three plants that can supply [...]* are controlled by the new enlarged entity, the price will also be controlled by this group. Given that the third supplier, Kronos, is in a dire economic situation, it will rather follow a price increase than counter it*".

(322) Large customers also mentioned the potential detrimental impact on competition. While [...]* indicated it does not expect the Transaction will have any effect on the

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474 Horizontal Merger Guidelines, paragraph 27.

475 Horizontal Merger Guidelines, paragraph 68.

476 Horizontal Merger Guidelines, paragraph 68.

477 Horizontal Merger Guidelines, paragraph 31.

478 Horizontal Merger Guidelines, paragraph 17.

479 See responses to questions 86-89 of questionnaire "Q2 and Q2 bis - Questionnaire For Competitors Titanium Dioxide- Phase I".

480 [...]*, response to question 76 of questionnaire "Q1-Customers titanium dioxide", [ID 1579].

price of TiO_2 for printing ink applications, it nonetheless expects "*price increases*"[481] on the overall market as "*both companies [Huntsman and Sachtleben] are not at their target margins*",[482] as well as "*reduced competition*"[483] and, regarding overall TiO_2 production capacities, "*nothing initially but then a reduction*".[484] [...]* similarly expects "*increasing prices and reduced capacity in the short term*".[485] Eventually, [...]* expects that price of TiO_2 for printing ink applications "*could rise*" because of "*significantly less competition*"[486] since "*one major competitor of the other will disappear*".[487]

(323) During the phase II market investigation, while [...]* indicated that its "*multisourcing strategy always forces [...]* to look for alternative options*",[488] it specified that "*so far competition between the two major suppliers worked well*".[489] This is echoed by [...]*, which believes that "*in Europe prices are high because […] Huntsman, Sachtleben, Kronos […know] customers need them and their products. In that respect, the 3-to-2 merger would remove a significant competitive constraint in the EEA*".[490]

(324) It follows that the merged entity, not only becoming the largest sulphate-based supplier worldwide, would also control substantial amount of sales in the EEA market for TiO_2 for printing ink applications conferring upon it significant market power. The following sections outline the reasons why the Commission considers that in this case there are no significant mitigating factors, such as the existence of competitors that could act as a disciplining element on the merged entity, or customers with the ability to directly constrain the merged entity's pricing behaviour which in that case would rebut the presumption of dominance.

6.3.12.2. The 2011 TiO_2 shortage showed that TiO_2 suppliers have a degree of market power allowing them to increase prices beyond their costs increases

(325) The TiO_2 market recently experienced a natural experiment indicating that TiO_2 suppliers are able to increase prices beyond the mere passing-on to their customers the costs increases. In 2011, a price rise occurred as the result of the reduction in TiO_2 capacity that was implemented by the industry following the onset of the financial and economic crisis, combined with an increase in feedstock prices in late 2010 and 2011.[491] TiO_2 suppliers, among others the Parties, increased their prices in the period of 2010-2012 beyond the feedstock price increase.

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481 [...]*, response to question 78 of questionnaire "Q1- Questionnaire For Customers Titanium Dioxide - Phase I", [ID 2303].

482 [...]*, response to question 78 of questionnaire "Q1- Questionnaire For Customers Titanium Dioxide - Phase I", [ID 2303].

483 [...]*, response to question 75 of questionnaire "Q1- Questionnaire For Customers Titanium Dioxide - Phase I", [ID 2303].

484 [...]*, response to question 76 of questionnaire "Q1- Questionnaire For Customers Titanium Dioxide - Phase I", [ID 2303].

485 [...]*, response to question 75 of questionnaire "Q1- Questionnaire For Customers Titanium Dioxide - Phase I", [ID 1625].

486 [...]*, response to question 78 of questionnaire "Q1- Questionnaire For Customers Titanium Dioxide - Phase I", [ID 1352].

487 [...]*, response to question 75 of questionnaire "Q1- Questionnaire For Customers Titanium Dioxide - Phase I", [ID 1352].

488 Agreed minutes of conference call with […]* of 19 May 2014, paragraph 13 [ID 2580].

489 Agreed minutes of conference call with […]* of 19 May 2014, paragraph 13 [ID 2580].

490 Agreed minutes of conference call with […]* of 22 May 2014, paragraph 33 and 34 [ID 2219]

491 Form CO, paragraph 287.

Figure 13 - Huntsman average European price of TiO_2 for inks and other applications

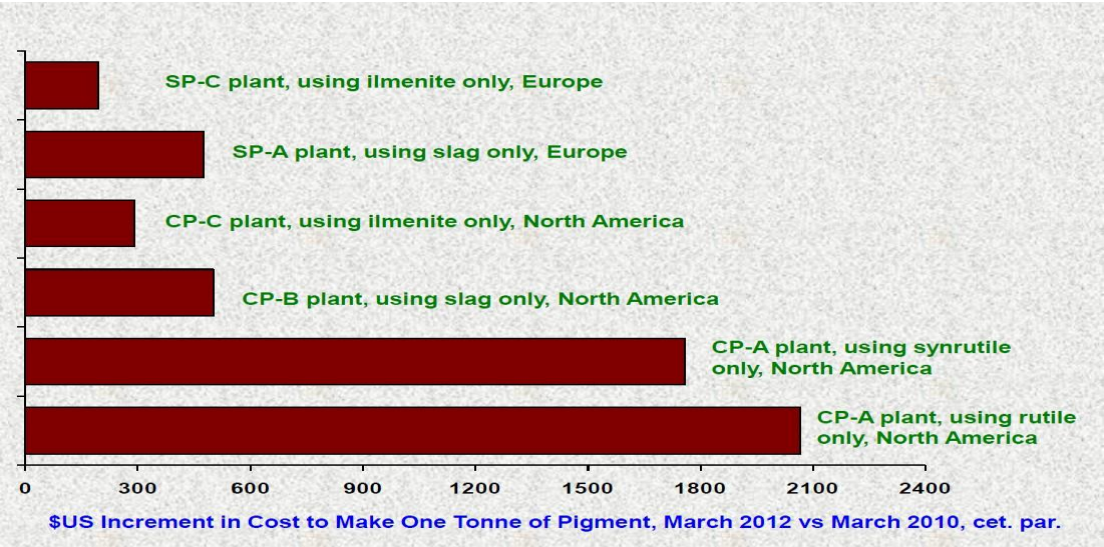
[…]*

Source: Form CO, page 69.

(326) One major customer indicated for example that the price increase applied by the TiO_2 suppliers was beyond feedstock increase: "*The 2011 price increase was caused by a surge in the TiO_2 feed stock prices and the fact that the global TiO_2 industry mothballed 10-15% of its sulphate capacity. As the demand for TiO_2 was growing at that time and there were TiO_2 capacity constraints, TiO_2 suppliers were in a position to increase prices well above the feedstock price increase and did it together as a market.*"[492]

(327) […]*.[493] […]*.

Figure 14 - Increment in cost to make one tonne of pigment between March 2010 and March 2012



Source: Sachtleben's internal document[494]

(328) […]*[495] […]*.

Figure 15 - Evolution of […]* price and margin between Q1 2007 and Q1 2012

[…]*

Source: Sachtleben's internal document[496]

(329) This can also be inferred from the financial results of the pigment division of Huntsman, which show that the years 2010-2012 (EBITDA at 17%, 31% and 25%) were more profitable than 2008-2009 (EBITDA at 2% and -3%), but also better than before the crisis (11% in 2005, 11% in 2006 and 5% in 2007).[497]

(330) A number of plant idling and closures occurred during these years, including at Huntsman which idled its sulphate plant in Huelva (Spain, 80 kt) between June 2009

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492 Agreed minutes of conference call with […]* of 2 June 2014, paragraph 21. [ID 2293].
493 Sachtleben's internal document, […]*, 11 February 2013, page 13.
494 Sachtleben's internal document, […]*, 11 February 2013, page 15.
495 Sachtleben's internal document, […]*, 11 February 2013, page 13.
496 Sachtleben's internal document, […]*, 11 February 2013, page 16.
497 Huntsman's internal document, *Annual reports for the years 2007*, page 83, *2009*, page 78, *2010*, page 87, *2011*, page 76 , *2012*, page 75 and *2014*, page 82.

and January 2010[498] and permanently closed another of its sulphate plants, Grimsby in 2009 (UK, 40 kt).[499]This, together with other factors, had a very positive impact on the EBITDA margins which reached a better level than before the crisis.

(331) While these financial results cover the whole TiO_2 business and possibly more, this analysis provides a broad understanding of the fact that the shortage of TiO_2 that occurred in 2010-2012 allowed TiO_2 suppliers to increase prices and reach better margins than previously. In addition, there are no reasons to believe that these findings would differ in relation to TiO_2 for printing ink applications. First, the same production assets and feedstock are used for TiO_2 grades for printing ink applications and for other grades,[500] closely linking the production costs of the different grades. Therefore, plant idling and closure, as well as increase of feedstock price affect all TiO_2 markets, and also impact prices of all TiO_2 markets.

(332) The fact that TiO_2 suppliers are able and have the incentives to keep the prices high is also recognised by a major cutsomer, […]*.[501] This further indicates that TiO_2 suppliers are the price setters in this market and are not disciplined to a significant extent by their customers and this irrespective of the fact that the customer base is very concentrated in this market (see also section 6.3.13 on buyer power).

(333) Therefore, the Commission takes the view that the 2011 TiO_2 shortage showed that TiO_2 suppliers have a degree of market power allowing them to increase prices beyond their costs increases.

6.3.12.3. Kronos would not have the ability and the incentive to discipline the pricing behaviour of the merged entity post-merger

(334) Non-merging firms in the same market can also benefit from the reduction of competitive pressure that results from the merger, since the merging firms' price increase may switch some demand to the rival firms, which, in turn, may find it profitable to increase their prices.[502]

(335) The Commission has analysed the extent to which Kronos would have the ability to expand in the market with sufficient volume to cater for additional demand shifting away from the merged entity and the extent to which it would have the incentives to undercut the merged entity's price rather than to follow it.

(336) As concerns its ability, theoretically Kronos has the relevant attributes to expand in the EEA market for TiO_2 for printing ink applications: it has 146 kt of sulphate-based capacity and the required know-how as it is already active in the market with a recognised printing ink grade. However, Kronos' ability to further expand in this market may be limited by its capacity. Indeed, Kronos indicated that its capacity is constrained at this stage, as it "*historically has operated its plants at high utilization rates exceeding 90% of effective capacity*".[503] "*Kronos was not running at full capacity in the beginning of 2013, but began to run all of its available plants at full capacity starting in Q2 2013. […] Additionally, this effect will remain in place during 2014 as Kronos envisages that it will sell in excess of its production, […]. Kronos considers that it would have little to no spare capacities to serve customers*

498 Huntsman, Annex 2 of reply to RFI No 21 of 18 March 2014, page 6.

499 Huntsman, Annex 2 of reply to RFI No 21 of 18 March 2014, page 7.

500 Form CO, paragraphs 117 and following; Huntsman, reply to RFI No 21 of 18 March 2014, page 15.

501 Sachtleben's internal document, […]*, 11 February 2013, page 18.

502 Horizontal Merger Guidelines, paragraph 24.

503 Kronos, response to question 33 of questionnaire "Q6 – Market Test Of The Commitments - Competitors" [ID 1688].

of Huntsman and Sachtleben if there were any willing to switch post-transaction (or that any new customers would be come at the expense of other existing sales volume). In general, in the long term, Kronos considers that the market for TiO_2 will become tight due to increasing demand in the developing countries with limited new capacities being built."[504] Finally, Kronos believes that "*most significantly debottlenecking opportunities in [its] plants have already been completed*".[505]

(337) It is therefore unlikely that Kronos would be able to react to increased demand in the EEA market for TiO_2 for printing ink applications and increase its sales should the prices go up post-merger, unless it were to shift some of its production capacity currently used for other applications to this application.

(338) In terms of incentives, Kronos is already slightly more expensive than the Parties[506] and considers that the prices of TiO_2 for printing ink applications are too low due to the competition between Huntsman and Sachtleben indicating that it would not be willing to undercut the prices but would rather follow a price increase by the Parties: "*[i]t appears that the market does not price more for this niche segment because competition primarily between Huntsman and Sachtleben, who dominate the printing ink segment, keeps prices for ink grades lower than they otherwise might be.*"[507]

(339) In its response to the Statement of objections, the Notifying Party contested the Commission's findings that Kronos would have limited ability and no incentives to undercut the potential price increase.[508]

(340) According to the Notifying Party. Kronos has sufficient capacity to be able to expand its sales in the printing ink segment and "*start producing at least* […]* *kt per year of TiO_2 for use in inks*".[509] The Notifying Party primarily relies on Kronos' 10-K statement to show that its production rate as a percentage of capacity peaked in 2010 and 2011 when demand was high.[510] Yet these figures represent overall TiO_2 operating statistics, and do not show any breakdown by application, falling short of explaining how Kronos arbitrages its capacity with respect to printing ink applications and other applications. Furthermore, Huntsman's claim that "*a supplier who has a TiO_2 grade for use in inks applications can easily switch production from coatings to inks*"[511] is in contradiction with its previous acknowledgement that "*to produce significantly more TR52 than […]* kt per annum would require material investment and/or a consequential reduction in the production of other grades*".[512]

(341) As concerns the incentive to follow the price increase by the merged entity rather than undercut it, this is implicitly recognized by the Notifying Party in its example provided in the response to the Statement of objections. Indeed, the Notifying Party

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504 Agreed minutes of conference call with Kronos of 13 February, paragraph 18 [ID 1065].

505 See responses to questions 33 and 34 of questionnaire "Q6 – Market Test Of The Commitments - Competitors".

506 See agreed minutes of conference call with Kronos of 13 February, paragraph 22 [ID 1065]. See also Sachtleben's internal document, *[...]*: Liquid Inks Raw Material Strategy Workshop TiO_2 Review*, 11 February 2013, page 22, where [...]* describes the recent behaviour of Kronos as very opportunistic price-wise: "*always states to be ready to support [...]* with volumes (prices a different story)*", "*the first in increasing prices to [...]**".

507 Agreed minutes of conference call with Kronos of 13 February, paragraph 22 [ID 1065].

508 Notifying Party's response to the Statement of Objections, paragraphs 271ff.

509 Notifying Party's response to the Statement of Objections, paragraphs 296.

510 Notifying Party's response to the Statement of Objections, paragraphs 292.

511 Notifying Party's response to the Statement of Objections, paragraph 294.

512 Form RM of 28 July 2014 submitted by the Notifying Party, paragraph 80.

described the following hypothetical scenario: "[…]*".[513] However, at odds with its own interpretation, this line of reasoning shows that, should the merged entity increase prices from 100 to 102, Kronos could (and would have incentive to) increase the price to 100 (or even 101), compared to 98 or 99 in the absence of the merger.

(342) Finally, Kronos does not have a good reputation in the market as customers found it too aggressive during the shortage in 2010-2012 and since then customers are wary of Kronos.[514]

(343) Therefore, the Commission takes the view that Kronos would have limited ability and insufficient incentives to discipline the pricing behaviour of the merged entity in the EEA market for TiO_2 for printing ink applications.

6.3.12.4. Chloride-based TiO2 suppliers are unlikely to exert sufficient competitive pressure on the merged entity

(344) Regarding chloride-based suppliers, as indicated in section 6.1.1, their very small market share in the EEA is unlikely to increase significantly post-merger as their grades only fit a very small part of the EEA customers' requirements. Furthermore, as shown during the market test of the commitments offered by the Notifying Party on 28 March 2014, even provided with the know-how for TR52, a "*chloride-based producer will be unable to produce TR-52 which is sulphate grade, because the production process is different*".[515] According to Kronos, producing TR52 for chloride-based suppliers would require that "*they would build a SP [sulphate]* operation which is costly and very unlikely*".[516]

(345) Therefore, the Commission takes the view that chloride-based TiO_2 suppliers would have limited ability to discipline the pricing behaviour of the merged entity in the EEA market for TiO_2 for printing ink applications.

6.3.12.5. Eastern European and other sulphate-based suppliers are unlikely to increase their position and sufficiently constrain the merged entity

(346) In its response to the Statement of objections, the Notifying Party argued that Eastern European TiO_2 suppliers could constrain the merged entity even by switching a small part of their production to the production of TiO_2 for printing ink applications.

(347) First, the Commission notes that the market investigation and the sales data show that Eastern European suppliers are not really active in the EEA market for printing ink applications, mainly due to the fact they do not have the necessary production know-how and the fact that their scale is not adapted to focus on niche markets like this one.

(348) In addition, according to the market investigation and the market test of the commitments, Eastern European suppliers and non-Chinese Asian sulphate-based suppliers, are either more expensive,[517] do not have the necessary scale and spare capacity, lack the know-how and hence do not have the appropriate quality to meet

513 Notifying Party's response to the Statement of Objections, paragraph 308.

514 Sachtleben's internal document, […]*, 11 February 2013, pages 22-23.

515 Ishihara Sangyo Kaisha, Ltd., response to question 23 of questionnaire "Q6 – Market Test Of Commitments - Competitors" [ID 1644].

516 See responses to question 23 of questionnaire "Q10 – Questionnaire For Competitors - TiO_2 - Phase II".

517 See in particular sections 9.2.7 and 9.2.8.

the customers' requirements in the EEA, or do not have any interest in investing in this market.

(349) In particular, the market investigation revealed that Eastern European suppliers (Cinkarna, Precheza, Police), even provided with the know-how, do not have the financial and operational size to significantly enter the EEA market for TiO_2 for printing ink applications which is characterised by large customers having stringent quality requirements. These suppliers also indicated that expanding their portfolio would put at risk their operational efficiency.

(350) The responses to the market test of the commitments of 28 March 2014 revealed that even if Precheza were to be provided with the relevant know-how due to its scale it would have limited incentives to enter the EEA market for TiO_2 for printing ink applications. Precheza indicated that "*there would be little economic incentive for Precheza to purchase the TR-52 business, as the production costs would be higher than their existing costs, while the profit margin would not be higher than its current products*".[518]

(351) Similarly, Cinkarna specified that due to capacity reasons it "*would not be a suitable candidate for purchasing the TR-52 business. It has no spare capacity and has no real possibility to debottleneck/expand its capacity […]. Therefore, if Cinkarna were to purchase the TR-52 business, it would need to switch 40-50% of its portfolio towards this product. Cinkarna considers that such change would imply substantial risk and is not realistic*".[519]

(352) Police confirmed Cinkarna's and Precheza's analysis by indicating "*not to be interested in purchasing the TR-52 business of Huntsman as the volume sold (30 kilotons per year) is too large for a small company like Police. According to Police, Huntsman's commitment proposal could only be suitable for medium or large companies, which have a production capacity larger than 150 kilotons per year*".[520]

(353) These comments were provided within the context of the market test of the commitments of 28 March 2014 consisting in the transfer of the know-how associated with the production of TR52 and indicate that their capacity and operational set up would not allow them to become significant competitors in this market even if these suppliers were to be provided with the relevant know-how.

(354) First, there are no indication that these suppliers would have more ability and incentive to develop the necessary know-how to enter the EEA market for TiO_2 for printing ink applications in the future. Indeed, they already tried to enter the EEA market for TiO_2 for printing ink applications in the past, but have not been successful.[521] Precheza indicated that "*they had had quality problems and […] low profitability issues*",[522] Cinkarna mentioned that "*our grades do not match the*

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518 Agreed minutes of conference call with Precheza of 11 April 2014 [ID 2204].

519 Agreed minutes of conference call with Cinkarna of 8 April 2014 [ID 2022].

520 Agreed minutes of conference call with Grupa Azotv Zakladv Chemiczne Police of 9 April 2014 [ID 2170].

521 See responses to question 3.1 of questionnaire "Q10 – Questionnaire For Competitors – TiO_2 - Phase II".

522 Precheza, response to question 3.1 of questionnaire "Q10 – Questionnaire For Competitors - TiO_2 - Phase II".

requirements of customers"[523], while Police indicated that "*The ratio of printing ink market in our sales is very low*".[524]

(355) Second, in view of their size, the financial incentives of these suppliers to make the effort to enter the market appear to be limited. Indeed, the development and production of a new grade implies costs associated with the investment in R&D and possibly in equipment adaptations, and leads to production inefficiencies. Precheza therefore indicated that it would not enter the EEA market for TiO_2 for printing ink applications, even if the price of TiO_2 grades for printing ink applications were to permanently increase by 5-10% while the prices of other TiO_2 grades remained constant, because "*[t]here are several points against - from profitability up to production technology*".[525] Likewise, Police indicated that widening its portfolio would lead to inefficiencies: "*Adding each new grade to our portfolio increases cost of production (as a result of too frequent switching from grade to grade).*" [526]

(356) The lack of interest of these suppliers in the EEA market for TiO_2 for printing ink applications is also due to the difficulty to reach to large customers. Indeed, the success of a new entrant is also determined by the volume it will be able to sell on the market. As highlighted by large customers, a certain critical scale is required to serve large customers. In this context Police indicates that a minimum volume is necessary to be accepted as a supplier by printing ink manufacturers, especially the largest ones, as they are global players: "*There is a very wide span of demand between minor and major ink producers (from few tons up to thousands). On the ink market there are also global producers, therefore to be global supplier appropriate capacity is needed."*[527] Therefore, Police considers that "*the annual capacity of a potential global supplier for ink market should be enough high, for example at least 100 000 tons.*" [528] Likewise, Precheza explained that "*It´s difficult to be accepted by big players from ink sector*".[529]

(357) Finally, it should also be noted that such entry would require significant time. Police considers that a supplier already active in the market for TiO_2 for printing ink applications would need "[a]*t least 3 years*"[530] to develop a new TiO_2 grade for printing ink applications. Likewise, Precheza considers that the time needed is "*Under 3 years without the investment. We expect the amount of hundreds thousands € for R&D*." [531] This might take even more time, since a TiO_2 supplier not active in printing ink applications but active in architectural/decorative or industrial coatings,

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523 Cinkarna, response to question 3.1 of questionnaire "Q10 – Questionnaire For Competitors - TiO_2 - Phase II".

524 Police, response to question 1_2.1 of questionnaire "Q10 – Questionnaire For Competitors - TiO_2 - Phase II".

525 Precheza, response to question 35.4 of questionnaire "Q10 – Questionnaire For Competitors - TiO_2 - Phase II".

526 Police, response to question 36.3 of questionnaire "Q10 – Questionnaire For Competitors - TiO_2 - Phase II".

527 Police, response to question 30 of questionnaire "Q10 – Questionnaire For Competitors - TiO_2 - Phase II".

528 Police, response to question 30 of questionnaire "Q10 – Questionnaire For Competitors - TiO_2 - Phase II".

529 Precheza, response to question 36.5 of questionnaire "Q10 – Questionnaire For Competitors - TiO_2 - Phase II".

530 Police, response to question 28.1 of questionnaire "Q10 – Questionnaire For Competitors - TiO_2 - Phase II".

531 Precheza, response to question 28.1 of questionnaire "Q10 – Questionnaire For Competitors – TiO_2 - Phase II".

such as Police, Precheza and Cinkarna, would need "*[a]t least 5 years*"[532] to develop a new TiO_2 grade for printing ink applications according to Police and "*[…] approximately 4-6 years and huge investment to new technology*" according to Precheza.[533]

(358) Therefore, the Commission takes the view that Eastern European suppliers would have limited ability (no current know-how, limited capacity) and no incentives (small scale, high investments needed to adapt the production process) to increase their position in this market and thus discipline the pricing behaviour of the merged entity.

6.3.12.6. Chinese suppliers are unlikely to sufficiently constrain the merged entity after the Transaction, as there are significant uncertainties as to whether Chinese entry into the EEA market for TiO_2 for printing ink applications would be timely

(359) Throughout these proceedings, the Notifying Party claimed that Chinese suppliers constitute a credible competitive threat pre-merger and will continue to do so, and even to a larger extent, after the Transaction. For instance, the Notifying Party claims in the Form CO and in its response to the Statement of Objections that leading Chinese suppliers have heavily invested in additional capacity over the last decade and that it expects this trend to be maintained in the future, therefore leading to ample Chinese capacity available.[534] The Notifying Party also claimed that Chinese suppliers already exert a competitive constraint on the Parties,[535] because leading Chinese suppliers have significantly improved the quality of their TiO_2 grades over the last five years.[536]

(360) To demonstrate the level of competitive constraint exerted by Chinese suppliers in the EEA market for TiO_2 for printing ink applications, the Notifying Party, in its response to the Decision opening the proceedings, submitted a number of references from customer reports allegedly showing that "*most customers have already tested and approved Chinese materials*".[537] This is further stated in its response to the Statement of Objections in which the Notifying Party also argues that Chinese suppliers already supply some volumes to European customers.[538] It nevertheless acknowledges the so far limited volumes are sold in the EEA, while considering that a price increase by the merged entity would prompt customers to switch to Chinese suppliers.[539]

(361) In accordance with the Horizontal Merger Guidelines, for entry (or expansion) by Chinese suppliers to be considered to be a sufficient competitive constraint on the merging parties, it must be likely, timely and sufficient.[540] Against this background, the Commission assessed the level of likely post-merger constraint exercised by Chinese suppliers on the merged entity in the following way. First, the Commission

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532 Police, response to question 28.2 of questionnaire "Q10 – Questionnaire For Competitors - TiO_2 - Phase II".

533 Precheza, response to question 28.2 of questionnaire "Q10 – Questionnaire For Competitors - TiO_2 - Phase II".

534 Form CO, paragraphs 180-183, Notifying Party's response to the Statement of Objections, paragraph 156 ff.

535 Notifying Party's response to the Statement of Objections, paragraphs 182 ff.

536 Form CO, paragraphs 192-195.

537 Notifying Party's response to the Decision opening the proceedings, paragraph 109; Annex 1 and Annex 2 of the Notifying Party's response to the Decision opening the proceedings.

538 Notifying Party's response to the Statement of Objections, paragraphs 173 ff.

539 Notifying Party's response to the Statement of Objections, paragraphs 173 and 186.

540 Horizontal Merger Guidelines, paragraph 68.

investigated the likelihood of entry into the EEA market for TiO_2 for printing ink applications by Chinese suppliers with a suitable grade and in a timely manner. Then, assuming that such entry were to occur, the Commission investigated whether the Chinese suppliers, individually or taken together, would be in a position to constrain the pricing behaviour of the merged entity to a sufficient extent.

(362) As indicated in section 6.3.7, the presence of Chinese suppliers in the EEA market for TiO_2 for printing ink applications is currently limited due to in particular a difference in quality between the Chinese product and the product supplied by the Western suppliers, Huntsman and Sachtleben.

(363) However, the market investigation also provided objective indications that some printing ink manufacturers, in particular the largest ones, are actively working with some Chinese suppliers to develop a suitable TiO_2 grade for printing ink applications in the EEA. These efforts are in line with customers' cost reducing strategies[541] and the willingness of customers to secure alternative suppliers within the framework of their multisourcing strategy. While these intentions are not directly linked to the Transaction, the latter may nonetheless speed up customers' efforts to approve Chinese ink grades.

(364) Specifically, the three biggest customers are at various stages of approval process of Chinese TiO_2 grades.

(365) First, [...]* generally confirmed it "*has tested hundreds of grades from several Chinese suppliers*"[542] but that "*developing a relationship with a supplier takes years and therefore [it] prefers focusing on one Chinese supplier*".[543] At the end of May 2014, [...]* indicated that it experienced "*a success (break-through) in testing Chinese TiO_2. [...]*'s European laboratory tests resulted in granting lab approval for a grade*"[544] although the internal reporting on the results of the testing indicate that the grade has some shortcomings such as "*the gloss of the [confidential] is slightly down*" and "*the dispersion seemed more difficult on a laboratory mixer and despite a longer milling time, some bits remained on the gauge*" while "*the resulting prints seem to have a slightly 'rough' feel.*"[545] While, according to [...]*, such laboratory approval is the most difficult part of the approval process, the key remaining phase in the qualification process of this grade is the customer approval. Indeed, the results of the testing process is uncertain at this stage as [...]* stated itself "*to sum up, the opacity and gloss quality of the new [confidential] looks good but we need to determine whether the larger particles will disperse under factory conditions.*"[546] Currently, [...]* has placed an order for 20 tons of Chinese TiO_2, to be tested "*at [...]* manufacturing plants and at the customers*"',[547] a process which is expected to last for two to three months.[548] However, so far, [...]* confirmed that its use of Chinese TiO_2 is only limited to some applications: "*[t]he Chinese TiO_2 is used pure (without blending with other TiO_2 grades) in one application, namely water-based ink for flexo packaging. This application involves ink for flexographic surface*

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541 Sachtleben's internal document, *Examples of Chinese TiO_2 grades in printing inks*, 11 November 2013, page 3.

542 Agreed minutes of conference call with [...]* of 2 June 2014, paragraph 9 [ID 2293].

543 Agreed minutes of conference call with [...]* of 2 June 2014, paragraph 9 [ID 2293].

544 Agreed minutes of conference call with [...]* of 2 June 2014, paragraph 13 [ID 2293].

545 [...]*, response to Commission's article 11(3) decision of 20 June 2014 [ID 2537].

546 [...]*, response to Commission's article 11(3) decision of 20 June 2014 [ID 2537].

547 Agreed minutes of conference call with [...]* of 2 June 2014, paragraph 13 [ID 2293].

548 Agreed minutes of conference call with [...]* of 2 June 2014, paragraph 14 [ID 2293].

printing on cardboard paper where gloss is not needed".[549] This is however not the predominant printing ink application, surface printing, for which TR52 and RDI-S are typically used.

(366) [...]* indicated being "*in discussion with Chinese suppliers to develop a grade for printing ink*".[550] However, while "*[...]* expects to see grades with suitable quality in near future*", it is "*subject to the results of the tests of the Chinese grades [that] [...]* would consider to adapt its purchasing strategy*".[551] [...]* highlights in particular the need for their customer's acceptance of ink produced with Chinese TiO_2 grades: "*[t]he duration of the market test [of Chinese TiO_2 grades] will highly depend on its results, that is if the customers approve the trial product. Based on previous experience, market testing can take between 1 month to several months*".[552]

(367) [...]* is also in the process of developing relationships with Chinese suppliers. So far, however, since "*Chinese quality […] is still away from the Western European standard, […] [...]* uses Chinese TiO_2 for a selected range of intermediate products blended with other components*".[553] Indeed, [...]* uses Chinese TiO_2 blended with Western European TiO_2 to avoid compromising the quality of the ink produced. Laboratory tests made by [...]* show that no grade currently offers a 1:1 substitution with Sachtleben's RDI-S, and that blending with RDI-S is necessary to obtain a suitable opacity and gloss: "*we made investigations to substitue RDI-S in all or partially. All results to substitue RDIS from Sachtleben by 100% failed. We didn't recive the same opacity and the same matt grade like the original. The best were obtained by a mixed grinding of RDI-S with alternative typs [sic]*".[554]

(368) So far, [...]* is working on improving the quality of Chinese suppliers through ongoing exchanges: "*[[...]*]* shows its end product where a certain blend of Chinese TiO_2 had been used to its customers (without indicating which TiO_2 grade had been used) and seeking for feedback regarding its quality. The feedback from [...]*'s customers is consequently passed on to the Chinese TiO_2 producers*".[555]

(369) Furthermore, the same large customers also highlight lower prices as the motivation behind their cooperation with Chinese suppliers, indicating that this cooperation was not triggered by the Transaction. In particular, according to [...]*, "*[t]he main driver for [...]* is the net price difference of 10% between European sulphate-based TiO_2 and Chinese sulphate-based TiO_2*" and "*its testing of Chinese grades is independent of the proposed merger*".[556] [...]* also explains that it "*did not start looking at purchasing TiO_2 from Chinese suppliers just because of the announced Huntsman/Sachtleben merger*" but that it started to look for alternatives even before the announcement of the merger.[557] It also highlighted the price motivation behind its search for co-operation with Chinese suppliers.[558]

(370) This confirms that, while the largest customers are keen to start importing Chinese TiO_2 grades for printing ink applications, the level of imports is currently very

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549 Agreed version of conference call with [...]* on 2 June 2014, paragraph 7 [ID 2293].
550 Agreed minutes of conference call with [...]* of 19 May 2014, paragraph 5 [ID 2580].
551 Agreed minutes of conference call with [...]* of 19 May 2014, paragraph 6 [ID 2580].
552 Agreed minutes of conference call with [...]* of 18 June 2014, paragraph 16 [ID 2581].
553 Agreed minutes of conference call with [...]* of 22 May 2014, paragraph 4 [ID 2219].
554 [...]*, response to Commission's article 11(3) decision of 20 June 2014 [ID 2538].
555 Agreed minutes of conference call with [...]* of 22 May 2014, paragraph 7 [ID 2219].
556 Agreed minutes of conference call with [...]* of 2 June 2014, paragraph 15 [ID 2293].
557 Agreed minutes of conference call with [...]* of 22 May 2014, paragraph 6 [ID 2219].
558 Agreed minutes of conference call with [...]* of 22 May 2014, paragraph 6 [ID 2219].

limited and the products imported are mostly used in blends or for limited applications that have less stringent quality requirements. For [...]*, [...]* and [...]*, customer acceptance tests will be key to the increase of Chinese TiO_2 imports, and such tests are likely to take several more months.

(371) As concerns the Parties' smaller customers, the vast majority do not have any Chinese supplier among their approved suppliers. Furthermore, only a minority of them have already tested grades from Chinese suppliers.[559]

(372) Therefore, the questions that arise are, first, whether Chinese suppliers will develop a suitable grade in a timely manner, second, whether they would have the capacity to expand in the European market and, third, more generally whether they would have incentives to serve European customers.

(373) The Commission tried to contact the Chinese suppliers to assess the level of progress in the development of TiO_2 grades for printing ink applications as well as the Chinese suppliers' incentives to serve the EEA market. Amongst the various suppliers working with European customers, the Commission managed to conduct teleconference calls with Henan Billions, a Chinese supplier which currently has 200 kt of sulphate-based capacity,[560] and Titanos, a Chinese distributor of pigments in Europe.

(374) Henan Billions confirmed the very limited extent of its sales to European printing ink manufacturers so far. Indeed, "*Henan Billions estimates that its sales to European ink customers account for around 300-500 mt in 2013*",[561] which corresponds to approximately [0-5]*% of the market. Henan Billions is also aware of the quality shortcomings of its TiO_2 products: "*Henan Billions considers itself to be a relatively new player, […]* it still has room for improvement to achieve the necessary quality that would make it a direct competitor to RDI-S and TR52.It considers that it will need at least another 1 to 2 years to achieve the good quality of the 631 ink grade*".[562] Regarding specific quality issues, Henan Billions confirmed the customers' views that "*the main issues at this stage are related to gloss, dispersibility and hiding power*".[563]According to Henan Billions, the quality gap between Chinese suppliers and the Parties will still take time to be bridged as Henan Billions feels "*it still has room for improvement to achieve the necessary quality that would make it a direct competitor to RDI-S and TR52. It considers that it will need at least another 1 to 2 years to achieve the good quality of the 631 ink grade.*"[564] It is likely that other Chinese suppliers will take even more time, as Henan Billions appears to be most advanced Chinese supplier so far in this market Indeed, "*to Henan Billions' knowledge, a few other Chinese producers provide some volumes to the European market, but they do not have a product of similar quality to grade 631*".[565] Henan Billions further specifies that it believes "*its ink grade 631 has the best quality*

559 See responses to question 71 of questionnaire "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II".

560 Agreed minutes of conference call with Henan Billions of 26 June 2014, paragraph 3 [ID 2440].

561 Agreed minutes of conference call with Henan Billions of 26 June 2014, paragraph 11 [ID 2440].

562 Agreed minutes of conference call with Henan Billions of 26 June 2014, paragraph 17 [ID 2440].

563 Agreed minutes of conference call with Henan Billions of 26 June 2014, paragraph 14 [ID 2440].

564 Agreed minutes of conference call with Henan Billions of 26 June 2014, paragraph 17 [ID 2440].

565 Agreed minutes of conference call with Henan Billions of 26 June 2014, paragraph 12 [ID 2440].

compared to the other Chinese TiO_2 producers' ink grades".[566] This view is also shared by customers.[567]

(375) Titanos confirmed the quality issues currently faced by Chinese TiO_2 suppliers: *"printing ink grades have to comply with very specific customer requirements (in relation to opacity, particle size and dispersibility of the grades) […] [Chinese suppliers] still need to develop the adequate quality so that they can compete on equal footing with the Western suppliers"*.[568] It also further acknowledged that "*the products provided by Titanos and the products provided by European manufacturers are not 100% identical*".[569]

(376) In addition, the net price difference also plays a role as it enters in the trade off considerations between local suppliers and distant suppliers which inherently carry a higher risk. In this context, Titanos explained that, because of the quality shortcomings of Chinese suppliers, the price difference needs to be higher than 8% for European customers to buy TiO_2 from China. Indeed, in Titanos' view there is a "*need to have a difference of more than 8% compared to the prices offered by the European manufacturers in order for the product to be competitive against them*".[570]

(377) As concerns the available sulphate-based capacity of Chinese suppliers, the Commission understands that Chinese environmental regulation cast doubts on the ability of Chinese suppliers to expand sulphate-based capacity in China.

(378) Indeed, a Huntsman's strategy document of the end of 2011 indicates that the National Development and Reform Commission (NDRC) adopted guidelines effective as from 1 June 2011 which encourage the development of the chloride process and restrict the development of the sulphate process. Huntsman assesses measures "*restricting new planned sulphate facilities*" to have a medium probability for the next 5 years and measures "*encouraging large scale chloride investment – based on higher grade feedstock usage*" a high probability for the next 10 years.[571] As from 1 June 2011, "*new [sulphate] process plants are forbidden*" and "*new SO4 [read sulphate] projects […] will face the following: no approvals granted by the NDRC, environmental approvals blocked, financing blocked, provincial authorities with not process applications*", unless they are submitted before the deadline, "*the products from the process meet international standards*" and "*waste acid and iron compounds are appropriately managed*".[572]

(379) Henan Billions confirmed to be capacity constrained when it comes to its sulphate production.[573] The impact of Chinese government policy is also felt by customers. For instance, in December 2013, a Sachtleben's customer states that "*[I don't] see any workable alternative coming from China and not only from the technical point of*

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566 Agreed minutes of conference call with Henan Billions of 26 June 2014, paragraph 12 [ID 2440].

567 See responses to question 71.1 of questionnaire "Q7 - Questionnaire for Customers - TiO_2 for Printing Ink - Phase II"; agreed minutes of conference call with Henan Billions of 26 June 2014, paragraph 4 [ID 2440].

568 Agreed minutes of conference call with Titanos of 30 June 2014, paragraph 16 [ID 2540].

569 Agreed minutes of conference call with Titanos of 30 June 2014, paragraph 19 [ID 2540].

570 Agreed minutes of conference call with Titanos of 30 June 2014, paragraph 19 [ID 2540].

571 Huntsman's internal document, *Business Strategy Session, Structural review of the TiO_2 industry*, 22 November 2011, page 21.

572 Huntsman's internal document, *Business Strategy Session, Structural review of the TiO_2 industry*, 22 November 2011, page 19.

573 Agreed minutes of conference call with Henan Billions of 26 June 2014, paragraph 6 [ID 2440].

view. Chinese government is trying to control pollution and this is already affecting dyes prices that will increase by 40%".[574]

(380) As concerns the incentives of Chinese suppliers to enter the EEA market for TiO_2 for printing ink applications, several elements need to be taken into account amongst which the size of the market, the opportunity cost of such entry, and the likely evolution of the external factors having an impact on prices paid by customers.

(381) The Commission first acknowledges that some of the largest customers seem confident that Chinese suppliers they are in contact with are interested in supplying them with TiO_2 grades for printing ink applications, provided that the quality issues of their products are resolved. Irrespective of the limited market size and exigent customer base, [...]* states that "*potential future business with the globally active [customer]**"[575] might be attractive for Chinese suppliers while [...]* explained that TiO_2 for printing ink applications is "*a quality benchmark*"[576] which would allow the Chinese suppliers to gain credibility in the market and then further develop in other niche applications.

(382) The Commission nevertheless notes that the EEA market for TiO_2 for printing ink applications is relatively small ([…]* kt) as compared to other markets such as architectural coatings ([…]* kt), industrial coatings ([…]* kt) or plastics ([…]* kt). Only a few ink manufacturers purchase large amounts of TiO_2 in the EEA market, the rest of the market being very fragmented and these large ink manufacturers are much smaller compared to large coatings or plastics suppliers. According to Parties' data, save for [...]*, which buys more than […]* kt per annum in the EEA and more than […]* kt worldwide,[577] overall only […]* ink companies buy more than […]* kt from Huntsman and Sachtleben globally, while more than […]* coatings companies and […]* plastics companies purchase larger volumes. Likewise, only […]* ink companies buy more than […]* kt from Huntsman and Sachtleben worldwide, while […]* coatings companies and […]* plastics companies buy more.[578] Note that this comparison is based on the Parties' sales and intelligence and is likely to underestimate the difference in size between ink manufacturers and coatings or plastics manufacturers as, on the one hand, the description of printing ink manufacturers purchases is likely to be accurate as sales from the merging parties cover most of the market and, on the other hand, significant purchases by coatings and plastics manufacturers are not taken into account in the description above as the market shares of the merging parties have a more limited market coverage in coatings and plastics.

(383) Furthermore, the incentives of Chinese suppliers to supply sufficiently large volumes to EEA customers depend on the profitability of alternative business opportunities available. The EEA market for TiO_2 for printing ink applications is a niche market, with tight specifications, small volumes and a real but limited price difference compared to prices of other grades. When contemplating the possibility of significantly increasing its production, a Chinese supplier will assess which is the most profitable market to address. TiO_2 for architectural coatings, industrial coatings and plastics applications, which can partly accept lower quality grades and can absorb much larger volumes in view of their market size, would appear to be good

574 Sachtleben's internal document, *Customer report of [...]**, 12 December 2013.
575 Agreed minutes of conference call with [...]* of 2 June 2014, paragraph 10 [ID 2293].
576 Agreed minutes of conference call with [...]* of 22 May 2014, paragraph 9 [ID 2219].
577 Sachtleben's internal document, *SCM Pori*: *Presentation of main customers*, 2012, pages 2-3.
578 Annex 50 of the Form CO.

candidate markets. In this respect, while Chinese suppliers already supply […]* kt, […]* kt and […]* kt in these markets in the EEA (compared to […]* kt for printing ink applications),[579] no drastic change have been observed in the last years which would presage a strong increase in imports of Chinese TiO_2 into the EEA. This is also in line with the statements of several market participants that Chinese entry into Europe tends to be opportunistic rather than strategic.[580]

(384) The Commission further notes that market reports forecast that the pressure from Chinese exports will be limited in the future. Between 2008 and 2011, while there was a shortage of TiO_2, China's exports grew by 65.4% CAGR[581] and, for the period of 2012 to 2020, a lesser growth of 12.7% CAGR is forecasted. The exports of low quality TiO_2, which represent the vast majority of the exports, are expected to grow stronger (with a 14% CAGR) than the exports of high quality TiO_2 (6.2% CAGR) between 2011 and 2020.[582] This expected decrease of Chinese exports is due to a significant expected growth of Chinese domestic demand which is unlikely to be matched by the supply. China's domestic TiO_2 demand is forecasted to grow by 7.8% CAGR between 2011 and 2020.[583] Domestic TiO_2 demand will require an additional 1.2 million tonnes per year of TiO_2 by 2020 (85% of the market in 2020).[584] China's domestic chloride-based nameplate capacity is expected to increase by 330 kt between 2011 and 2020.[585] Sulphate-based capacity is expected to increase by 100 kt in 2012, by 540 kt in 2013, by 225 kt in 2014 and by 230 kt in 2015.[586] Therefore, Chinese capacity increase does not appear to keep up with the additional local demand.

(385) Finally, the ability of Chinese suppliers to act as a price constraint in the EEA market for TiO_2 for printing ink applications is affected by other elements which influence the price at which they will be able to enter the market. In particular, two elements have surfaced in the Commission's market investigation: the USD/EUR currency exchange considerations, due to the fact that Chinese sales are USD linked while sales into Europe are based on Euro,[587] and import/export taxes. Regarding this latter uncertainty, market reports forecast the possibility that the Chinese administration will levy an export tax on TiO_2 to restrict TiO_2 exports from China.[588] While these two elements are not barriers *per se* they influence the expansion decisions of Chinese suppliers into the EEA market.

(386) Customers also indicated that they do and will continue to multisource and that, besides the price, there are other non-price related considerations such as the security of supply, lead time, contract terms, production capacity, insurance guarantee, ability to respond to emergencies, consistency of batches, dedicated services to the

579 Huntsman, reply to the RFI No 13 of 26 February 2014.
580 Agreed minutes of conference call with [...]* of 19 May 2014, paragraph 4 [ID 2580].
581 CAGR stands for compound annual growth rate.
582 Huntsman's internal document, […]*.
583 Huntsman's internal document, […]*.
584 Huntsman's internal document, […]*.
585 Huntsman's internal document, […]*.
586 Huntsman's internal document, […]*.
587 Agreed minutes of conference call with Henan Billions of 26 June 2014, paragraph 22 [ID 2440].
588 Huntsman's internal document, […]*.

customer, an adequate supply chain etc., all of which influence the level of customer switching.[589]

(387) For example, EEA printing ink manufacturers comparing the lead time of suppliers in the EEA to that of suppliers in China indicated that sourcing in China takes four times longer than sourcing in the EEA.[590] Payment terms with Chinese suppliers also appear to be less flexible, for example with payments in advance against delivery duty paid.[591] Customers expressing their views on these elements consider them as important selection criteria,[592] since longer lead time can for example imply more control to avoid stock running out and more rigid payment conditions impacts the company cash flow.[593]

(388) Reliability of supply is also an important factor for customers. Chinese suppliers are generally considered as less reliable than European suppliers.[594] In this context some customers, including large ones, pointed to issues of consistency of batches as a hurdle for Chinese suppliers.[595] As indicated by a customer in the market investigation, "*[i]t is difficult to have a constant product quality over time from Chinese sources and fully testing each single batch we receive is expensive and time consuming.*"[596] Logistics weaknesses and reliable and consistent quality can strongly impede the incentives of customers to switch significant amounts to Chinese suppliers. In this context, [...]* explained that "*it would still require time to ensure the consistency of grades and reliability of Chinese supplies which is actually the main point. In any event, even if a perfect alternative was achieved, [...]* would move at most 30-40% of its purchases to China, since it would be too risky to rely fully on the Chinese supplies as in times of increased demand or shortages, Chinese suppliers tend to supply their home market first.*"[597]

(389) Therefore, the Commission takes the view that although Chinese suppliers may have incentives and may have been trying to develop a suitable printing ink grade, there are significant uncertainties as to whether the market entry of Chinese suppliers will materialise in a timely fashion.

6.3.12.7. The Parties could price discriminate across customers, targeting in particular their price increase to small, non-sophisticated customers

(390) The market investigation provided indications that mainly large customers are working with Chinese suppliers. However, beyond the three large customers which are already working with Chinese suppliers, the timing of a Chinese alternative is

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589 See responses to question 33 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I" and to questions 79-82 of questionnaire "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II"

590 See responses to question 78 of questionnaire "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II".

591 See responses to question 78 of questionnaire "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II".

592 See responses to question 78 of questionnaire "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II".

593 […]*, response to question 78 of questionnaire "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II" [ID 2337].

594 See responses to question 78 of questionnaire "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II".

595 Agreed minutes of conference call with […]* on 29 November 2013, paragraph 8 [ID 1518].

596 […]*, response to question 76 of questionnaire "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II" [ID 2337].

597 Agreed minutes of conference call with […]* on 29 November 2013, paragraph 8 [ID 2293].

even more uncertain for smaller customers, which would likely allow the merged entity to charge higher prices to this customer group for a longer period. Indeed, given that the TiO_2 suppliers can charge different prices to their customers through bilateral negotiations and rebates in particular, the merged entity could charge higher prices to customers which cannot switch, or which would find it difficult to switch, to Chinese suppliers.

(391) The Commission notes that quantity rebates are already a way of charging different prices to customers, as only part of the market (the bigger customers) will be able to obtain the price discount. Additionally, the internal documents reveal that Huntsman tailors the rebates around individual customers,[598] which indicates the ability and the habit of fixing prices on a customer by customer basis.

(392) The analysis of the Transaction Data provides further indications of price discrimination across customers. Table 7 below reports a comparison among a sample of Huntsman's customers in the European market.[599] The table includes for each customer:

(a) The name of the customer;

(b) The average price paid for TR52 in the European transactions of 2013 (in EUR/tonne);

(c) The comparison of TR52's price with the price paid by […]*;

(d) The total volume of TR52 purchased in Europe during 2013;

(e) The total volume of TiO_2 purchased from Huntsman on a global level in 2013;

(f) The total volume of TiO_2 purchased from Huntsman in Europe in 2013.

Table 7 – Comparison of TR52 price across European Huntsman's customers in 2013

Customer	Price of TR52 (EUR/tonnes)	Price difference with […]* (in %)	Purchases of TR52 (tonnes)	Global Purchases of TiO_2 from Huntsman (tonnes)	European Purchases of TiO_2 from Huntsman (tonnes)
[…]*	[…]*	0.00%	[…]*	[…]*	[…]*
[…]*	[…]*	1.84%	[…]*	[…]*	[…]*
[…]*	[…]*	5.12%	[…]*	[…]*	[…]*
[…]*	[…]*	-2.31%	[…]*	[…]*	[…]*
[…]*	[…]*	-8.18%	[…]*	[…]*	[…]*
[…]*	[…]*	-0.39%	[…]*	[…]*	[…]*
[…]*	[…]*	-10.38%	[…]*	[…]*	[…]*
[…]*	[…]*	-2.06%	[…]*	[…]*	[…]*

Source: Transaction Data, Commission's computation.

598 See Section 8.3.6.

599 In the analysis of the Transaction Data the Commission applied the definition of Europe given by the Parties, which is broader than EEA, as it includes the following countries: Albania, Armenia, Austria, Azerbaijan, Belarus, Belgium, Bosnia Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Former Yugoslav Republic of Macedonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Kazakhstan, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, San Marino, Serbia & Montenegro, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, Ukraine.

(393) […]*.

(394) In its response to the Statement of Objections the Notifying Party contested the Commission's findings claiming that "*[t]he Commission has wrongly asserted the ability of the merged entity to discriminate between customers*" because "*[the Commission] has overlooked that price of each customer reflects a wide variety of factors*".[600] To this end the Notifying Party provided evidence that some of the prices in Table 7 are not comparable, as they do not reflect the differences in the INCO terms. Should these differences be accounted for, the price of TR52 paid by different customers would be similar. […]*.

(395) The Commission notes that it requested information on INCO terms[601] […]*,[602] and none of them have been provided by the Notifying Party. Nevertheless, the Commission assessed the claims raised by the Notifying Party and found that:

(a) The adjusted price estimated by the Notifying Party to account for differences in the customers' INCO terms "*is based on Huntsman's experience of cost of distribution and logistics*" and "*was generated purely for the purposes of explaining the price differences*".[603] Therefore, the Commission is unable to verify the reliability of these estimates.

(b) Differences in the price for TR52 paid by different customers persist even after the adjustments made by the Notifying Party.

(396) The Commission requested the Notifying Party to extend the price adjustment made for Table 7 to a longer list of European customers that purchased TR52 in 2013.[604] Table 8 shows a sample of customers for which the Notifying Party did not have any comment. That is, the price computed by the Commission and the adjusted price estimated by the Notifying Party are the same.[605]

Table 8 – Adjusted comparison across Huntsman's European customers in 2013.

Customer	Estimate of Adjusted Price for TR52 Computed by the Notifying Party (€/t)	Adjusted price compared to […]*	Purchases of TR52	Global Purchases of TiO_2 from Huntsman	European Purchases of TiO_2 from Huntsman
[…]*	[…]*	0.0%	[…]*	[…]*	[…]*
[…]*	[…]*	10.2%	[…]*	[…]*	[…]*
[…]*	[…]*	16.5%	[…]*	[…]*	[…]*
[…]*	[…]*	5.6%	[…]*	[…]*	[…]*
[…]*	[…]*	2.4%	[…]*	[…]*	[…]*
[…]*	[…]*	5.5%	[…]*	[…]*	[…]*
[…]*	[…]*	42.6%	[…]*	[…]*	[…]*
[…]*	[…]*	-2.0%	[…]*	[…]*	[…]*

(397) Even if the global and European purchases of these customers are similar, the price of TR52 that they pay varies, sometimes substantially. Hence, even if provided with

600 Notifying Party's response to the Statement of Objections, section 7.2, paragraph 334.
601 RFI No 18 of 14 March 2014, Question 1.
602 RFI No 21 of 18 March 2014, Question 11.
603 Huntsman, reply to the RFI No 33 of 28 July 2014, Question 1.
604 Huntsman, Annex of reply to the RFI No 33 of 28 July 2014, Question 1
605 The only exception is […]* that serves as base price in the comparison.

a smaller sample due to the impossibility of verifying the reliability of the Notifying Party's estimates, the Commission still finds evidence of the Notifying Party's ability to charge different prices to different customers, in particular to small customers.

(398) Therefore, the price discrimination by the merged entity could further limit the level of competitive constraint exerted by competitors, by providing extra flexibility to the merged entity to increase prices, at least to some customer groups. Indeed, it is an efficient tool for the merged entity to implement a sophisticated price-increasing strategy at the detriment of smaller customers in particular.

6.3.12.8. The Notifying Party's critical loss analysis is inconclusive and does not provide evidence that the price increase would not be profitable

(399) In its response to the Statement of Objections, the Notifying Party provides a critical loss analysis allegedly showing that "*it would only take* […]**% *of the Parties' current volumes of* TiO_2 *sold for use in inks applications to switch away from the merged entity for the 10% price increase to be unprofitable*".[606]

(400) In its decision practice, the Commission has addressed the suitability of a critical loss analysis in competition law decisions, and its potential drawbacks, at several occasions in particular in relation to industries with high fixed costs.[607]

(401) First, generally speaking, high margins tend to indicate low demand elasticity and, consequently, a high degree of firms' market power. Therefore, a price increase of the merged entity in such situations will trigger a small volume loss. High margins also suggest that competitors do not exert sufficient competitive pressure as firms can charge high prices because customers cannot switch to competitors. Hence, low price elasticity tends to lead to high prices (and high margins).

(402) Second, the Commission has shown in this Decision that the Parties could price discriminate among their customers. This undermines the reliability of the critical loss, as the merged entity can strategically allocate the price increase across the customers. Indeed, it is possible that a 5-10 % average price increase could profitably be achieved by increasing prices to certain customers (such as small, less-sophisticated customers).

(403) Third, the use of the critical loss analysis to assess the level of competitive constraint from other TiO_2 suppliers requires the estimation of the actual loss in volume from a hypothetical increase in price. The comparison between the actual loss and the critical loss is then used to decide whether such constraints would defeat a hypothetical attempt by the merged entity to raise prices. In particular, the merged entity could be disciplined if the actual loss exceeds the critical loss. However, the Parties did not provide compelling evidence, qualitative or quantitative, showing that a 5-10 % increase in price would trigger a high actual loss in sales that would exceed the critical loss.

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606 Notifying Party's response to the Statement of Objections, paragraph 186. This critical loss figure of […]*% is calculated as the p/(p+m) where p is the proposed price increase in percentage terms, and m is the gross margin, also expressed in percentage terms. The Parties submit that Huntsman's gross margin was […]*% and Sachtleben's was […]*%, with Huntsman accounting for […]*% of the volumes of the Parties' combined TiO_2 sold for use in inks applications in 2013, resulting in a combined (volume-weighted) gross margin obtained by the Parties of […]*%.

607 See e.g. Commission Decision 2012/C 195/EU in Case No M.5830 - Olympic/ Aegean Airlines, OJ C195 3.7.12, p.10 and Commission Decision of 17.10.2012 in Case No M.6166 - DEUTSCHE BÖRSE / NYSE EURONEXT.

(404) Regarding Eastern European suppliers, the Notifying Party claims that "*if either Precheza (total capacity of ~50 kt), Police (total capacity of ~40 kt) or Cinkarna (total capacity of ~60 kt) decided to target in a more active way the European ink segment and allocated only 10% of their capacity to that end, this would defeat a hypothetical attempt by the combined entity to raise prices*".[608] However, it has been shown in section 6.3.8 that Eastern European suppliers do not have the relevant production know-how and therefore sufficient product quality to compete with the Parties, and in section 6.3.12.5 that they are unlikely to increase their position and sufficiently constrain the merged entity. Therefore, even following a 5-10% increase in prices by the merged entity, it is unlikely that Eastern European suppliers would allocate some of their capacity to target the EEA market for printing ink applications, and that the customer switching to these suppliers would trigger a loss in sales exceeding the critical loss.

(405) Similarly, regarding Chinese suppliers, the Notifying Party claims that "*all TiO_2 currently used for flexographic, reverse-laminate printing could switch to being supplied by Chinese TiO_2 producers – in other words, at least 25% of TiO_2 used in the manufacturing of inks in the EEA could switch to Chinese suppliers immediately*".[609] On the other hand, the Notifying Party acknowledges that "*inks TiO_2 grades imported into Europe from China sell at a* […]*% *discount, or EUR* […]* *per tonne discount to standard ink grades, with EUR* […]* *per tonne being an estimated midpoint of the discount*".[610] Given that Chinese suppliers already benefit from a price difference of about […]*% (estimated midpoint), if a substantial amount of TiO_2 for printing ink applications could be sourced from Chinese suppliers immediately, the switching would have already occurred regardless of the merger. Nevertheless, as shown in section 6.3.7 of this Decision, Chinese suppliers currently have a very limited presence in the EEA. For this reason, and also on grounds of quality issues of Chinese TiO_2 highlighted in section 6.3.12.6 of this Decision, the switching to Chinese suppliers in response to a price increase by the merged entity is likely to be very limited.

(406) Regarding Kronos, as shown in section 6.3.12.3 of this Decision, Kronos has neither the ability nor the incentive to fiercely compete with the merged entity. This is further enhanced by the Parties' […]* margins reported in the Notifying Party's response to the Statement of Objections.[611] Both Huntsman and Sachtleben have more than […]*% margins in the EEA market for TiO_2 for printing ink applications. The […]* margins of the Parties underline the […]* profitability of the market in its current competitive landscape. If Kronos had the ability and the incentive to undercut the Parties' prices, Kronos would already have done so and the switching to Kronos would have already occurred regardless of the merger. In addition, the Notifying Party claimed that "*large inks producers, following a multi-sourcing strategy, would strongly support Kronos' expansive strategy both for bargaining and for security of supply concerns*".[612] Nevertheless, these large customers would have to purchase both from the merged entity and from Kronos in order to maintain their current security of supply. This situation limits the switching possibilities of the customers and further decreases the incentive of Kronos to compete. As outlined by the

608 Notifying Party's response to the Statement of Objections, paragraph 127.
609 Notifying Party's response to the Statement of Objections, paragraph 185.
610 Notifying Party's response to the Statement of Objections, paragraph 231.
611 Notifying Party's response to the Statement of Objections, paragraph 126.
612 Notifying Party's response to the Statement of Objections, paragraph 313.

Horizontal Merger Guidelines and explained in section 6.3.2 of this Decision, non-merging firms may have the incentive to follow a price increase post-merger. Indeed, it is likely that Kronos would not be willing to undercut the prices but would rather follow the post-merger price increase.

(407) Therefore, the Commission takes the view that the critical loss analysis provided by the Notifying Party is inconclusive, and does not evidence the lack of profitability for the merged entity to increase prices. This is because the high gross margins tend to underline low demand elasticity hinting at a small actual loss, the existence of price discrimination across customers undermines the reliability of the critical loss and there are indications that the actual loss (especially to Eastern European suppliers, Chinese suppliers and Kronos) is likely to be lower than the critical loss.

6.3.12.9. The merged entity could consider it to be more profitable to close some capacity and increase prices

(408) According to the Horizontal Merger Guidelines, "*when market conditions are such that the competitors of the merging parties are unlikely to increase their supply substantially if prices increase, the merging firms may have an incentive to reduce output below the combined pre-merger levels, thereby raising market prices. The merger increases the incentive to reduce output by giving the merged firm a larger base of sales on which to enjoy the higher margins resulting from an increase in prices induced by the output reduction.*"[613]

(409) While Kronos would be the competitor best positioned strategically to take on the volumes switching away from the merged entity, as explained in sections 6.3.6 and 6.3.12.3, Kronos appears to be capacity constrained and to lack the incentives to compete on price. Similarly, Chinese suppliers, despite their large (at least theoretical) capacities, might not be able or willing to substantially increase their supply of TiO_2 for printing ink applications in the EEA. As explained in sections 6.3.8, 6.3.9, 6.3.10, 6.3.12.4 and 6.3.12.5, other suppliers might not be able to exert any significant competitive constraint on the merged entity due to the lack of scale and know-how.

(410) In addition, the merged entity will hold the 6 largest sulphate plants located in the EEA, which together represent 65% of the EEA sulphate capacity, and even more when considering the plants able to produce rutile TiO_2. Given that the merged entity does have the know-how for TiO_2 grades for printing ink applications, its plants benefit from supply-side substitutability between various TiO_2 grades, putting aside applications which require specific production process (e.g. nanogrades). In view of the large production basis the merged entity would benefit from, it could therefore consider it more profitable to close one plant which produces the least specialised grades and to reallocate the volumes to its other plants.

(411) […]*:[614] "[…]*."[615]

(412) An external industry report indicated in January 2014 that the Uerdingen plant might be a good candidate for closing: "*Uerdingen has been unprofitable, and costs of remediation and shutting down could be in range of $50-200MM, depending on*

613 Horizontal Merger Guidelines, paragraph 32.

614 Huntsman, reply to the RFI No 4 of 22 November 2013, question 59.

615 Huntsman's internal document, […]*.

timing and discipline".[616] This same report indicates that 90% of utilisation rate is "*the level at which producers could garner pricing power*".[617]

(413) Although Sachtleben does not produce TiO_2 for printing ink applications at the Uerdingen plant, the closure of that plant could nevertheless have an impact on the EEA market of TiO_2 for printing ink applications, as the merged entity could reallocate the volumes currently produced at the Uerdingen plant to its other plants, thereby reducing production of TiO_2 for printing ink applications.

(414) Kronos also considers that it is possible that the merged entity will close some plants: "*the Huntsman/Sachtleben transaction may result in reduced worldwide capacity due to plant consolidations or closures that may be undertaken by the combined entity.*"[618] [...]* also indicated that it expects "*nothing initially [from the proposed transaction] but then a reduction*" in overall TiO_2 production capacities.[619]

(415) In its reply to the Statement of Objections, the Notifying Party claimed that, if there were capacity rationalisation, "[…]*".[620] In the absence of further quantitative evidence, the Commission does not share the Notifying Party's views as production costs can vary across plants. Therefore, moving the production of grades produced to Uerdingen to a more efficient plant (e.g. with lower fixed costs) could turn out to be profitable even if these grades represent a lower gross margin than grades for printing ink applications.

(416) Therefore, it cannot be excluded that the merged entity will consider more profitable to close a plant in which case the prices will increase as a result of decreased capacity in the market. This could be problematic given the expectations that the market may become tight again in the near future. In this context Kronos concurs with this assessment when it states that, "*[i]n general, in the long term, Kronos considers that the market for TiO_2 will become tight due to increasing demand in the developing countries with limited new capacities being built.*"[621]

6.3.13. Buyer power

(417) The Notifying Party claims that any post-merger price increase is unlikely in this case given that customers enjoy a high degree of buyer power.[622] According to the Notifying Party, the countervailing buyer power in this case is evidenced by:

(a) the high concentration of demand with five top customers accounting for […]*% of the global demand and the top three accounting for […]*% of the EEA total sales,[623] and the top three representing approximately […]*% of Huntsman's and approximately […]*% of Sachtleben's total annual sales in the ink segment;[624]

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616 Huntsman's internal document, *Equity Research, Interview of Jim Fisher of IBMA by Wells Fargo Securities, LLC*, "*TiO_2: postponing wake up call ' til H2 2014 if then*", 15 January 2014, page 1.

617 Huntsman's internal document, *Equity Research, Interview of Jim Fisher of IBMA by Wells Fargo Securities, LLC*, "*TiO_2: postponing wake up call ' til H2 2014 if then*", 15 January 2014, page 1.

618 Agreed minutes of conference call with Kronos of 13 February 2014, paragraph 18 [ID 1065].

619 [...]*, response to question 76 of questionnaire "Q1 - Questionnaire for Customers Titanium Dioxide Phase I" [ID 2303].

620 Notifying Party's response to the Statement of Objections, paragraph 116.

621 Agreed minutes of conference call with Kronos of 13 February 2014, paragraph 18 [ID 1065].

622 Form CO, paragraphs 264, 324 and 331; Notifying Party's response to the Decision opening the proceedings, paragraphs 76-77 and paragraph 114.

623 Notifying Party's response to the Decision opening the proceedings, paragraph 114.

624 Notifying Party's response to the Decision opening the proceedings, paragraph 114.

(b) the fact that customers play the Parties against each other to extract better prices, and "increasingly threaten to, and do, switch to Chinese and other suppliers";[625]

(c) the ease for customers to switch suppliers, as they are not bound by long-term volume commitments[626] and their ability to sponsor new entrants or provide them with technical support;[627] and

(d) finally, the inability of the Parties to price discriminate.[628]

(418) The Commission assessed these claims against the criteria set out in the Horizontal Merger Guidelines and its case practice. A market where the demand is concentrated, where customers have a particular commercial significance to the supplier because of their size or because they buy several products from the same supplier, or where customers have ability to switch to alternative suppliers, is an indicator of potential buyer power.[629]

(419) Nevertheless, buyer power can only be exercised if customers could credibly threaten to resort, within a reasonable timeframe, to alternative sources of supply (for example by switching supplier or sponsoring upstream expansion or entry) and if the existing buyer power is not counterbalanced by the increase of market power induced by the merger.[630]

(420) Further elements to take into account in the assessment of buyer power are:

(a) the potential lack of incentives for buyers to utilise their buyer power, for example if the benefit of sponsoring new entry in terms of lower input costs could also be reaped by its competitors,[631]

(b) the fact that countervailing buyer power cannot be found to sufficiently off-set potential adverse effects of a merger if it only ensures that a particular segment of customers, with particular bargaining strength, is shielded from significantly higher prices or deteriorated conditions after the merger,[632] and

(c) the fact that buyer power needs to remain effective post-merger, in particular as buyer power can be precluded if the merger removes a credible alternative.[633]

(421) As indicated in section 6.3.4, part of the demand of the EEA market for TiO_2 for printing ink applications is concentrated with the top 3 customers representing 60-65% of the EEA market. Beyond these 3-4 customers, the rest of the market in the EEA is rather fragmented, the next largest customer of each Party representing around […]*% of Huntsman's and Sachtleben's combined sales to the ink market in the EEA.

(422) Nevertheless, the size and associated buyer power of printing ink manufacturers must be analysed in the context of the overall TiO_2 market and the overall weight of these customers in the Parties' customer portfolio. The […]* largest coatings

625 Notifying Party's response to the Decision opening the proceedings, paragraph 114.
626 Form CO, paragraph 324.
627 Form CO, paragraph 331; Notifying Party's response to the Decision opening the proceedings, paragraph 114.
628 Form CO, paragraph 331.
629 Horizontal Merger Guidelines, paragraphs 64-65.
630 Horizontal Merger Guidelines, paragraph 65.
631 Horizontal Merger Guidelines, paragraph 66.
632 Horizontal Merger Guidelines, paragraph 67.
633 Horizontal Merger Guidelines, paragraph 67.

manufacturers in the Parties' customer portfolio purchase more than […]* kt from the Parties, and the […]* largest plastics manufacturers purchase more than […]* kt, while, apart from […]*, only […]* ink manufacturers buy more than […]* kt in the EEA and worldwide, the next customer buying around […]* kt. This is in line with the Notifying Party's claim that TiO_2 for printing ink applications is only a "drop in the water" compared to the overall TiO_2 market. As a result, the degree of buyer power of these customers is limited by their overall size compared to the entire customer portfolio.

(423) Even the largest customers would face limits to their potential buyer power due to the very high combined market share of the merged entity and the difficulty to switch to other suppliers. While [...]* mentioned that it "*has already been developing other suppliers, including in China*",[634] it indicated that it "*is concerned about the impact of the merger, since it would reduce its choice of suppliers and its bargaining power which can be used now in negotiations with Sachtleben and Huntsman*".[635] Similarly, [...]* indicated that "*one major other TiO_2 supplier, a potential challenger to this exceptional position of Sachtleben, will disappear*".[636] It further explained that "*Developing new alternatives to a combined offer of Sachtleben/Huntsman will be costly and will take time and effort*".[637]

(424) This lesser degree of buyer power is also acknowledged by an internal document of Huntsman which indicates that they achieve to get higher prices from […]*, irrespective of the relatively large size of some ink manufacturers: "[…]*".[638] Furthermore, the large majority of the ink manufacturers that responded to the market investigation stated that they do not produce coatings (e.g. architectural coatings, industrial coatings, thin-film coatings)[639] and, therefore, cannot leverage their purchases of TiO_2 for these segments during their negotiations of ink grades.

(425) The limits of large ink manufacturers' buyer power is also evidenced by the fact that […]*, does not obtain the best price conditions, as explained in section 6.3.12.7 above.

(426) As concerns the switching possibilities of printing ink manufacturers, as already explained in sections 6.3.6 to 6.3.10, such switching is considerably constrained by the limited number of TiO_2 suppliers able to produce TiO_2 grades for printing ink applications, the time needed to qualify a new grade and the barriers to entry described in section 6.3.11. Overall, even the large customers who are working with Chinese suppliers have limited ability to support new entry. Their ability to switch orders of sufficient volumes depends on (i) the quality improvement achieved by the Chinese suppliers, (ii) the available spare production capacity of Chinese suppliers who succeed with the technical qualification and (iii) the evolution of non-price related considerations (e.g. security of supply, lead-time, contract terms, production capacity, insurance guarantee, ability to respond to emergencies, consistency of batches, etc.) during the development of ink-related business relationship with these

634 Agreed minutes of conference call with […]* of 29 November 2013, paragraph 20, [ID 1518].
635 Agreed minutes of conference call with […]* of 29 November 2013, paragraph 20, [ID 1518].
636 Agreed minutes of conference call with [...]* of 19 November 2013, paragraph 19, [ID 1351].
637 Agreed minutes of conference call with [...]* of 19 November 2013, paragraph 20, [ID 1351].
638 Huntsman's internal document, […]*, page 1.
639 See responses to question 16 of questionnaire "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II".

Chinese suppliers.[640] In addition, they have limited ability to support entry technically, as the main barrier is the production know-how of TiO_2 suppliers. Therefore, the main assistance they can provide is to share with the suppliers the results of testing the various sample grades.[641]

(427) Moreover, if any, buyer power would only be relevant for the few largest ink manufacturers while the smaller customers would not be shielded from price increases. This therefore leaves room for price increases on a customer-by-customer basis (see section 6.3.12.7).[642]

(428) In its response to the Statement of Objections, the Notifying Party claimed that customers would be in a position to exercise countervailing buyer power by sponsoring entry or expansion of existing suppliers. To this end the Notifying Party mostly provided arguments supporting the fact that larger customers enjoy significant buyer power, highlighting in particular their ability to multisource ("*no substantial technical barriers […]* would prevent customers from using TiO_2 from multiple suppliers at the same time*").[643] The Commission notes that the key example of multisourcing set out by the Notifying Party is that "*a number of customers (*[…]**) obtain TiO_2 for use in inks applications from both Huntsman and Sachtleben*".[644]First, the Commission does not contest that customers multisource, see e.g. section 6.3.4. Second, as explained above in section 6.3.5, the Transaction would lead to the elimination of one of the two most important suppliers and thus the number of multisourcing opportunities would be significantly reduced. As concerns the Notifying Party's argument about sponsoring the entry/expansion of existing suppliers, as already explained in sections 6.3.12.3 to 6.3.12.6, the Commission notes that such entry/expansion is limited due to the lack of relevant know-how of other TiO_2 suppliers.

(429) Therefore, the Commission takes the view that the countervailing buyer power is unlikely to prevent the merged entity from increasing its prices post-merger, even more so in relation to the smaller customers representing […]*% of the Parties' sales. In addition, any degree of buyer power of the few large customers would be seriously weakened post-merger, since the merger would remove the most credible alternative on the market.

6.3.14. Efficiencies

(430) According to the Horizontal Merger Guidelines, it is possible that efficiencies brought about by a merger counteract the effects on competition and in particular the potential harm to consumers that it might otherwise have.[645] For the Commission to consider such efficiencies, they have to benefit consumers, be merger-specific and be verifiable.[646] Most of the information, allowing the Commission to assess whether the merger will bring about the sort of efficiencies that would enable it to clear a merger, is solely in the possession of the merging parties. It is, therefore, incumbent

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640 Agreed minutes of conference call with […]* of 2 June 2014, paragraph 12 [ID 2293]; agreed minutes of conference call with [...]* of 19 May 2014, paragraph 6 [ID 2580].

641 Agreed minutes of conference call with […]* of 2 June 2014, paragraph 9 [ID 2293]; agreed minutes of conference call with [...]* of 22 May 2014, paragraph 7 [ID 2219].

642 The Notifying Party's argument that Huntsman does not have the ability to price discriminate amongst its customers is addressed in section 6.3.12.7 of this Decision.

643 Notifying Party's response to the Statement of Objections, paragraph 326.

644 Notifying Party's response to the Statement of Objections, paragraph 320.

645 Horizontal Merger Guidelines, paragraph 76.

646 Horizontal Merger Guidelines, paragraph 78.

upon the notifying parties to provide in due time all the relevant information necessary to demonstrate that the claimed efficiencies are merger-specific and likely to be realised. Similarly, it is for the notifying parties to show to what extent the efficiencies are likely to counteract any adverse effects on competition that might otherwise result from the merger and therefore benefit consumers.[647]

(431) In the present case the Notifying Party has not provided details on any potential efficiency gains and has not submitted evidence that such efficiencies would meet the criteria of the Horizontal Merger Guidelines.

(432) Therefore, the Commission takes the view that there are no efficiencies of a nature to counteract the anticompetitive effects likely to stem from the Transaction.

6.3.15. Conclusion

(433) In view of the above analysis in recitals (207) – (432), the merger is likely to lead to a significant impediment of effective competition by creating a dominant position and eliminating competition between closest competitors holding large market shares in a market characterised by high barriers to entry.[648] Indeed, pre-merger, the main competitive constraint in the EEA market for TiO_2 for printing ink applications stemmed from the competition between Huntsman and Sachtleben while the next competitor, Kronos, has a significantly smaller market share. In addition, customers have limited switching possibilities given that at this stage there are no alternative suppliers that could credibly discipline the merged entity's pricing behaviour and this is unlikely to change in a sufficient and timely manner post-merger. Indeed, Kronos would have limited ability and incentives to increase its share of the market by undercutting the prices of the merged entity, and the Eastern European and Ukrainian suppliers have insufficient know-how and some of them are limited to their small scale. The Chinese suppliers currently lack the necessary know-how to increase their share of the market and it is uncertain whether they will have the incentive and/or the ability to expand in the EEA market for TiO_2 for printing ink applications with a suitable product in the foreseeable future. Even if they were to develop a suitable product, they are unlikely to be in a position to constrain the merged entity for the portion of the demand that is inelastic due to issues related to security of supply and multisourcing.

(434) It follows that the merged entity, which would become a dominant undertaking with an unmatched position in the market, is likely to have significant pricing power without the customers and/or the competitors being in a position to mitigate the likely effects of such position either by entering the market or by exercising buyer power. As a result, the Commission considers that prices in the EEA market for TiO_2 for printing ink applications would be likely to increase post-merger.

7. MARKET FOR TiO_2 FOR COSMETICS, PHARMACEUTICALS AND FOOD

7.1. Relevant product markets

(435) TiO_2 is also used in the cosmetics, pharmaceuticals and food industry ("CPF"). TiO_2 for cosmetics applications is used in (i) decorative/colour cosmetic products (like foundation, lipstick), (ii) personal care products such as shampoo, and (iii) oral care products (like toothpaste). In the pharmaceutical field TiO_2 is used as a pill/capsule

647 Horizontal Merger Guidelines, paragraph 87.

648 Horizontal Merger Guidelines, paragraphs 24-38.

coating to obtain whiteness and coverage so that tablets and capsules are coated with TiO_2 to mask the unappealing tablet/capsule core colour. TiO_2 coating protects tablets/capsules from UV light, prolonging their shelf life. Finally, in food, TiO_2 is used in its pigmentary form as a whitening agent in food (colouring agent) and drinks (to increase rich texture and turbidity) to increase their aesthetic appeal, or as basis for other colorants. It is also used as a whitener in pet food.

(436) As mentioned in section 6.1, within the TiO_2 for CPF applications there is a special segment called nano/ultrafine grades that is used in UV filters for sun protection products, since it offers natural and inorganic UV protection, with application in both cosmetics and the pharmaceutical sectors.

7.1.1. The Notifying Party's views

(437) The Notifying Party submits that CPF is part of the one overall market for TiO_2 as previously mentioned in Section 5.3.1. According to the Notifying Party's view, with the exception of nano/ultrafine grades,[649] there is no significant difference in production cost to produce different grades at the same plant because the variations in coating reagents are very small and have minimal impact on the total manufacturing cost. Equally, there is no clear distinction between the sales prices for different grades of TiO_2, including the CPF segment. The Notifying Party argues that should there be a differentiation by application; CPF should be considered as one single market, without further distinguishing between cosmetics, pharmaceuticals and food.

(438) As regards the manufacturing process, the uncoated anatase form of TiO_2 is generally preferred by the CPF customers since it is purer and less abrasive than the rutile form. Furthermore, since the TiO_2 pigment is intended for consumption (in food and pharmaceuticals) or for personal care (in cosmetics), the product must conform to specific regulatory requirements in the EEA as well as in other jurisdictions.[650] At the same time, the Notifying Party argues that such regulations do not constitute high barriers to entry to any existing TiO_2 supplier, which should have good manufacturing practices in place and should be used to dealing with various regulatory environments. Furthermore, as to the TiO_2 grades for use in cosmetics, the Notifying Party claims that any TiO_2 manufacturer can enter this segment, because most of the needs can be satisfied by "*the simplest of all produce (…) the anatase form, which any sulphate producer has the capability to produce*".[651]

(439) According to the Notifying Party, there is also a historical preference of customers towards the use of the anatase crystal also due to the past regulations in these fields, requiring the use of this form of TiO_2, although in the last 10 years, the specifications in the EEA and the USA for TiO_2 grades sold into CPF applications have been broadened to include high purity rutile grades that could be made by either the chloride or the sulphate process.

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649 As regards the nano/ultrafine grades used in CPF applications, they are manufactured by a different process and significantly differ in terms of production cost and sale price from pigmentary grades, according to the Notifying Party. In any event, as Huntsman does not produce nano grades, should this segment be considered as a different market there would be no overlap between the Parties and therefore this would not be further analysed.

650 For food applications it is the European E171 in the EEA and in the USA Food and Drug Administration (FDA).

651 Notifying Party's response to the decision opening the proceedings, paragraph 52.

7.1.1.1. The Commission's assessment

7.1.1.2. The relevant market is not wider than TiO_2 for CPF applications

(440) To verify the Notifying Party's claims, the Commission analysed both supply-side and demand-side aspects of the CPF market. Contrary to the Notifying Party's claims, the market investigation revealed that, as regards the scope of the product market, CPF is likely to represent a separate market from other TiO_2 applications.

(441) From the demand side, the market investigation revealed that TiO_2 for CPF applications faces specific regulatory barriers, requires reformulation and extensive testing (with qualification usually between 6 to 12 months).[652] Moreover, the SSNIP test broadly confirmed that producers not active in CPF would not switch to CPF not even for a constant increase in price of 5-10%.[653]

(442) From a Study drawn up by Boston Consulting Group (BCG Report)[654] it can be seen that CPF grades are regarded as having the highest degree of customization/quality requirements from all TiO_2grades. Moreover, as "*high barriers to entry into CPF market, mainly drive by the regulatory environment*" the study also mentions technical know-how (focusing on excellence rather than on product know-how, more technical capabilities are required for producing the ultrafine/nano TiO_2, focus on high purity aspect as technical product differentiator).[655] This has been confirmed also by the market investigation results according to which CPF plants are often audited by customers (quality and safety audits, every 2-5 years depending on the supplier performance and assigned risk) compared to the other more general ones, where audits are seldom performed.[656]

(443) From the supply side, the market investigation confirmed that in particular as regards the food and pharmaceuticals grades, stringent regulatory requirements need to be met.[657] Competitors active in these applications indicated that specific production methods are required in order to ensure high quality (in particular as regards purity). Moreover, also the inputs necessary for the production of CPF grades requires a special quality and some parts of the production line are devoted to the production of CPF grades.[658] Some large distributors explained that for example TiO_2 grades from China are not of acceptable quality, often containing heavy metals, thus not compliant with European or US regulations.[659]

(444) The analysis of grades sold by the Parties indicates that they propose specific grades for the CPF applications and the related volumes sold are indeed largely purchased

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652 See responses to questions 4.1 and 6 of questionnaire "Q8 - Questionnaire For Customers –TiO_2 for CPF applications- Phase II" and Responses to question 20 of questionnaire "Q1 - Questionnaire For Customers Titanium Dioxide- Phase I".

653 See responses to question 52 of questionnaire "Q10 - Questionnaire For Competitors –TiO_2- Phase II".

654 According to the Form CO, this report was prepared in conjunction with the sales process and was provided to the interested parties who were invited to management presentations – i.e. those entities who had received Confidential Information Memorandums and made preliminary offers and were subsequently invited to attend management presentations.

655 BCG Report, *Atlas in the TiO_2 market*, June 2013, p. 37.

656 See responses to questions 5, 5.1 and 5.2 of questionnaire "Q8 - Questionnaire For Customers –TiO_2 for CPF applications- Phase II"

657 See responses to question 48 and 55 of questionnaire "Q10 - Questionnaire for Competitors –TiO_2- Phase II"

658 See responses to question 51and 52 of questionnaire "Q10 - Questionnaire for Competitors –TiO_2- Phase II"

659 See responses to question 16 of questionnaire "Q8 - Questionnaire For Customers –TiO_2 for CPF applications- Phase II"

for these applications. In 2012, the main two grades sold by Sachtleben in CPF applications were Hombitan AFDC and Hombitan FG. They represented together almost […]*% of the volume sold to CPF customers by Sachtleben. Other grades are used in lower quantities, several being 100% dedicated to CPF customers. Likewise, in 2012, […]*% of Huntsman's grade AHRSE was sold for CPF applications. This grade represented more than […]*% of the volume sold to CPF customers by Huntsman and is indicated as suitable for all three CPF applications.[660]

(445) Specificities of production processes in specialty segments, in particular CPF, translate into higher prices and margins. Indeed, a majority of competitors indicate that the margins in CPF are higher compared to other applications including other specialty segments. The BCG Report confirms that prices and margins are higher in the CPF segment compared to other products: "CPF applications have approx. […]*% higher price points than the average TiO_2 market price";[661] "decorative cosmetics, pharmaceuticals and food applications use pigmentary TiO_2 – with price premiums of up to […]*%". [662] This has also been confirmed by a competitor, explaining that the CPF applications generate premiums of around 15-20% above the price for a standard rutile crystal for coatings or plastics.[663]

(446) Furthermore, from the internal documents of the Parties it can be clearly seen that CPF is regarded and treated as a separate segment in the overall TiO_2 market. Those documents reveal that the evolution of the CPF market and the evolution of the CPF prices are discussed and analysed separately from the other TiO_2 applications. Finally, TDMA also reports quarterly data on sales in the TiO_2 field by CPF application, distinguishing it as a distinct line.

(447) As regards the production process, the market investigation also confirmed that in the CPF applications the anatase crystal, produced only via the sulphate-based process is predominantly used. The vast majority of customers who replied to the market investigation in this case buy only sulphate-based grades for their CPF applications due to the fact that they are softer and best suited to CPF applications.[664] Moreover, the chloride grades do not have the necessary purity (in terms of heavy metals) for CPF applications. Also, the anatase form, which is preferred in CPF, cannot be produced through the chloride process. The Parties themselves and also the vast majority of competitors use only the sulphate-based process to produce CPF grades.

(448) Therefore, the Commission takes the view that as concerns CPF grades the relevant market is distinct from the market for TiO_2 for other applications and is not wider than TiO_2 for CPF applications.

7.1.2. Further subdivision between cosmetics, pharmaceuticals and food

(449) As regards further segmentation of the CPF applications into cosmetics, pharmaceuticals and food, the market investigation was inconclusive. The market investigation results confirmed that each sub-segment has to fulfil specific regulatory

660 Annex 12 and 13 of the Form CO.

661 BCG, *Atlas in the TiO_2 market*, June 2013, p. 25.

662 BCG, *Atlas in the TiO_2 market*, June 2013, p. 134.

663 Agreed minutes of conference call with Kronos of 13 February 2014.

664 See responses to questions 8, 8.1, 8.2 and 9 of questionnaire "Q8 - Questionnaire For Customers –TiO_2 for CPF applications- Phase II".

standards in terms of product characteristics and production process.[665] Pharmaceuticals need to comply with more stringent standards than food and even more than cosmetics.[666] Several customers, including distributors active in several segments, indicated that the characteristics of cosmetics, food and pharmaceuticals are different.[667] However, there are some customers that use the same grade for several CPF applications.[668]Moreover, some suppliers such as Precheza market a grade which is suited for both food and cosmetics. On the other hand some suppliers market a specialised grade for pharmaceuticals. An analysis of the grades sold by the Parties confirms the same mixed picture. As regards Huntsman, out of the three grades dedicated to CPF (AHR Select, Purity 71 and Purity 73), one is dedicated for all three applications, one can be used in cosmetics and pharmaceuticals and one is dedicated only to food applications. However, the multi-purpose grade (AHR Select) represents […]*% of the total sales in CPF. Sachtleben has more grades dedicated to CPF applications since it is more focused on this area and has also nano-ultrafine grades that are only dedicated to pharma and/or cosmetic applications. Nevertheless, it also has multi-purpose grades, such as FF-PHARMA that is recommended for the use in cosmetics and food, and HOMBITAN AFDC which is appropriate for all three applications.

(450) In general, the customers buying TiO_2 for CPF applications do not seem to be very price sensitive, since TiO_2 constitutes a small fraction of their overall production costs. However, some distributors mentioned that the customers using TiO_2 in food applications may be slightly more price sensitive due to the pressure on the market to deliver cheap food, while cosmetics and pharmaceuticals are much more expensive products, with active ingredients having the main impact on the end-price.[669]

(451) As regards the method used by the Parties to report sales, the figures are not broken down into individual segments for each application, but instead one figure for CPF sales as a whole is given. This also applies to Sachtleben for whom CPF is one of the main focus areas, and to the TDMA report for the quarterly data for TiO_2 for CPF applications.

(452) Therefore, the Commission takes the view that the question of further segmentation of the CPF market into cosmetics, pharmaceuticals and food can be left open for the purpose of the present case since the Transaction does not raise competition concerns under any plausible market definition in relation to this market or sub-markets.

7.1.3. Conclusion on product market definition

(453) Therefore, the Commission takes the view that TiO_2 for CPF applications constitutes a separate relevant product market. As regards further segmentation between the separate applications, namely cosmetics, pharmaceuticals and food, this can be left

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665 See responses to question 4.1 of questionnaire "Q8 - Questionnaire For Customers –TiO_2 for CPF applications- Phase II" and responses to question 48 of questionnaire "Q10 - Questionnaire for Competitors –TiO_2- Phase II.

666 Agreed minutes of conference call with Precheza of 17 February 2014; BCG, *Atlas in the TiO_2 market*, June 2013, p.148; Responses to question 19 of questionnaire "Q1 - Questionnaire For Customers Titanium Dioxide- Phase I".

667 Responses to questions 19-19.1 of questionnaire "Q1 - Questionnaire For Customers Titanium Dioxide- Phase I".

668 See responses to question 2 of questionnaire "Q8 - Questionnaire For Customers –TiO_2 for CPF applications- Phase II".

669 Agreed minutes of conference call with […]* of 4 April 2014.

open since the Transaction does not raise competition concerns under any plausible market definition.

7.2. Relevant geographic market

7.2.1. The Notifying Party's views

(454) The Notifying Party claims that the geographic market for TiO_2 is global irrespective of any segmentation among the various end-applications.[670]

(455) In addition to the arguments put forward by the Notifying Party and which have been mentioned in section 5.3.2, in respect of the CPF applications in particular the Notifying Party argues that the supply of TiO_2 has a strong global character, noting that the production facilities supplying the anatase grade are located principally in Europe, Asia and Canada. From the demand side, there are major international customers, such as L'Oreal, Nestle and Unilever, which purchase globally, as well as large international distributors, which supply at least 70% of the TiO_2 need of the CPF applications.

7.2.2. The Commission's assessment

(456) Further to the arguments mentioned in Section 6.2. for the printing ink applications, the market investigation in the present case confirmed that customers that purchase TiO_2 for use in the EEA also source from Asia (China, Japan and other Asian countries).[671] However, the percentage of these customers is small (less than 33% of the respondents to the market investigation) and also the percentage of their needs (less than 40%).[672] Nevertheless, the majority of customers recognised that EEA requirements are different from the other world regions (in terms of heavy metal impurities/types, testing method, labelling requirements, registration).[673]

(457) Respondent customers to the market investigation did not confirm that the contracts that they have with their suppliers cover several world regions. On the contrary, they are often limited to just one region or group of countries for distributors.[674]

(458) Also based on the market investigations results, the Commission concludes that the different regulatory approvals needed to be fulfilled in order to market CPF products in EEA and in other regions of the world plays an important role for producers. Moreover, other elements such as the way the Parties follow the evolution of the prices and how they report sales for the CPF applications, similar as the way TDMA reports quarterly data for CPF, point towards an EEA-wide market for TiO_2 for CPF applications.

7.2.3. Conclusion on geographic market definition

(459) In light of the above, the Commission takes the view that the geographic market for TiO_2 for CPF applications or for any of the individual segments of the CPF market is likely to be EEA-wide. However, it can be left open since the Transaction does not

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670 Form CO, paragraph 140.

671 See responses to question 10 of questionnaire "Q8 - Questionnaire For Customers –TiO_2 for CPF applications- Phase II"

672 See responses to question 10 of questionnaire "Q8 - Questionnaire For Customers –TiO_2 for CPF applications- Phase II"

673 See responses to questions 12, 13, 13.1., 13.2. and 13.3 of questionnaire "Q8 - Questionnaire For Customers –TiO_2 for CPF applications- Phase II"

674 See responses to question 11 of questionnaire "Q8 - Questionnaire For Customers –TiO_2 for CPF applications- Phase II"

raise competition concerns under any plausible market definition in relation to this market or submarkets.

7.3. Competitive assessment

(460) As regards TiO_2 for CPF applications, according to the Notifying Party, in 2013 this market represented less than 1% of the total TiO_2 sales in the EEA. This represented only amounted to […]* kt, out of which approximately […]* % was cosmetics, an almost equal part was food applications and only around […]*% was pharmaceuticals applications.

(461) After the Transaction the combined market share of the Parties as regards the overall market for TiO_2 for CPF applications would amount to [30-40]*% (with an increment brought by Huntsman amounting to [5-10]* %). According to internal documents of the Notifying Party, […]* of Sachtleben's revenues come from the sale of the ultrafine-nano grades and the remainder from the other CPF applications. This would result in the end in a lower market presence of Sachtleben should the nano-grades be considered as a distinct segment. Other active European producers with a considerable market share in the CPF market are Kronos with [10-20]*% and Precheza with [5-10]*%. Also, according to the Notifying Party, two Japanese producers, Sakai and Tayka are also present in this segment together accounting for [10-20]*% of the sales, the Korean producer Cosmo with a market presence of [5-10]*% and some other Chinese producers (comprising a handful of players: Jiangsu Hongyuan Pharmaceuticals, China Bluestar Group, Yunnan Dahutong, Shanghai Jianghu Industrial, Shanghai Bestmore Industry) who accounted for around [10-20]*% of total demand in 2013. The Notifying Party also claimed that Cinkarna is active in this market, although it has a very limited presence of less than [0-5]*%.

(462) If this segment of the market were to be subdivided into cosmetics, pharmaceuticals and food the market position of the Parties and their main competitors would be as presented in Table 9 below.

Table 9 – Estimated market shares in the EEA for cosmetics, pharmaceuticals and food applications (2013)

	Cosmetics	**Pharmaceuticals**	**Food**
Huntsman	[5-10]*%	[0-5]*%	[20-30]*%
Sachtleben	[40-50]*%	[30-40]*%	[10-20]*%
Combined	[50-60]*%	[30-40[%	[30-40]*%
Kronos	[10-20]*%	[10-20]*%	[10-20]*%
Cinkarna	[0-5]*%	[0-5]*%	-
Sakai/Tayca	[10-20]*%	[5-10]*%	[20-30]*%
Precheza	[5-10]*%	[5-10]*%	[10-20]*%
Total Chinese	[0-5]*%	[20-30]*%	[10-20]*%
Total Ukraine	[0-5]*%	-	-
Cosmo	[0-5]*%	-	[10-20]*%

Source: Huntsman, Annex 140606-World and EEA TiO_2 segments share estimates of reply to RFI 13 of 26 February 2014.

(463) The Notifying Party claims that in terms of closeness of competition, Huntsman's and Sachtleben's market positioning are clearly distinct. […]*. Referring to the different applications, Sachtleben's position is strengthened by its sales of ultrafine-nano grades in cosmetics, a segment where Huntsman is not present. This explains the strong positioning of Sachtleben in the CPF market, due to the high prices of these ultrafine-nano gradest.

(464) In general, for all CPF applications, the Notifying Party underlines the role of international distributors, who are influential, able to provide technical support and certify compliance with regulations. They are usually able to provide the customers with the whole range of products building strong relationships with end-customers, and they can equally leverage their access to end-customers during price negotiations with TiO_2 producers. The Notifying Party claims that distributors with such a position could encourage alternative TiO_2 suppliers to enter into the market for CPF applications, for example from Japan, Korea or China.

(465) The Notifying Party also underlines that the entry barriers as regards the CPF applications are not high. First, CPF applications in general use basic uncoated anatase grades and so any difficulties and fine tuning at the finishing production process is avoided. Second, the Notifying Party considers that fulfilling regulatory requirement should not be overestimated, and it should not exceed two years including qualifications by customers. Third, the quantities at stake are limited: the total CPF market amounts to […]* kt in the EEA (which amounts to […]*% of the EEA sulphate capacity excluding the Parties), so any entry is not limited by capacity constraints. Moreover, the Chinese producers are developing significant sulphate-based production capacities and they could expand easily their presence to further constitute a competitive significant constraint on the merged entity.[675]

(466) Finally, the Notifying Party claims that there are major international customers in the CPF market that purchase TiO_2 globally on the basis of a single framework agreement and therefore enjoy a strong bargaining position in the commercial negotiations and they could easily switch suppliers in response to any attempted price increase by the merged entity.

(467) The market investigation confirmed the existence of Japanese producers Sakai and Tayka, next to Sachtleben among the preferred suppliers especially in the cosmetics and pharmaceutical segment (in particular because they are among the few producers of the ultrafine-nano grades for these two applications).[676] Due to the fact that Huntsman does not produce ultrafine-nano grades, they are not seen as an important competitor in either of these two segments, which confirms the modest presence reflected in the market shares. As regards the food segment, although the Parties are seen as close competitors, the market investigation confirmed the presence of other strong competitors in this segment such as Kronos and Precheza.[677] Moreover, the market investigation results have revealed a much stronger presence of Precheza on the CPF market than the one indicated by the Notifying Party, considering the overall volume of the market as per Notifying Party's estimations. Moreover, they confirmed that there are other suppliers that could represent an alternative to the merged entity, mentioning suppliers mainly like Kronos, but also other suppliers of TiO_2 that could

675 Form CO, paragraph 366.

676 See responses to questions 14 and 15 of questionnaire "Q8 - Questionnaire For Customers –TiO_2 for CPF applications- Phase II"

677 See responses to question 15 of questionnaire "Q8 - Questionnaire For Customers –TiO_2 for CPF applications- Phase II"

potentially enter the CPF market like DuPont, Cinkarna and also Asian producers (including the Chinese).[678]

(468) As regards closeness of competition, the Commission notes that, overall, customers have confirmed that Sachtleben is a more sophisticated producer of CPF grades, being known as the quality leader. […]*. The analysis of the top customers of the two Parties shows that apart from one isolated case, there is no actual overlap in customers between the two Parties. Additionally, this shows also the different focus of the Parties as regards their customer structure and how they approach the market for CPF.

(469) As regards the role of Chinese suppliers in the CPF applications, the replies to the market investigation indicated that customers either did not try their products, or they tried but had quality problems. There is a limited number of customers that have tested their products in the past but almost all had bad experiences due to low quality, non-existent technical service, no production licence and non-compliance with the Union regulation in force, although the prices seem to be lower.[679] Quality problems were also referred to in the internal documents of the Parties.[680]

(470) As regards switching from one segment to another, the Commission notes that the replies to the market investigation revealed that although switching to pharmaceuticals grades takes usually longer and is more difficult, the requirements are not very different and the process is not considered as expensive or involving major costs or production adjustments.[681] On the contrary, the respondents to the market investigation indicated that entering the CPF market (so switching from another purpose grade to a CPF grade) would require equipment modifications for ensuring high purity of the products and specific particle size, which are not required in another segments. One competitor mentioned that approvals take a considerable amount of money.[682] As regards the time frame of developing and marketing a CPF grade, a time frame between 2-7 years has been indicated. Internal documents of the Parties have also confirmed a long time frame for being able to market a new CPF grade. Referring to the CPF overall market, Sachtleben admits that only the customer qualification process "is always a long process. The qualification process is normally 1-2 years" and launching a new CPF grade takes 5 years.[683]

(471) The number of approved suppliers for CPF applications varies from one to four, but more often customers have only one or maximum two active approved suppliers.[684] This is also due to the fact that some of them are the direct distributor of the Parties in some regions.

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678 See responses to question 71 of questionnaire "Q1 - Questionnaire For Customers Titanium Dioxide- Phase I".

679 See responses to question 16 of questionnaire "Q8 - Questionnaire For Customers –TiO_2 for CPF applications- Phase II"

680 See responses to question 16 of questionnaire "Q8 - Questionnaire For Customers –TiO_2 for CPF applications- Phase II"

681 See responses to question 49 and 49.1 of questionnaire "Q10 - Questionnaire for Competitors –TiO_2- Phase II"

682 See responses to question 51 of questionnaire "Q10 - Questionnaire for Competitors –TiO_2- Phase II"

683 See responses to question 20 of questionnaire "Q8 - Questionnaire For Customers –TiO_2 for CPF applications- Phase II".

684 See responses to question 15 of questionnaire "Q8 - Questionnaire For Customers – TiO_2 for CPF applications- Phase II".

(472) Taking into account the small size of the market for CPF applications and moreover the fact that an important part of it is represented by the nano-ultrafine grades where the Parties do not overlap, the existence of other important competitors in this market and the possibility of others TiO_2 producers to enter the market that could represent a competitive constraint on the merged entity, and finally that Huntsman is not seen as the closest competitor of Sachtleben, the Commission takes the view that the Transaction would not significantly impede effective competition in the internal market or in a substantial part of it with respect to the market of TiO_2 for CPF applications or any of the possible sub-segments.

8. MARKET FOR TiO_2 FOR FIBRE APPLICATIONS

8.1. Relevant product markets

(473) In fibre applications, TiO_2 is generally used to give to extruded fibres a less shiny and more natural appearance and thus reduce fibres transparency and deluster the surface. The same TiO_2 grades are mainly applied to polyester fibres and, to a smaller extent, to polyamide and polypropylene fibres.

8.1.1. The Notifying Party's views

(474) The Notifying Party considers that there is a global market for TiO_2 applications, composed of all differentiated products. All the arguments mentioned in Section 5.2.1.2 for TiO_2 for printing ink applications apply with the necessary changes being made as appropriate.

8.1.2. The Commission's assessment

(475) The market investigation results indicated that TiO_2 for fibre applications is likely to constitute a separate market. This is mainly due to specific features of the fibre grades such as level of impurities, particle size, particle dispersibility, abrasiveness.[685] Customers have largely confirmed that they use specific grades for their fibre applications.[686]One customer mentioned that "*you need to choose the right TiO_2 for any single application to get the performances you are looking for*".[687] Moreover, they would not readily switch to other grades in response to a 5-10% SSNIP test.[688]

(476) The BCG Report identifies clusters of applications indicating that market trends and technical requirements depend on the application.[689] […]*.[690] That points to the fact that there are supply side specificities by application, which make switching and entry in each application market relatively difficult, in particular higher quality applications.

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685 See responses to question 6.2 of questionnaire "Q9 - Questionnaire For Customers –TiO_2 for Fibres applications- Phase II".

686 See responses to question 6 of questionnaire "Q9 - Questionnaire For Customers –TiO_2 for Fibres applications- Phase II".

687 See responses to question 13 of questionnaire "Q1 - Questionnaire For Customers Titanium Dioxide- Phase I".

688 See responses to question 7 of questionnaire "Q9 - Questionnaire For Customers –TiO_2 for Fibres applications- Phase II".

689 BCG, *Atlas in the TiO_2 market*, June 2013, p. 27

690 BCG, *Atlas in the TiO_2 market*, June 2013, p. 38.

(477) The market investigation also confirmed that in fibre applications the anatase crystal, produced only via the sulphate-based process is predominantly used.[691] Customers require sulphate-based anatase crystal because of the specific physical features of these grades. It follows that the demand-side substitutability between the sulphate-based and the chloride-based processes is also limited in the fibre applications for which sulphate-based process is best adapted.

(478) For the purposes of this Decision, the Commission takes the view that the product market definition for TiO_2 for fibres can be left open, since the Transaction does not raise competition concerns under any plausible market definition.

8.2. Relevant geographic markets

8.2.1. The Notifying Party's views

(479) The Notifying Party claims that the geographic market for TiO_2 is global irrespective of any segmentation among the various end-applications.[692]All the arguments mentioned in Section 5.3.2 for TiO_2 for printing ink applications apply with the necessary changes being made as appropriate.

8.2.2. The Commission's assessment

(480) The market investigation results have indicated that the geographic market for TiO_2 for fibres application is most probably EEA-wide as respondent customers that have used TiO_2 for fibre applications they all purchased the TiO_2 from the same geographic area.[693] Moreover, both the BCG Report and the TDMA analyse the TiO_2 market for fibre applications by the main regions (this being Asia, Europe, North America and the rest of the world).

(481) However, for the purpose of this Decision, the Commission concludes that the geographic market definition for TiO_2 for fibre applications can be left open, since the Transaction does not raise competition concerns under any plausible market definition in relation to TiO_2 for fibre applications.

8.3. Competitive assessment

(482) According to the Notifying Party, the EEA market for TiO_2 for fibre applications was around […]* kt in 2013, which represents only […]*% of the total EEA TiO_2 market. In this industry, TiO_2 represents a very small input, around […]*% of the total costs.

(483) Both Parties are active in the market for TiO_2 for fibre applications, although the presence of Huntsman is modest, with a market share of only [0-5]*% in 2013, compared to […]*[50-60]*% of Sachtleben. The other players active in this segment are Kronos ([20-30]*%), Cosmo ([5-10]*%), Precheza ([5-10]*%) and some Chinese suppliers ([0-5]*%).

(484) The Commission considers that the Parties do not seem to be close competitors in this segment due to the fact that according to the Notifying Party, over the last ten years, Huntsman has chosen not to focus on this segment. Moreover, the customers that it focuses on have a different profile than Sachtleben's customers. Huntsman's

691 See responses to questions 13 and 15 of questionnaire "Q1 - Questionnaire For Customers Titanium Dioxide- Phase I" and responses to question 3 of questionnaire "Q9 - Questionnaire For Customers – TiO_2 for Fibres applications- Phase II".

692 Form CO, paragraph 140.

693 See responses to question 8 of questionnaire "Q9 - Questionnaire For Customers –TiO_2 for Fibres applications- Phase II".

very limited customers are […]*. Huntsman has a limited product portfolio and customers, whereas Sachtleben has products for all fibre applications.

(485) In light of the above, and in particular taking into account the limited overlap, the existence of several alternative suppliers who will continue to exercise competitive pressure on the merged entity and the fact that the Parties are not close competitors in this segment, the Commission concludes that the Transaction would not significantly impede effective competition in the internal market or in a substantial part of it in relation to TiO_2 for fibre applications.

9. OTHER MARKETS FOR TiO_2

9.1. Relevant product markets

9.1.1. The Notifying Party's views

(486) According to the Notifying Party, coatings, plastics and paper are the three main categories of applications for TiO_2 ('mass applications'), as they represent approximately 90%[694] of the overall TiO_2 demand.

(487) As regards coatings, the majority of TiO_2 for coatings applications is used in the manufacture of architectural coatings (also referred to as "decorative" coatings/paints) and industrial coatings (such as marine, automotive, powder, coil, can, wood and other protective coatings). Small quantities of TiO_2 are also supplied for use in the thin-film applications, which according to the Parties include can coatings, interior coil coatings and printing ink.

(488) As regards plastics, TiO_2 is used in polyolefins (used in packaging applications), PVC (used in construction applications) and engineering plastics (used mainly in automotive and consumer good applications). The Parties indicate that all major players (including competitors and customers) that are active in one of the three main plastics applications are typically active across all segments (namely PVC, polyolefin and engineering plastics). Moreover, the Parties report that the TDMA data, on which Huntsman relied to estimate market shares, does not sub-segment data about TiO_2 by specific plastics applications.

(489) As regards paper, TiO_2 is used to whiten and opacify paper in fine paper, coated paper and paper laminate applications. The Parties indicate that for paper applications, TiO_2 can be replaced by calcium carbonate. Accordingly, Huntsman maintains that if TiO_2 for paper were to be considered a separate relevant product market, the market should also include calcium carbonate as a substitute. [695]

(490) The Notifying Party maintains that there is a single market for TiO_2, regardless of the end application.

(491) As regards mass applications, Huntsman considers that these are large volume commodity applications where customers make their buying decisions mainly on the basis of price and commercial terms. Whereas for some specific coating and plastic

694 Form CO, Paragraph 270.

695 Huntsman and Sachtleben are only marginally active in the paper segments. Huntsman sold approximately […]* tonnes to this market which represents less than […]*% of the company's total sales and less than [0-5]*% of the entire segment of industry sales in the EEA. Sachtleben sold approximately […]* tonnes to this market which represents […]*% of the company's total sales and [5-10]*% of the entire segment of industry sales in the EEA. In view of the limited overlap that would arise further to the Transaction, TiO_2 for paper applications will no longer be discussed in this Decision.

applications, customers have a strong preference for chloride grades (e.g. some construction plastics and industrial coatings), the Notifying Party submits that for the majority of the mass applications, both sulphate and chloride are widely used.[696]

(492) According to the Notifying Party, any manufacturer of TiO_2 can quickly switch between the production of grades for coatings and plastics applications.[697] The Notifying Party submits that the positioning of different grades for different applications is typically more reflective of a marketing strategy rather than real technical differences between the various grades.[698] As regards grades sold to mass applications customers, TiO_2 manufacturers do not charge a price premium to those customer categories[699] (contrary to their practice in respect of printing ink and other specialty applications customers)[700].

(493) Ultimately the Notifying Party submits that if any TiO_2 segmentation by end-use applications were to be considered of relevance, coatings, plastics and paper should be regarded as three separate markets.

9.1.2. The Commission's assessment

(494) The information obtained during the market investigation confirmed that TiO_2 produced via the sulphate-based process or chloride-based process can be used almost interchangeably in the vast majority of mass applications, with few exceptions.[701]

(495) In this regard, the Commission also notices that whereas only few TiO_2 suppliers focus on specialty segments, most of them are active in mass applications, also in view of the substitutability between sulphate/chloride grades. Consequently, the vast majority of TiO_2 suppliers appear to be active both in coating and plastics applications.

(496) Therefore, from a supply-side perspective, the segmentation by type of mass applications (namely coatings, plastics and their hypothetical sub-segments) and by type of TiO_2 manufacturing process would not appear to be appropriate for any of the mass applications.

(497) As for the demand-side perspective, customers in mass applications usually appear to be characterized by less stringent technical requirements for TiO_2, as compared to specialty applications. Nonetheless, the market investigation shows that the TiO_2 requirements for coating and plastics applications are not always the same, but they can vary in certain specific end applications (e.g. some indicated that architectural exterior coatings might require higher durability/quality and that food packaging plastics might require higher purity).[702] Therefore, the segmentation by type of mass application (namely coatings, plastics and their hypothetical sub-segments) appears to be appropriate.

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696 Form CO, paragraphs 111-112.

697 Form CO, Paragraph 123.

698 Form CO, Paragraph 104.

699 Form CO, Paragraph 101.

700 Notifying Party's response to the Statement of Objections, paragraph 21.

701 See responses to questions 16 and 18 of questionnaire "Q1 - Questionnaire For Customers Titanium Dioxide - Phase I".

702 See responses to questions 16 and 18 of questionnaire "Q1 - Questionnaire For Customers Titanium Dioxide- Phase I".

(498) For the purpose of this Decision, the Commission concludes that the product market definition of TiO_2 for coatings and plastics can be left open, since the Transaction does not raise competition concerns under any plausible market definition.

9.2. Relevant geographic markets

9.2.1. The Notifying Party's views

(499) The Notifying Party submits that the market for the supply of TiO_2 is global. This holds true irrespective of whether or not there is any segmentation on the basis of end-use applications.[703]

9.2.2. The Commission's assessment

(500) The results of the market investigation described in more detail in Section 6.2 on the market for TiO_2 for printing ink applications apply to TiO_2 for coatings and plastics with the necessary changes being made as appropriate.

(501) However, for the purpose of this Decision, the Commission concludes that the geographic market definition of TiO_2 for coatings and plastics can be left open, since the Transaction does not raise competition concerns under any plausible market definition.

9.3. Competitive assessment

9.3.1. Competitive assessment - Coatings

(502) As regards TiO_2 for coatings, in the event of the Transaction taking place, the Parties' combined market share in the market defined at EEA and world-wide level would be respectively [30-40]*% and [10-20]*%. The Parties would have market shares in the same range in the hypothetical markets for architectural coatings and industrial coatings.

(503) The Notifying Party also submits that there is an additional coatings segment, namely the thin-film coatings segment, which would include printing inks, can coating and interior coil coatings. In this segment the combined market shares of the Parties amount to [20-30]*% worldwide and [40-50]*% in the EEA. Excluding TiO_2 for printing ink applications, the combined worldwide and EEA-wide market shares of the Parties would be [5-10]*% and [20-30]*% respectively.

(504) According to the Notifying Party, TiO_2 producers are to some extent all active in the coatings segment as both chloride and sulphate-based TiO_2 can be used in these applications. In particular, several strong global players are present both in the decorative coatings and in the industrial coatings, including chloride-based suppliers that usually have higher margins therefore more price flexibility than the sulphate-based ones. The current largest TiO_2 producer in the world, DuPont, is the market leader. Chinese suppliers are also considered by the Parties as increasingly strong competitors. Finally, Huntsman submits that the market is characterized by high spare capacity as in 2012 the average utilisation rate ranged between 70 and 80%.[704]

(505) The market investigation confirms that several strong competitors, including chloride-based TiO_2 suppliers are active on both decorative and industrial markets, such as the market leader DuPont, or Cristal, Kronos or Tronox. According to the results of the market investigation, Kronos, Huntsman, Sachtleben, as well as chloride-based suppliers DuPont, Tronox and Cristal, are considered strong

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703 Form CO, paragraph 143.

704 Form CO, paragraph 560.

competitors in this market.[705] Chinese TiO_2 is mainly used in some architectural/decorative coatings and in particular lower quality and standard products.[706]

(506) In the course of the market investigations, some customers indicate that the overall number of reliable suppliers for coatings is quite limited and that the switching process, including testing and customer's validation, might take up to 1 year.[707] However, in order to reduce their vulnerability to suppliers and the risk of production disruption, coatings customers have a well-established multi-sourcing practice, so that on average they have more than four approved suppliers and usually five to six approved suppliers.[708] Once a grade/supplier is approved, customers can switch between approved suppliers/grades relatively swiftly and without incurring additional costs.[709]

(507) A number of coatings customers expressed concerns in relation to the Transaction.[710] However, on the basis of the results of the market investigation, it can be expected that after the Transaction the merged entity will continue to face strong competitive pressure from several global players and that customers will continue to be able to choose among several valid alternative suppliers. The market investigation also supports the existence of limited spare capacity in the TiO_2 industry as a whole (namely sulphate- and chloride-based), which ranged from 75% to 95% in the EEA in 2012. Competitors could tap into that spare capacity in order to counteract any attempt by the merged entity to deteriorate supply conditions.[711]

(508) In light of the above, the Commission concludes that the Transaction would not lead to a significant impediment of effective competition in relation to the coatings markets.

9.3.2. Competitive assessment - Plastics

(509) As regards TiO_2 for plastics, in the event of the Transaction taking place, the Parties' combined market share in the market defined at EEA and world-wide level would be respectively [20-30]*% and [10-20]*%. The parties were not able to provide information on hypothetical sub-segments for plastics end-use applications because there is no standard/agreed methodology to sub-segment the plastics industry, not even at the level of the TDMA, which does not make any distinction within TiO_2 for plastics.

(510) The Parties submit that after the Transaction the merged entity would be constrained by the market leader Dupont and strong competitors such as Cristal, Kronos and Tronox. Moreover, according to the Parties, the merged entity would face

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705 See responses to question 29 of questionnaire "Q1 - Questionnaire For Customers Titanium Dioxide- Phase I".

706 See responses to questions 56, 57, 58.2 and 59.2 of questionnaire "Q1 - Questionnaire For Customers Titanium Dioxide- Phase I".

707 See responses to question 69 of questionnaire "Q1 - Questionnaire For Customers Titanium Dioxide- Phase I"; See also BCG, *Atlas in the TiO_2 market*, June 2013, p. 252.

708 See responses to question 67 of questionnaire "Q1 - Questionnaire For Customers Titanium Dioxide- Phase I".

709 See responses to question 69 of questionnaire "Q1 - Questionnaire For Customers Titanium Dioxide- Phase I".

710 See responses to question 75 of questionnaire "Q1 - Questionnaire For Customers Titanium Dioxide- Phase I".

711 See responses to question 4 of questionnaire "Q2 and Q2 bis - Questionnaire For Competitors Titanium Dioxide- Phase I".

competition from Chinese suppliers already representing about a third of the global TiO_2 supply for plastic applications.

(511) In the course of the market investigation, a number of customers expressed the general concern that the Transaction might ultimately lead to a price increase in the TiO_2 for plastics applications, mainly due to the reduction of the number of suppliers.[712]

(512) However, the respondents to the market investigation confirmed that Kronos, Tronox and the market leader DuPont are indeed the Parties' closest competitors in plastics.[713] Therefore, after the Transaction the merged entity would continue to be constrained by those strong competitors.

(513) As regards Chinese suppliers, a large majority of customers claimed not to buy Chinese TiO_2 for use in the EEA[714] and the majority of respondents active in plastics considered that, with the exception of a few specific plastics applications, Chinese TiO_2 is generally not suitable for plastics.[715] At the same time, all the customers of TiO_2 for plastics confirmed that both sulphate and chloride grades can be used in plastics.[716]

(514) Therefore, the findings of the market investigation support the existence of supply-side substitutability between chloride and sulphate-based grades for plastics applications. On this basis, the Commission considers that after the Transaction the merged entity would continue to be constrained by several suppliers, including Dupont, which is the largest TiO_2 producer in the world.

(515) In light of the above, the Commission concludes that the Transaction would not significantly impede effective competition in the internal market or in a substantial part of it in relation to the plastics market.

10. BY-PRODUCTS: FERROUS SULPHATE AND FILTER SALTS

10.1. Relevant product markets

10.1.1. The Notifying Party's views

(516) Both Huntsman and Sachtleben produce and sell copperas and filter salts. The Notifying Party submits that copperas from a TiO_2 process can generally be used in all five applications for which they are used (water treatment, as a cement additive, in iron pigments, for fertilisers and for animal nutrition), and there are a number of substitutes to copperas and filter salt for all applications, therefore no market is affected. On the supply-side, suppliers of copperas tend to sell into all of the relevant applications on a global level.

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712 See responses to question 78 of questionnaire "Q1 - Questionnaire For Customers Titanium Dioxide- Phase I".

713 See responses to question 37 and 38 of questionnaire "Q1 - Questionnaire For Customers Titanium Dioxide- Phase I".

714 See responses to questions 21 and 56 of questionnaire "Q1 - Questionnaire For Customers Titanium Dioxide- Phase I".

715 See responses to questions 56, 57, 58.2 and 59.2 to questionnaire "Q1 - Questionnaire For Customers Titanium Dioxide- Phase I".

716 See responses to question 8 of questionnaire "Q1 - Questionnaire For Customers Titanium Dioxide- Phase I".

10.1.2. The Commission's assessment

10.1.2.1. Demand-side substitutability

(517) The evidence derived from the market investigation showed that the purchasers of copperas and filter salts can adapt to copperas or filter salt from either TiO_2 production or steel production for their applications. Subject to being suitable chemically and legally for the end-application, the purchasers stated that copperas and filter salt from TiO_2 can be used for all applications.[717]

(518) The market investigation confirmed that there are substitutes for copperas and filter salts for all applications, see Table 10:

Table 10: Substitutes per application

Application	**Substitutes (according to the Notifying Party)**	**Substitutes (according to copperas and filter salts customers)[718]**
Water treatment	Ferric chloride, aluminium sulphate, polyaluminium sulphate, pluminium chloride, polyaluminium chloride, polymers	All aluminium and iron-based coagulants, aluminium salts ($AlCl_3$, $Al_2(SO_4)_3$), ferric chloride ($FeCl_3$) and ferrous chloride ($FeCl_2$) and all blends thereof.
Cement additive	Antimony oxide, tin sulphate (stannous sulphate)	Antimony oxide, antimony chloride, antimony sulphate tin sulphate (stannous sulphate), tin chloride, zinc sulphate, treated filter salts.
Iron pigments	Scrap iron	Scrap iron, ferrous chloride, scrap iron treated with sulfuric acid.
Fertiliser	Chelated iron	Iron chelates
Animal nutrition	Iron carbonate	Iron carbonate

Source: Form CO, responses to question 13 of questionnaire "Q3 – customers – copperas and filter salt.

(519) A market study concluded that these substitutes (in particular stannous sulphate), provide viable alternatives in case of price increases of copperas.[719]

10.1.2.2. Supply-side substitutability

(520) A TiO_2 producer using the sulphate process can increase the production of copperas and filter salts by changing the blend of ilmenite ore and slag used as raw material.[720] The evidence derived from the market investigation showed that copperas and filter

717 See responses to question 32 of questionnaire "Q3 – customers – copperas and filter salt

718 See responses to question 13 of questionnaire "Q3 – customers – copperas and filter salt.

719 Annex 49 of the Form CO, Frost&Sullivan, *Iron Salts market expansion opportunity assessment*, p.17.

720 See responses to questions 7 and 8 of questionnaire "Q4 – competitors – copperas and filter salt

salt are never produced for themselves. The supply of copperas and filter salt is entirely dependent on the production volumes for TiO_2 and steel.[721]

(521) A TiO_2 producer stated: "*We sell all produced amount of copperas. But we have to reduce our copperas production according to the situation on the market and sales possibilities.*[722] However, this TiO_2 producer added that he would increase his output of by-products if the Notifying Party increased copperas and filter salts prices. Another TiO_2 producer was of the same view, subject to the quality of copperas required. The steel producers' output of copperas is aligned on the production of steel.[723]

10.1.3. Conclusion on product market definition

(522) For the purpose of this Decision, the Commission concludes that the product market definition of ferrous sulphate and filter salts can be left open, since the Transaction does not raise competition concerns under any plausible market definition in relation to by-products.

10.2. Relevant geographic markets

10.2.1. The Notifying Party's views

(523) The Parties consider the geographic market for the supply of copperas to be at least EEA-wide, if not global, since it is easily transported and highly competitive. To illustrate, the Notifying Party state that, […]*. According to the Notifying Party, the geographic market for copperas should also include the USA. The USA is short of copperas and imports more than 100kt per annum from Europe, because there is no sulphate-based TiO_2 production facility in the USA.

(524) The Notifying Party does not see filter salts as a genuine market since they are largely treated as a waste product. Accordingly, the Notifying Party has limited knowledge about the structure of supply of filter salts in Europe.

(525) Finally, the Notifying Party states that, given their status as by-products or waste, both copperas and filter salts are […]* and their economic value is low. However, producers will sell the material as long as it […]*.

10.2.2. The Commission's assessment

(526) In view of their status as by-products or waste with a low economic value, transport costs are the determining issue for the definition of the geographic market. As the evidence collected during the market investigations indicated, transport costs range from 5% (in case the by-product producer and the by-product buyer are located on the same industrial field)[724] up to 200% of the price of the actual product, if the copperas or the filter salts have to be shipped over a distance of several hundred or thousand kilometres.[725] On average market participants stated that shipping distances beyond 600-800 km lead to a net loss for the producer.[726]

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721 See responses to question 37 of questionnaire "Q4 – competitors – copperas and filter salt".
722 See responses to question 37 of questionnaire "Q4 - competitors – copperas and filter salt".
723 See responses to question 38 of questionnaire "Q4 - competitors – copperas and filter salt".
724 See responses to question 17 of questionnaire "Q3 - customers – copperas and filter salt".
725 See responses to question 17 of questionnaire "Q3 - customers – copperas and filter salt".
726 See responses to question 18 of questionnaire "Q4 - competitors – copperas and filter salt".

(527) Accordingly prices of the by-products vary significantly. They vary according to the distance between the location of the production site of the by-products and the location of the buyer. Indeed the Notifying Party's own documents show that the majority of the volume of by-products produced is sold off locally or even regionally.[727] However, there are purchasers from Canada and Mexico who import copperas from the Notifying Party's plants in the EEA.

(528) While there is some export of copperas and filter salt from the EEA to the NAFTA region, the high share of transport costs as well as the European Union waste and chemical legislation appear to be barriers to entry for non EEA-producers of copperas and filter salt.[728] In addition, as the evidence from the market investigations showed, some buyers of copperas and filter salts stated that they tried to work with Chinese material during the TiO_2 shortage in 2009/10, however, this material was either too expensive (too far away) or did not match the security of supply criteria. The evidence derived from the market investigation indicated that copperas and filter salt buyers also import limited amounts from China.[729]

10.2.3. Conclusion on geographic market definition

(529) For the purpose of this Decision, the Commission concludes that the geographic market definition of ferrous sulphate and filter salts can be left open, since the Transaction does not raise competition concerns under any plausible market definition in relation to by-products.

10.3. Competitive assessment

(530) A customer in this market (a recycling company) submitted a complaint underlining the fact that the Notifying Party has a high sulphate-based installed capacity and therefore also a strong position in the market for copperas and filter salts. Nevertheless, the complainant recognised that there are substitutes for the applications of copperas and filter salts.

(531) The combined market share of the Notifying Party on the market for copperas amounts to [40-50]*%, see Table 11.[730]

727 Annex 21 of the Form CO.

728 See responses to question 18 of questionnaire " Q3 - customers – copperas and filter salt".

729 See responses to question 21 of questionnaire " Q3 - customers – copperas and filter salt".

730 Form CO, paragraph 419

Table 11 - Estimated copperas market shares in the EEA

Producer	Industry	Volume (t)	Estimated EEA market share in copperas
Sachtleben	TiO_2	[…]*	[30-40]*%
Kronos	TiO_2	[…]*	[30-40]*%
Huntsman	TiO_2	[…]*	[10-20]*%
ThyssenKrupp	Steel	[…]*	[5-10]*%
Precheza	TiO_2	[…]*	[5-10]*%
Police	TiO_2	[…]*	[0-5]*%
Cristal	TiO_2	[…]*	[0-5]*%
Voest Alpine	Steel	[…]*	[0-5]*%
Arcelor Mittal	Steel	[…]*	[0-5]*%
Ecosteel	Steel	[…]*	[0-5]*%
Tata Steel	Steel	[…]*	[0-5]*%
Imports from China	--	[…]*	[0-5]*%
		1 402 000	**100%**

Source: Form CO, paragraph 419

(532) Given that disposal of copperas and filter salt as waste (landfilling) requires expensive pre-treatment or is not legally possible at all, the handling and disposal of copperas and filter salts […]* for TiO_2 producers using the sulphate-based production method. Consequently these TiO_2 producers aim to dispose of the product at […]*, including through third-party sales. The sales of copperas and filter salts should result in […]*. Therefore, the TiO_2 producers aim to use the chemical properties of the by-products in several applications.

(533) Table 12 shows the market shares of the Notifying Party in the different applications in the EEA. All market shares except for cement additives are below [5-10]*%. As regards cement additives, cement producers can influence the iron dosage needed to treat the chromium (IV) content in the cement by changing their raw material inputs. In addition, as derived from the evidence collected through the market investigation, there are substitutes available for all copperas and filter salts applications, including substitutes for the cement industry (see Section 10.1.2).

Table 12 - Estimated market share in the EEA by application area (merchant sales, 2012)[731]

Application	Huntsman sales (kt)	Est. share	Sachtleben sales (kt)	Est. share	Combined sales (kt)	Est. share combined	Est. total input demand in application (kt)
Water treatment	[…]*	[0-5]*%	[…]*	[0-5]*%	[…]*	[5-10]*%	[…]*
Iron oxide pigments	[…]*	[0-5]*%	[…]*	[0-5]*%	[…]*	[5-10]*%	[…]*
Fertiliser	[…]*	[0-5]*%	[…]*	[0-5]*%	[…]*	[5-10]*%	[…]*
Cement[732]	[…]*	[5-10]*%	[…]*	[10-20]*%	[…]*	[20-30]*%	[…]*
Animal feed	[…]*	[0-5]*%	n/a[733]	n/a	[…]*	[0-5]*%	[…]*
TOTAL	252.6	2.4%	404.8	3.8%	657.4	6.2%	10 595.5

Source: Form CO, paragraph 424

(534) Because of the disposal costs and due to the difficulty of handling and stocking ferrous sulphate the producers of copperas and filter salts have an interest in reducing supplies to third party customers. The Notifying Party considers that supply in Europe exceeds demand and consequently producers also ship copperas outside the Union due to a lack of demand in the Union. According to the Notifying Party, the lack of demand is further evidenced by […]*.

(535) As confirmed by the evidence gathered through the market investigation, Kronos, a TiO_2 producer, is an alternative supplier of copperas and filter salts in Europe.[734] In addition, there is also a possible competitive constraint on the Notifying Party coming from Ukrainian based TiO_2 producers, who produce copperas and filter salts as well.[735]

(536) In addition, there are competitive constraints on copperas from iron salts coming from the steel industry such as iron sulphate and iron chloride coming from steel pickling with sulphuric and hydrochloric acid.

(537) While some market participants were concerned about a possible strong market position of the merged entity on the copperas and filter salt market, the evidence collected through the market investigations indicates that a majority of copperas and

731 The table includes the iron-based by-products, including the Parties' overlapping ferrous sulphate (copperas) and filter salt products. The table also includes allocation of sales by application for distributors based on the parties' best estimates.

732 Iron-based products and other substitutes are used as an additive in cement to reduce the risk of dermatitis through acting as reducing agent for chromium (VI).

733 […]*.

734 See responses to questions 33 and 34 of questionnaire "Q3 - customers – copperas and filter salt".

735 See responses of […]* to questions 15 and 20 of questionnaire "Q3 - customers – copperas and filter salt".

filter salt buyers expects none or only a very slight impact on the price development of copperas and filter salt after the Transaction. [736]

(538) The Commission notes that for a majority of copperas and filter salt buyers Huntsman and Sachtleben are not the only suppliers.[737] On the contrary, as the evidence gathered during the market investigations indicates, there are alternative sources for copperas and filter salts available other than the Notifying Party. These were used during the squeeze of the TiO_2 market in 2009/10.[738] The buyers of copperas and filter salts indicated in the market investigation that it is a well-known fact that Sachtleben has excess copperas stocks in Finland.[739] In addition, the Commission points out that market participants stated that the supply of the by-products exceeds demand and that the copperas and filter salt market is a buyer's market.[740] Accordingly the majority of copperas and filter salt purchasers do not fear volume constraints. [741] Consequently, the Commission considers that the merged entity would have no incentives to increase the prices as this would necessarily imply diversion of demand to the other sources/substitutes.

10.4. Conclusion

(539) In light of the above, the Commission concludes that the notified Transaction would not significantly impede effective competition in the internal market or in a substantial part of it in relation to the market for by-products of the sulphate-based TiO_2 production process, namely ferrous sulphate (copperas) and filter salts. The conclusion also applies to all applications of copperas and filter salts.

11. COMMITMENTS

(540) When a concentration raises competition concerns because it could significantly impede effective competition, in particular as a result of the creation or strengthening of a dominant position, the parties may seek to modify the concentration in order to resolve the competition concerns and thereby gain clearance of their merger. As set out in the Notice on remedies,[742] the commitments have to eliminate the competition concerns entirely and have to be comprehensive and effective from all points of view. Furthermore, commitments must be capable of being implemented effectively within a short period of time as the conditions of competition on the market will not be maintained until the commitments have been fulfilled.[743] In assessing whether proposed commitments are likely to eliminate the competition concerns identified, the Commission will consider all relevant factors including inter alia the type, scale and scope of the proposed commitments, judged by reference to the structure and particular characteristics of the market in which the competition concerns arise, including the position of the parties and other participants on the market.[744]

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736 See responses to question 42.1 of questionnaire "Q3 - customers – copperas and filter salt".
737 See responses to question 36 of questionnaire "Q3 - customers – copperas and filter salt".
738 See responses to question 30 of questionnaire "Q3 - customers – copperas and filter salt".
739 See responses to question 39 of questionnaire "Q3 - customers – copperas and filter salt".
740 See responses to question 39 of questionnaire "Q3 - customers – copperas and filter salt".
741 See responses to question 42.2 of questionnaire "Q3 - customers – copperas and filter salt".
742 Commission Notice on remedies acceptable under Council Regulation (EC) No 139/2004 and under Commission Regulation (EC) No 802/2004 ("Notice on remedies").
743 Notice on remedies, paragraph 9.
744 Notice on remedies, paragraphs 5, 9, and 12.

11.1. Commitments submitted on 28 March 2014

(541) To remove the Commission's competition concerns identified during the phase 1 market investigation in relation to the EEA market for TiO_2 for printing ink applications, the Notifying Party submitted commitments on 28 March 2014 ("Commitments of 28 March 2014").

11.1.1. Description of the Commitments

(542) The Commitments of 28 March 2014 consisted of the divestiture of Huntsman's worldwide TR52 business, which included the main following assets:

(a) the full global transfer of the TR52 brand;

(b) the assignment of the technology that is exclusively and uniquely used to develop, manufacture and sell TR52;

(c) a list of customers for TR52 for the period 2012 – Q1 2014, as well as, where applicable, the assignment of any supply arrangements, contracts, contract rights, customer records, customer reports, transactional data, customer accreditations and other customer documentation for the same period.

(543) Moreover, at the option of the Purchaser, the Commitments of 28 March 2014 foresaw the following assets and arrangements:

(a) the transfer of key personnel ([…]* key profiles);

(b) a transitional supply agreement for TR52 for a period of up to […]* years at current quantity levels or quantities otherwise agreed between the Notifying Party and the purchaser, that reflect changes in customer demand, under the scrutiny of the Monitoring Trustee;

(c) a transitional agreement providing for technical support and training for the implementation of the transferred and licensed TR52 technology for a period of up to […]* years;

(d) a transitional support agreement for the provision of the necessary support in sourcing the necessary equipment and raw materials for the production of TR52 for a period of up to […]* years;

(e) the assignment of a royalty-free, irrevocable, non-exclusive global license to use Huntsman know-how which is used for the production of TR52 as well as for the production of other grades.

(544) Huntsman committed not to implement the Transaction until having entered into a final binding agreement for the sale of the above assets and the conclusion of the above arrangements ("the Divestment Business") and until having received the Commission's approval of the Purchaser.

11.1.2. Results of the market test

(545) In order to assess the effectiveness and the suitability of the Commitments of 28 March 2014 to allay the identified competition concerns, the Commission conducted a market test in particular with customers purchasing TiO_2 for printing ink applications as well as with TiO_2 suppliers.

(546) Overall, the market test indicated that the transfer of know-how could be suitable to remedy the competition concerns identified in this case provided that a suitable purchaser acquires it and develops its presence in the market.[745]

(547) Indeed, the majority of customers and competitors that responded to the market test indicated that the transfer of the Divestment Business as described in the Commitments would be viable on a lasting basis so that a suitable purchaser would be in a position to maintain it and further develop it.[746] Such statements remained conditional on the suitability of the purchaser, as evidenced for example by [...]* ("*it would depend on who the purchaser was and their commitment to and the importance they place on the printing ink market*"),[747] [...]* ("*The essence is in the word "suitable" purchaser*")[748] and [...]* ("*We do believe that if the purchaser has the right capabilities, a transfer is possible*").[749] This condition aside, the majority of customers that responded to the market test indicated that the know-how transferred would enable the potential Purchaser to effectively produce TR52 at a comparable level in terms of quality, product consistency, technical characteristics, *etc.* to TR52 produced by Huntsman,[750] while the majority of competitors that responded to the market test indicated that the transfer of such know-how and IP rights would be sufficient to enable a potential purchaser to compete effectively with the merged entity on a lasting basis in the EEA market for TiO_2 for printing ink applications.[751]

(548) The market test also indicated that the transfer of know-how is subject to the implementation risk. Many customers indicated the need to re-qualify the TR52 grade due to the fact that the grade is produced in a different production facility and by a different TiO_2 producer.[752] [...]* indicated that it "*would treat it like any other material which needs to be requalified, the time for such a qualification depends on the quality of the product*"[753] while […]* specified that "*requalification will be needed as pigment will be produced in a different location*".[754] Indeed, while customers responding to the market test that currently purchase TR52 from Huntsman generally expressed their willingness to switch to the new supplier of TR52,[755] this depends on achieving a similar level of quality, or, as indicated by [...]*, "*when they will be able to offer us a quality acceptable option*".[756] This is confirmed by competitors such as ISK which supposes "*customers will worry about the quality of TR-52 after transfer*"[757] and Police which underlines the "*risk of adaptation of the grade TR52 produced by new/other producer*".[758] Indeed, the transfer of the TR52 to the purchaser's facilities would carry some level of risk, as evidenced by Precheza: "*From a technical point of view, Precheza would be able to*

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745 See responses to questions 1 and 24 of questionnaire "Q5 – Market test - customers" and questions 1 and 37 of questionnaire "Q6 – Market test competitors".

746 See responses to question 2 of questionnaire "Q5 – Market test - customers" and question 3 of questionnaire "Q6 – Market test - competitors".

747 [...]*, responses to question 2 of questionnaire "Q5 – Market test - customers".

748 [...]*, responses to question 2 of questionnaire "Q5 – Market test - customers".

749 [...]*, responses to question 2 of questionnaire "Q5 – Market test - customers".

750 See responses to question 5 of questionnaire "Q5 – Market test - customers".

751 See responses to question 5 of questionnaire "Q6 – Market test - competitors".

752 See responses to question 6 of questionnaire "Q5 – Market test - customers".

753 [...]*, response to question 6 of questionnaire "Q5 – Market test - customers".

754 […]*, response to question 6 of questionnaire "Q5 – Market test - customers".

755 See responses to question 8 of questionnaire "Q5 – Market test - customers".

756 […]*, response to question 8 of questionnaire "Q5 – Market test - customers".

757 Ishihara Sangyo Kaisha, response to question 10 of questionnaire "Q6 – Market test - competitors".

758 Zaklady (ZCH) Police, response to question 10 of questionnaire "Q6 – Market test - competitors".

integrate the TR-52 business. However, this would involve substantial investments and would require a switch of current portfolio."[759] Finally, some competitors highlighted the risk of customer erosion: while "*the market/customer data are vital*",[760] "*there can be no guarantee that these customers will continue to buy from the new purchasing entity*".[761]

(549) The market test suggested that the transitional agreements might need to be further improved in terms of overall duration (potential need for a longer transition period to approve the grade and build customer relationships once the grade is developed),[762] pricing formula (potential need for a clearer definition of the cost-plus formula to guarantee competitiveness of the purchaser)[763] and quantity (potential need for volume flexibility to meet unexpected volatility in demand).[764] Depending on the purchaser, transfer of personnel might be necessary, and additional information about customers might be needed in order to guarantee customer transfer.[765]

(550) In terms of the purchaser criteria, respondents highlighted that the suitability and viability of the commitments strongly depend on the identity and characteristics of the purchaser of the Divestment Business. The respondents underlined in particular that the purchaser should be an existing sulphate-based TiO_2 producer, should have a distribution network in the EEA and available production equipment compatible with the production of TR52.[766]

(551) Moreover, the market test respondents pointed out that the purchaser should have sufficient scale and production capacity to take over the TR52 production volumes and identified a range of minimal capacity. One respondent indicated that "*the overall capacity should ideally be at least 3 to 4 times the TR52 volumes*".[767] [...]* also indicated in the market investigation that it would *"not want to be more than 20% of a suppliers customer base by volume*"[768] and, as a consequence, considers the capacity of "*50 to 100KT as a minimum otherwise we would be nervous about supply security*".[769] Therefore, as indicated by one of the biggest printing ink manufacturers, small TiO_2 suppliers would not be suitable purchasers for the Divestment Business.[770]

(552) However, the market test did not reveal an interested purchaser that would meet the purchaser criteria. Indeed, although the majority of competitors agreed on the *prima facie* viability and attractiveness of the proposed package, no company expressed an unconditional interest to take on the know-how and start producing TR52 in volumes comparable to those currently produced by Huntsman. The only two companies that

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759 Agreed minutes of conference call with Precheza of 11 April 2014.

760 Tronox, response to question 8 of questionnaire "Q6 – Market test - competitors".

761 Kronos, response to question 8 of questionnaire "Q6 – Market test - competitors".

762 See responses to questions 11 and 14 of questionnaire "Q5 – Market test - customers" and to questions of 13, 14, 15 and 20 of questionnaire "Q6 – Market test - competitors".

763 See responses to question 15 of questionnaire "Q6 – Market test - competitors".

764 See responses to question 16 of questionnaire "Q6 – Market test - competitors".

765 See responses to questions 9, 10 and 11 of questionnaire "Q5 – Market test - customers" and to questions 9, 12, 16, 17 and 18 of questionnaire "Q6 – Market test - competitors".

766 See responses to questions 8, 15, 17, 19, 20 and 24 of questionnaire "Q5 – Market test customers" and questions of 26, 28, 29 and 30 of questionnaire "Q6 – Market test competitors".

767 […]*, response to question 20 of questionnaire "Q5 – Market test customers".

768 [...]*, response to question 31 of questionnaire "Q7 - Questionnaire For Customers - TiO_2 For Printing Ink - Phase II".

769 [...]*, response to question 20 of questionnaire "Q5 – Market test customers".

770 [...]*, response to question 21 of questionnaire "Q5 – Market test customers".

expressed some conditional interest, namely the Eastern European companies Precheza and Police, would not have sufficient available capacity to produce the entire TR52 volume.

(553) While both players would have in theory sufficient production capacity to accommodate the production of TR52, none of them would be willing to do so by switching their current production to TR52. In fact, Police explained that "*the option of switching its current portfolio to the production of TR-52 has been discussed internally within Police, but Police considers this to be a risky option. Purchasing the 30 kilotons of TR-52 business would equal 75 % of Police's total capacity. Police considers it dangerous to concentrate to such an extent on the relatively small printing inks market (only 3% on the total TiO_2 market)*".[771] Along the same lines, Precheza indicates that "*If Precheza were to take over, for example, 15 kilotons of the TR-52 business, this would reduce the number of grades offered by Precheza of 3 or 4 items. Such outcome would not be acceptable for Precheza as it would make it too dependent on few products, and expose it to the risks/volatility of one specific market. Contrary to big producers (who can easily adapt to demand, close down a plant if necessary and still continue their business), small TiO_2 producers with one plant (such as Precheza) need to have more stability and a sufficiently wide portfolio of products in order to remain viable.*"[772]

(554) As regards the possibility to further expand their production capacity in order to be able to absorb the production of TR52, both companies agreed that this would require substantial capital investments. As explained by Police,[773] a small TiO_2 producer with 50 kt capacity would need to bear very high investments costs to expand its capacity (in the order of about 5 000 USD per 1 ton of the product). Specifically, if "*Police were to purchase the whole TR-52 business, it would face major capacity issues. It would need to add production units, add a new calcination line and rebuild the black and white parts of the installation*".[774] Precheza *"would be able to integrate the TR-52 business. However, this would involve substantial investment"*.[775] Finally, not only would the costs of capacity expansion be very high, but also the very scope of the capacity expansion would be constrained by existing environmental limits.[776]

(555) The Commission considers that, in light of the replies to the market test, the identity of the purchaser is crucial for the effectiveness of the proposed remedy because the purchaser needs to be a TiO_2 supplier with sufficient capacity to accommodate the production of TR52 in order for the remedy to solve the competition concerns. However, the replies to the market test indicated that no TiO_2 supplier with the abovementioned capacity showed interest in purchasing the Divestment Business. Moreover, the Commission considers that, in light of the replies to the market test, the effectiveness of the provisions about the transitional agreements and the transfer of personnel would depend on the very identity of the purchaser. Therefore, on the basis of these elements, the Commitments of 28 March 2014 were unlikely to be sufficient to eliminate the serious doubts raised. Therefore, the Commission concluded on the basis of the market test that the Commitments of 28 March 2014

771 Agreed minutes of conference call with Grupa Azoty Zaklady Chemiczne Police of 9 April 2014.
772 Agreed minutes of conference call with Precheza of 11 April 2014.
773 Police, response to question 23 of questionnaire "Q6 – Market test - competitors".
774 Agreed minutes of conference call with Grupa Azoty Zaklady Chemiczne Police of 9 April 2014.
775 Agreed minutes of conference call with Precheza of 11 April 2014.
776 Agreed minutes of a conference call with Grupa Azoty Zaklady Chemiczne Police of 9 April 2014.

would not lead to a timely and sufficient entry and would not thus eliminate the serious doubts as to the compatibility of the Transaction with the internal market.

11.2. Commitments submitted on 18 July 2014

(556) Following the issuance of the Statement of Objections the Notifying Party submitted an improved commitments package on 18 July 2014 ("Commitments of 18 July 2014"), which was meant to address the shortcomings which emerged during the market test of the Commitments of 28 March 2014 in relation to a number of technicalities such as the duration of transitional agreements, the purchaser criteria etc.

11.2.1. Description of the Commitments

(557) The Commitments of 18 July 2014 include the following assets:

(a) the full global transfer of the TR52 brand;

(b) the assignment of the technology that is exclusively and uniquely used to develop, manufacture and sell TR52;

(c) the assignment of the technology that is primarily used to develop, manufacture and sell TR52. This technology will be licensed back to Huntsman for sole use in non-printing ink applications;

(d) a royalty-free, irrevocable, non-exclusive global license to use Huntsman know-how which is used on other grades or is not primarily used for the production of TR52. This technology will be licensed to the purchaser to the extent the purchaser requires it;

(e) a list of customers for TR52 between 2010 and the second quarter of 2014, as well as, where applicable, the assignment of any supply arrangements, contracts, contract rights, customer records, customer reports, transactional data, customer accreditations and other customer documentation for 2010 - Q2 2014;

(f) to the extent applicable, the transfer of all licences, permits and authorisations issued by any governmental organisation which contribute to the current operation or are necessary to ensure the viability and competitiveness of the Divestment Business;

(g) to the extent applicable, the transfer of: (i) books, records and files relating to the prosecution and maintenance of the TR52 trademark; (ii) all records of customers and suppliers, price lists, catalogues and mailing lists related to the Divestment Business; and (iii) all advertising, marketing, sales, publicity and presentational materials related to the Divestment Business, or copies thereof, where any items covered by (i), (ii) and (iii) of this recital also relate to a product retained by Huntsman;

(h) any TR52 inventory existing at the time of closing, which would be held separate and sold over time to the purchaser under the terms of the supply or toll manufacturing agreement; and

(i) key personnel with TR52 expertise, including a Hold Separate Manager and (i) an employee with product/applications knowledge and customer technical service knowledge; (ii) an employee with manufacturing/operations know-how; and (iii) a sales employee with inks market and customer knowledge;

(558) The commitments also provided for a number of transitional agreements for a period of up to […]* years after closing (with the addition of the possibility to extend them by […]*):

(a) a transitional supply or toll manufacturing agreement for TR52 at current quality and quantity levels or quantities otherwise agreed between the Parties that reflect changes in customer demand, but not to exceed […]* metric kilo tonnes per annum;

(b) a technological support agreement for the provision of necessary technical support and training on the use of the TR52 know-how;

(c) a transitional support agreement for the provision of necessary support in sourcing the necessary equipment and raw materials for the production of TR52, and procuring logistics and distribution services for the distribution of TR52 in the EEA.

(559) As compared to the first set of commitments, the new package essentially provided for:

(a) the transfer of additional technology, which is not uniquely and exclusively used for the production of TR52, but is also common to the production of other grades;

(b) additional flexibility on the duration of the transitional agreements, with the possibility to extend the […]* duration by […]* in order to ensure continuity and security of supply;

(c) additional transparency on the financial conditions of the toll/supply agreement, with the possibility for the purchaser to resort to an expert's advice in case of disputes with Huntsman […]*;

(d) a broader transitional support agreement, including also assistance on the procurement of logistics and distribution service;

(e) the addition of an explicit ceiling on the maximum annual volume to be supplied by Huntsman under the TR52 transitional supply/toll agreement (namely […]* kt);

(f) the inclusion of the list of key personnel in the Divestment Business (whereas in the first package its inclusion was at the option of the purchaser);

(g) the extension of the time period (to 2010 - Q2 2014) for the list of customers for TR52 and for the assignment of any supply arrangements, contracts, contract rights, customer records, customer reports, transactional data, customer accreditations and other customer documentation.

(560) The new set of commitments also included an upfront buyer provision and clearly set out the purchaser criteria, which take into account the necessity for the purchaser to be a sulphate-based TiO_2 producer, have sufficient capacity to meet current and foreseeable demand worldwide and have the ability to distribute TR52 in the EEA, as identified during the first market test.

(561) In general, the new proposed package took on board all the improvements suggested by the first market test and the sole outstanding issue remained the potential need for additional flexibility on the volumes of the supply/toll agreement. The Notifying Party explained that the whole global demand of TR52 did not exceed […]* kt over the last 4 years and that Commitments of 18 July 2014 allowed for sufficient foreseeable changes in customer demand. However, the Commission considers that

the limitation on the ability to meet extra demand for TR52 during the transitional period might impair the overall viability of the TR52 business.

11.2.2. Results of the market test

(562) On 18 July 2014 the Commission launched the market test of the Commitments of 18 July 2014. The market test aimed, first, to assess whether the Commitments of 18 July 2014 would lead to a timely and likely entry into the EEA market for TiO_2 for printing ink applications and, second, to verify whether the Divestment Business as provided for in the Commitments of 18 July 2014 contained all assets necessary for a suitable purchaser to successfully execute the transfer of the know-how and to run the TR52 business in a viable manner.

(563) Given that the substance of the commitments did not materially change from the 28 March 2014 version to the 18 July 2014 version, a limited market test was conducted in particular to assess whether any interest from potential purchasers could allow the Commission to conclude that a timely and sufficient entry was likely to occur on the basis of the proposed commitments. The Commission consulted two TiO_2 suppliers that had expressed interest about the TR52 Business.

(564) The results of the market test confirmed the overall viability of the proposed commitments and in general the appropriateness of the proposed improvements to ensure a swift transfer of the TR52 business to a suitable purchaser.

(565) Nonetheless, it was suggested that two provisions of the commitments could be further improved, namely the ones concerning the list of proposed key personnel and the transfer of the TR52 trademark.

(566) In fact, one of the respondents indicated that whereas the marketing profile identified in the list of key personnel might be sufficient, it could be useful to allow for some more flexibility in terms of the number and type of personnel to be potentially transferred to the purchaser.[777]

(567) The other respondent pointed out that whereas the current package only provides for the transfer of the TR52 brand, there was the need for more flexibility on the use of "TR" trademark for future developments/upgrades of TR52.[778]

(568) The Commission considers that, in light of the replies to the market test, the attractiveness of the proposed remedies was confirmed, in that some TiO_2 suppliers expressed their interest in acquiring the TR52 business.

(569) However, the market test indicated that two aspects of the commitments should be further improved to ensure the viability of the divestiture business.

(570) First, the commitments should provide for the personnel necessary to operate the business. In this regard, the market test highlighted that the scope of such personnel differs from purchaser to purchaser. The provisions of the Commitments of 18 July 2014 failed to address this need for flexibility.

(571) Second, the commitments should ensure the viability of the divestiture business, which in turn also entails the possibility for the purchaser to compete effectively on a lasting basis with the merged entity. In this respect, the commitments should allow the purchaser to build upon the acquired TR52 know-how so as to effectively continue developing and marketing new grades in the long-term. As highlighted by

[777] Agreed minutes of conference call with GPRO of 18 July 2014.

[778] Agreed minutes of conference call with Henan Billions of 18 July 2014.

the market test, the possibility for the purchaser to brand its future new products using similar trademarks would be important to further consolidate the image of the TR52 supplier vis-à-vis its customers. The commitments allowed for the transfer of the well-known TR52 brand, but failed to address the prospective need of the purchaser to continue expanding its product portfolio and consolidate its image vis-à-vis its customers by relying on consistent branding.

(572) Finally, the ability for the purchaser to retain current TR52 customers as well as to meet any additional demand during the transitional period is crucial to guarantee the purchaser the ability to compete with the Parties on a lasting basis. Therefore, even if the ceiling of […]* kt on the toll manufacturing agreement set by Huntsman stems from the analysis of past trends in demand and should be reasonable enough to meet future demand (based on current projections), it fails to provide for additional flexibility and the possibility for the purchaser to renegotiate such volumes in case of need.

(573) Therefore, on the basis of these elements, the Commitments of 18 July 2014 were not considered to be sufficient to eliminate the serious doubts raised. Therefore, the Commission concluded on the basis of the market test that the Commitments of 18 March 2014 would not lead to a timely and sufficient entry and would not thus eliminate the serious doubts as to the compatibility of the Transaction with the internal market.

11.3. Commitments submitted on 28 July 2014

(574) Following the results of the market test of 18 July 2014, the Notifying Party submitted a final improved commitments package on 28 July 2014 ("Commitments of 28 July 2014"), the full text of which forms an integral part of this Decision as included in Annex 3.

(575) The Commitments of 28 July 2014 provided for three additional improvements vis-à-vis the Commitments of 18 July 2014, namely:

(a) the possibility for additional personnel to be included in the Divestment Business if reasonably requested by the Purchaser and as overseen by the Monitoring Trustee;

(b) the use and registration rights to all distinctive marks containing the terms "TR53", "TR54", "TR55", "TR56", "TR57", "TR58", or "TR59" (the "Reserved Marks") became part of the TR52 Divestment Business and Huntsman committed not to oppose or contest the Purchaser's application, registration, renewal, and/or use of any of the Reserved Marks;

(c) the provision for flexibility on the […]* kt annual ceiling for the transitional supply/toll agreement, which at the request of the purchaser could be further increased by an additional […]* per cent.

11.4. Assessment of the Commitments of 28 July 2014

(576) The Commission has to be able to conclude with the requisite degree of certainty that it would be possible to implement the Commitments and that it is likely that the new commercial structures resulting from them will be sufficiently workable and lasting to ensure that the significant impediment to effective competition will not materialise.[779]

[779] Notice on remedies, paragraph 10.

11.4.1. Suitability of the Commitments of 28 July 2014 to remove the significant impediment of effective competition

(577) In this Decision, the Commission found that the Transaction was likely to lead to a significant impediment of effective competition in the EEA market for TiO_2 for printing ink applications. In particular, the Commission concluded that the Transaction would create a dominant position, while eliminating competition between close competitors that hold large market shares in a market characterised by high barriers to entry.

(578) As explained in section 6.3.11 of this Decision, the main barrier to entry and to supply-side substitutability identified in this case resides in the know-how necessary to produce TiO_2 for printing ink applications. As developed in section 6.3.12, most sulphate-based competitors lack the know-how to be able to enter the market for TiO_2 for printing ink applications. Chinese suppliers are unlikely to enter the market in a timely manner (see section 6.3.12.6). Eastern European suppliers lack the incentives to develop a suitable grade in view of their limited capacity. Therefore, in the absence of remedies such as the transfer of technology and know-how required to develop a suitable TiO_2 grade for printing ink applications, no entry would occur in a sufficiently timely manner to significantly constrain the merged entity.

(579) In addition, the main know-how issues of the Parties' competitors were due to the difficulty to reach customers' expectations for surface printing applications, which require high gloss. As TR52 is one of the two best-selling products on the EEA market for TiO_2 for printing ink applications and is particularly suitable for surface printing (see section 6.3.5.1), the divestiture of the technology associated to the production of TR52 would remedy this issue.

(580) According to the Notice on remedies, the divested activities must consist of a viable business that can compete effectively with the merged entity on a lasting basis and that is divested as a going concern.[780] The Commission has a clear preference for an existing stand-alone business. This may take the form of a pre-existing company or group of companies, or of a business division which was not previously legally incorporated as such.[781] Only in exceptional cases a divestiture package including only brands and supporting production and / or distribution assets may be sufficient to create the conditions for effective competition.[782]

(581) In the case at hand, in view of the size of the EEA market for TiO_2 for printing ink applications ([…]* kt) compared to the overcapacity available in the world, in particular sulphate-based capacity, a competitor provided with the adequate technology would have the ability to effectively compete on the market using its existing production equipment. The large customers in the EEA need the supply of TR52 grade that would be produced by the purchaser of the Divestment Business, as post-merger there would be limited alternatives for obtaining higher quality grades of TiO_2 for printing ink.

(582) Therefore, the Commission considers that the transfer of the Divestment Business provided by the Commitments of 28 July 2014 would produce a structural effect similar to a divestiture of a production facility as they would allow for a swift entry

780 Notice on remedies, paragraph 22.
781 Notice on remedies, paragraph 33.
782 Notice on remedies, paragraph 37.

of a new competitor on the EEA market for TiO_2 for printing ink applications and thus restore competition on the market.

11.4.1.1. Viability of the Divestment Business

(583) According to the Notice on Remedies, in order for a divestiture package consisting of brands and assets to be sufficient to create the conditions for effective competition, the package must be sufficient to ensure that the resulting business will be immediately viable in the hands of a suitable purchaser.[783] On a preliminary basis, it should be pointed out that the Commitments of 28 July 2014 incorporate all the improvements that, according to the results of the two market tests, were needed in order to ensure the viability of the business with in particular two respondents showing interest in purchasing the Divestment Business.

(584) As illustrated in sections 11.1 – 11.3, the Divestment Business consists of the transfer of all the necessary know-how and technology to produce and sell TR52. The purchaser will receive full technical assistance from Huntsman to facilitate the technology transfer and the launch of the TR52 production. To this end, the purchaser will also be granted the possibility to acquire key personnel identified in relation to the production and commercialisation of TR52.

(585) As highlighted by the replies to the second market test, the purchaser would need between 18-24 months[784] to complete the know-how transfer, adapt its production facility to the production of TR52, obtain customers accreditation of the new TR52 grade and start full production of TR52. During this period (and up to a maximum duration of […]* years), the purchaser would be able to buy TR52 from Huntsman on the basis of the transitional supply/toll agreement on the basis of "[a formula]*" , with the possibility to re-negotiate the terms of the toll agreement as well as the ceiling for the annual volumes to be supplied by Huntsman. In addition, as part of the Divestment Business, the purchaser would receive customer reports, customer records, transaction data and customer accreditation prepared over the period 2010 - 2014 Q2 in relation to the TR52 business. Therefore, despite the initial temporary absence of its own TR52 production, the purchaser would have the immediate ability to continue to supply TR52 and to take over the existing TR52 customers.

(586) Therefore, the acquisition of the TR52 business would enable, on a stand-alone basis, a new player to swiftly gain an important role in the market. In particular, the provisions on the transitional supply/toll agreement and the other transitional agreements would ensure the timely entry of the new player, who would be able to continue supplying TR52 even during the time needed to complete the know-how transfer and to set up its own production of TR52. On the basis of all these elements, the Commission considers that the Divestment Business would be immediately viable provided it is bought by a suitable purchaser.

(587) Finally, the Commission points out that the TR52 business is an attractive and profitable business, with global sales in the USD […]* – […]* million range and EBITDA margins of […]*% in 2012 and […]*% in 2013 (forecasts are […]*% in 2014 and […]*% in 2015). The following historical financial data and forecasts for

783 Notice on remedies, paragraph 37.

784 Agreed minutes of conference call with GPRO of 18 July 2014; agreed minutes of conference call with Henan Billions of 18 July 2014.

the TR52 Divestment Business were computed by Huntsman.[785] The forecast of sales and volumes for the TR52 business in Table 13 shows that the Divestment Business would maintain its viability and competitiveness.

Table 13 – Historical financial data and forecasts for the TR52 Divestment Business

	2012	2013	2014F	2015F
Volume (kt)	[…]*	[…]*	[…]*	[…]*
Net Sales (USD)	[…]* million	[…]* million	[…]* million	[…]* million
EBITDA (USD)	[…]* million	[…]* million	[…]* million	[…]* million

(588) TR52 is not only one of Huntsman's flagship TiO_2 products for printing ink applications, but also one of the two best-selling TiO_2 products for printing ink applications in the EEA in volume (along with Sachtleben's RDI-S). Indeed, in 2012 Huntsman sold […]* kt of TR52 to the EEA market, out of the overall […]* kt supplied by Huntsman to the EEA market for TiO_2 for printing ink applications. Under current market conditions, the TR52 business represents about […]*% of the overall EEA market.

(589) The continued competitiveness of the Divestment Business would be further ensured by the upfront buyer provision whereby the Transaction between Huntsman and Sachtleben cannot be completed until the Notifying Party (or the Divestiture Trustee) has entered into a binding sale and purchase agreement for the sale of the Divestment Business and the Commission has approved the purchaser.[786] By linking the implementation of the Transaction to the signing of the agreement on the divestiture, Huntsman will have the incentive to swiftly finalise negotiations with the potential purchaser. Consequently, the competitiveness and viability of the Divestment Business would be preserved in the interim period until divestiture[787] as the divestiture is likely to take place in a very limited timeframe.

(590) Therefore, the Commission concludes that the provision of the Commitments guarantee the viability and competitiveness of the Divestment Business, by providing all assets and arrangements that are necessary for it to be operated on a viable stand-alone basis.

11.4.1.2. Purchaser criteria

(591) Beyond the standard purchaser requirements, namely the independence vis-à-vis the Notifying Party, the existence of sufficient financial resources, expertise and incentives to maintain and develop the Divestment Business, and the absence of *prima facie* competition concerns, the Commitments of 28 July 2014 provide for additional purchaser criteria which ensure that the Divestment Business will be

785 Forecasts assumed (i) 2013 sales volumes; (ii) 2014 Q1 sales price (USD […]*/kt); (iii) manufacturing costs as per latest 5 year outlook; and (iv) SG&A allocated on volume basis. See Form RM submitted by Huntsman on 28 July 2014.

786 Paragraph 3 of the Commitments of 28 July 2014.

787 Notice on remedies, paragraph 55.

divested to a suitable Purchaser who will have all attributes to maintain and develop its viability.[788]

(592) First, the Purchaser shall be a sulphate-based TiO_2 producer and will therefore already have the main equipment required to reproduce TR52 (see above (129)). Should it need to implement adaptations to its equipment or change its raw material, it will obtain support from Huntsman during the transitional period to adapt its equipment and source the adequate raw materials.

(593) Second, the Purchaser shall have sufficient sulphate-based TiO_2 capacity and scope to meet current and reasonably foreseeable TR52 demand worldwide by the end of the transitional timeframe. Defining a precise capacity level is not necessary since the purchaser's ability to take on and develop the Divestment Business ought to be assessed possibly taking into account its future capabilities based on the concrete plans existing at the time when the assessment is made. In addition, the second market test confirmed the existence of suppliers with sufficient capacity and scope to take over the TR52 business. The sufficiency of the purchaser's capacity and scope will therefore be assessed on a case-by-case basis in the Purchaser approval decision.

(594) Third, the Commitments of 28 July 2014 provide for the purchaser to have the ability to distribute TR52 in the EEA or to acquire this ability within the transitional period. This will ensure that the product is effectively channelled to EEA customers irrespective of the location of the production facility. The second market test also confirmed that the transitional period and agreement would be sufficient to build a direct or indirect distribution network combined with bulk warehouses, which would allow it to be competitive in the EEA market.

(595) Therefore, the Commission considers that the requirements of the Commitments of 28 July 2014 include sufficient criteria to define the suitability of the purchaser and that the divestiture of the business to such a purchaser will be likely to remove the significant impediment of effective competition identified.

11.4.2. Likelihood of entry

(596) The market test of Commitments of 28 July 2014 provided indications that there are interested purchasers having sufficient scale and capacity to take on the Divestment Business.

11.4.3. Conclusion on the commitments

(597) In light of the above, the Commission concludes that the Commitments of 28 July 2014 are suitable and sufficient to remove the significant impediment of effective competition in the EEA market for TiO_2 for printing ink applications.

12. CONDITIONS AND OBLIGATIONS

(598) Pursuant to the second subparagraph of Article 8(2) of the Merger Regulation, the Commission may attach to its decision conditions and obligations intended to ensure that the undertakings concerned comply with the commitments they have entered into vis-à-vis the Commission with a view to rendering the concentration compatible with the internal market.

(599) The fulfilment of the measure that gives rise to the structural change of the market is a condition, whereas the implementing steps which are necessary to achieve this

[788] Notice on remedies, paragraph 47.

result are generally obligations on the parties. Where a condition is not fulfilled, the Commission's decision declaring the concentration compatible with the internal market is no longer applicable. Where the undertakings concerned commit a breach of an obligation, the Commission may revoke the clearance decision in accordance with Article 8(6) of the Merger Regulation. The undertakings concerned may also be subject to fines and periodic penalty payments under Articles 14(2) and 15(1) of the Merger Regulation.

(600) In accordance with the basic distinction as regards conditions and obligations, this Decision should be made conditional on the full compliance by the Notifying Party with Section B (including the Schedule) of the Commitments of 28 July 2014 while all other Sections should be obligations within the meaning of Article 8(2) of the Merger Regulation. The full text of the Commitments of 28 July 2014 is attached as an Annex 3 to this Decision and forms an integral part thereof.

13. CONCLUSION

(601) The Commission expressed serious doubts in its Decision opening the proceedings notably with respect to the EEA market for TiO_2 for printing ink applications. The result of the in-depth market investigation confirmed these concerns. The Commitments proposed as contained in Annex 3 to this Decision modify the Transaction that was notified to the Commission on 29 January 2014 to such an extent that they remove the significant impediment of effective competition in the internal market or in a substantial part of it.

(602) Following modification by the Notifying Party, the Transaction would therefore not significantly impede effective competition in the internal market or in a substantial part of it and should therefore be declared compatible with the internal market and the functioning of the European Economic Area Agreement pursuant to Article 8(2) of the Merger Regulation and Article 57 of the EEA Agreement, subject to compliance with the commitments set out in Annex 3, which is an integral part of this Decision.

HAS ADOPTED THIS DECISION:

Article 1

The notified operation whereby Huntsman Corporation acquires sole control of:

- Sachtleben;
- Rockwood's colour pigments business;
- Rockwood's timber treatment and wood protection chemicals business in North America;
- Rockwood's water treatment business; and
- Gomet

within the meaning of Article 3(1)(b) of the Merger Regulation is hereby declared compatible with the internal market and the EEA Agreement.

Article 2

Article 1 is subject to compliance with the conditions set out in Section B of Annex 3.

Article 3

Huntsman Corporation shall comply with the obligations set out in all the other sections of Annex 3.

Article 4

This Decision is addressed to:

Huntsman Corporation

500 Huntsman Way

Salt Lake City, Utah 84108

United States of America

Done at Brussels, 10.9.2014

For the Commission
(Signed)
Joaquín ALMUNIA
Vice-President

Annex I – Price correlation analysis

1. INTRODUCTION

(1) This Annex describes the Commission's price correlation analysis for product market definition. The analysis focuses on the substitutability between TiO2 primarily used in the production of printing ink ("ink grades") and TiO2 primarily used in the production of coating ("coating grades").

(2) The analysis has been developed in response to the Parties' economic submissions and to complement the qualitative market investigation.

(3) As set out in the main body of the Decision and in Annex II, the qualitative evidence of the market investigation strongly indicates that:

(a) There is no demand side substitution from ink to coating grades.

(b) There is no supply side substitution from coating grades to ink grades for those sulphate-based suppliers that only produce coating grades but not ink grades.

(c) The markets for coating and ink TiO2 were shaped during the last years by a number of common supply and demand shocks, with the common demand shock of 2010-2012 having the largest impact on the evolution of prices of ink and coating grades.

(4) In light of the clear outcome of the market investigation on the absence of demand and supply side substitution between ink and coating grades, the Commission considers that quantitative evidence would need to be particularly robust and compelling in order to support a conclusion that ink and coating grades belong to the same product market.

(5) A SSNIP test could, in principle, deliver such compelling evidence. Indeed, the SSNIP by a hypothetical monopolist is the most relevant test for the purpose of defining the relevant product market, as indicated in the Commission Notice on the definition of relevant market for the purposes of Community competition law.[1] However, the presence of common demand and supply components and the absence of shocks that only influence TiO2 primarily used in the production of printing ink undermine the use of the SSNIP test as a tool for product market definition in the current case. As a consequence, the Commission refined and augmented the Parties' price correlation analysis. However, price correlation analysis has several limitations for the purpose of defining the relevant product market, as explained in details in the following sections.

(6) Based on the evidence set out in this Annex, the Commission concludes that the price correlation analysis presented by the Parties in their economic submissions is inconclusive on the question of market definition. In particular, the Parties' analysis does not analyze adequately whether the high correlation of ink grade and coating grade prices could be driven by common supply and demand shocks, implying that the observed price co-movement would also be consistent with the two grades belonging to separate relevant product markets. In addition, the conclusions on market definition put forward by the Parties fail to recognize the fact that in a situation with joint production and a joint capacity constraint (such as the one that

[1] OJ C 372, 09/12/1997, pages 5-13, paragraphs 15-17 ("Commission Notice on Market Definition")

characterises the production of ink and coating grades), even if demand shocks are not perfectly symmetric, they can still produce strong co-movement of prices without indicating the presence of substitution on the demand and/or supply side (by suppliers that only produce coating grades at present).

(7) The Commission has refined the Parties analysis by attempting to control for common cost movements. This supplementary analysis finds that the prices of coating grades are typically slightly more correlated with each other than with the prices of ink grades, which is an indication of ink grades and coating grades belonging to different markets. However, due to the small size of this difference, as well as the inherent difficulty to adequately control for common demand and supply shocks, the Commission concludes that the price correlation analysis remains uninformative for the purpose of product market definition.

(8) The Annex is structured as follows. Sections 2 and 3 provide a general explanation of the price correlation and the shortcomings of this type of analysis for the purpose of defining relevant markets. Section 4 presents a brief overview of the Parties' economic submissions. Section 5 summarizes the Commission's assessment of the Parties correlation analysis. Section 6 identifies the three pre-requisites that the Commission considers necessary for a price correlation analysis to produce relevant information. Section 7 describes the data provided by the Parties. The methodology applied for this case is discussed in Section 8, and Section 9 describes the results. Finally, Section 10 presents the conclusion.

2. EXPLANATION OF THE ROLE OF PRICE CORRELATION ANALYSIS

(9) Price correlation measures the relationship between the changes of two price series over time. Price correlation analysis produces a measure, the price correlation coefficient, which is an index number taking values in the interval [-1; 1]*. Positive values correspond to prices more likely changing in the same direction than not. In particular, if the two price series move perfectly in line with each other, the correlation coefficient is equal to 1. If there is no statistical link between the changes in the two price series, the correlation coefficient is equal to 0. In other words, the higher the correlation coefficient between two price series, the higher the likelihood that if prices do change they change in the same way, or the higher the degree of co-movement between them.

(10) The use of a price correlation analysis for product market definition is based on the argument that, in absence of common shocks from both demand and supply sides, the degree of co-movement between two price series provides information about the substitutability of the underlying products. Specifically, if the correlation coefficient is "high enough"[2], the two products are likely to be substitutes and belong to the same relevant product market.

(11) The economic reasoning behind this link is based on the arbitrage argument. For example, assume that two products (*A* and *B*) are demand-substitutes and belong to the same relevant market. If an exogenous shock specific to product *A* (a cost shock, for example) increases the price of product *A*, the customers would substitute their purchasing decisions towards product *B*. The increase in demand would lead to an increase in product *B*'s price. As this increase in price has been triggered by an

[2] The correlation coefficient has to be compared to a benchmark in order to interpret its magnitude. See section 3.

increase of product *A*'s price, the two price series co-move and the correlation coefficient results positive. Conversely, if the two products were not substitute, the customers would not be able to switch their purchases from product *A* to product *B*. The price of product *B* would not increase and, as a result, the correlation coefficient would be equal to zero. A similar reasoning must hold also for product *B*: A shock specific to product *B* has to influence the price of product *A*.

(12) The same argument can be made for the supply-side. For example, assume that two products (*A* and *B*) are supply-side substitutes and belong to the same market. If an exogenous shock specific to product *A* (the closure of a plant producing product *A*, for example) increases the price of product *A*, the suppliers would switch some of their production of product B towards the production of product A. This will create a decrease of supply for product B, increasing its price[3]. As this increase in price has been triggered by an increase of product *A*'s price, the two price series co-move and the correlation coefficient is likely to be positive. Also in this case, a similar reasoning must hold for product *B*: A shock specific to product *B* has to influence the price of product *A*.

(13) Therefore, the price correlation tries to capture the substitutability of two products (hence, the definition of the relevant market they belong to) from "the bottom": Since the prices of two products belonging to the same relevant market are expected to co-move, a high degree of co-movement between two price series, as measured by the correlation coefficient, can be an indication of the two underlying products belonging to the same relevant market[4].

3. LIMITATIONS OF PRICE CORRELATION ANALYSIS

(14) While price correlation can sometimes be a reasonable indicator of two products belonging to the same relevant market, it has certain limitations when interpreted for the purpose of defining relevant markets[5].

(15) In particular, price correlation may lead to *false positives*. That is, the value of the correlation coefficient may indicate that two products belong to the same relevant market when in fact they belong to two separate markets.[6] False positive correlations arise most often under the following circumstances:

(a) Existence of common demand and/or supply shocks: A shock that affects both price series can induce a bias in the correlation coefficient as the positive high correlation could in fact be driven by the common factor/shock that is unrelated to consumer/producer substitution. For example, an exogenous increase in the price of a major common cost component (e.g. energy used in the production of both products) is likely to increase the products' prices simultaneously. This would result in a high and positive correlation coefficient, which in fact would be driven by a common factor that is external to substitution patterns.

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3 Note that this will increase the price of product A as compared to its initial high price following the supply-side shock but would still keep it above the price level in case of no such shock.

4 Note that perfect price co-movement is not necessary for two products to belong to the same relevant product market.

5 The arguments summarised in this section are primarily based on the discussion presented in section 4.2.3 of Davis, P. and E. Garces, *Quantitative Techniques for Competition and Antitrust Analysis*, Princeton University Press, 2010, pages 174-183.

6 Price correlation may also lead to *false negative*. That is, the correlation coefficient may indicate two products to belong to two different markets when in fact they belong to the same relevant market.

(b) Non-stationarity – Presence of a trend in the price series: If a trend, either a common trend or two different trends, is present in both price series, i.e. the price series are non-stationary, the co-movement of the series will, at least partially, be driven by the trend, resulting in a spurious correlation'[7]

(16) Finally, individual (non-spurious) correlation coefficients on their own are not informative for product market definition as it is not possible to determine when the correlation coefficient of the two price series is "high enough" for the underlying products to belong to the same relevant market. It is necessary, therefore, to define as a benchmark another correlation coefficient for which strong a priori (qualitative) evidences indicate that the two products belong to the same market. The benchmark will then be used as a threshold for the other correlation coefficients. If it is not possible to define a benchmark, the results of the price correlation analysis are difficult to properly interpret from an economic point of view.

4. THE PARTIES' SUBMISSIONS

(17) The Parties submitted a series of economic analyses (the Economic Submissions). Some of these analyses were developed in stand-alone submissions, while others were provided as parts of responses to a request for information (RFI).

The stand-alone submissions included:

i. "The relevant market for TiO2 pigments sold for inks and/or coatings applications in the EEA", dated 8 January 2014 (Economic Submission #1);

ii. "Response to Questions regarding the [economic] paper as contained in the RFI of 15th January 2014", dated 22 January 2014 (Economic Submission #2);

iii. "M.7061 Huntsman/Rockwood: Clarifications regarding prices and costs data previously submitted to the European Commission", dated 13 February 2014 (Economic Submission #3).

Analyses submitted as parts of responses to RFIs include:

i. Annex 7 to RFI of 31 January 2014, dated 5 February 2014;

ii. Response to RFI of 10 February 2014, dated 11 February 2014

iii. Responses to RFI #19 and RFI #20, dated 19 March 2014;

iv. Responses to RFI #22 and RFI #23, dated 27 March 2014;

v. Responses to RFI #27 and RFI #28, dated 14 April 2014;

vi. Responses to RFI #30, dated 19 May 2014;

vii. Responses to RFI #31, dated 27 May 2014.

(18) For the definition of the relevant product market, the Economic Submissions presents a price correlation analysis that, allegedly, "[…]* *provides empirical evidence which strongly supports the conclusion that sales for inks and other coatings applications*

[7] A time series is stationary when a shock to the time series does not have a permanent impact on the time series and therefore, it does not affect its expected value. Accordingly, a time series is non-stationary when a shock to the time series affects all the future values of that time series, preventing it to return it to its expected mean from before the shock. A more formal definition of stationarity and non-stationarity can be found in most econometrics textbooks.

exert a strong competitive constraint on one another, and hence are part of the same relevant market."[8]

(19) The arguments put forward by the Parties are based on the following five elements:[9]

(a) Many grades are sold for both ink and coating applications.

(b) There is a strong price correlation between the prices of inks and "other coatings": The prices for grades primarily employed in ink applications strongly co-move with the prices of grades primarily employed in coating applications.

(c) Different applications were subject to different shocks: While from the end of 2010 until mid-2012, the market for TiO2 experienced a strong positive demand shock that almost doubled price levels, application (ink vs. coating) level annual global sales figures indicate that the impact of this strong demand shock was different for ink and coating grades.[10] In addition, the co-movement of prices was not driven by the presence of common costs as variable costs move differently from prices over time. In particular, the variable costs increase with a time lag of a few months after the increase in TiO2 prices in 2010-2011.

(d) The co-movement of ink and coating grade prices is confirmed by their co-integration: Price series are co-integrated, indicating that the prices of different grades moves together over time and this co-movement is not spurious.

(e) The correlation between first differences of ink and coating grade is high: The correlation coefficient for the first differences of various coating grades (including ink grades) is generally above 0.5 and the average correlation coefficient between the first differences of ink and coating grade prices is higher than the average correlation coefficient between the first differences of coating grade prices. Furthermore, the Parties also claim that "*analyzing the correlation between first differences mainly provides information regarding the short-run relationship and therefore is less informative on whether or not products/regions are part of the same relevant market*."[11]

(20) Based on these five elements, the reasoning of the Parties is the following: Since the ink grades and the coating grades endured two different shocks, one would expect their prices to show different movements over time. However, the prices of ink grades and coating grades strongly co-move, and this co-movement is not driven by the variable costs. The co-movement of ink grades and coating grades can only be explained by the competitive constraint that they exert one another; hence, they should be considered to form part of the same relevant product market.

5. THE COMMISSION'S ASSESSMENT OF THE PARTIES' CORRELATION ANALYSIS

(21) The Commission found several shortcomings in the Parties' price correlation analysis. These shortcomings can be summarised as follows:

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8 Economic Submission #1, Section 4.

9 See Economic Submission #1 for (a)-(c) and Economic Submission #2 for (d)-(e)

10 The Parties argue that the different demand evolution patterns identified this way constitute a "natural experiment" that allows for the empirical testing of the existence of a competitive constraint between grades supplied for different applications.

11 Economic Submission #2, pages 12-13.

(a) High correlation of the price series in levels is not informative for the definition of the relevant product market: The price co-movement of ink and coating grade prices in 2010-2013 is most likely to be the result of the large demand shock across all grades (ink grades and coating grades included) between 2010 and 2013. Such a large shock can increase (and later decrease) the prices of ink and coating grades to a similar extent at the same time even if they are not in the same relevant market. Additionally, the Commission's analysis found that all the price series in levels are non-stationary, which introduces a severe bias in their correlation.

(b) Demand shock asymmetries are not clear: In the Form CO, the Parties describe market dynamics as being very broadly similar across grades.[12] In contrast to this, the Parties use estimates of global sales figures for 2010-2012 as evidence of asymmetric demand shocks for ink and coating grades in Economic Submission #1, a market feature that they extend to the period of 2007-2013 by using similar estimated annual global sales data[13] However, the Parties do not adequately reconcile this supposedly asymmetric demand evolution pattern with the sequence of industry shocks that they document in detail and none of which are claimed to be ink specific.[14]

(c) Common costs dismissed too easily: The impact of common shocks was dismissed by the Parties with a graph in Economic Submission #1 showing that the costs of raw materials started to increase only with a substantial time lag following the pigment price increase that started in 2010. However, the Commission's analysis of market dynamics found a discrepancy between the market price of the feedstock used in the production process of TiO2 and the cost figures provided by the Parties, i.e. the transaction level data used by the Parties for their analysis shows a more delayed increase in feedstock prices during the industry boom of 2010-2012 than what is indicated by the market intelligence used by the Commission in its analysis of market dynamics.[15] Accordingly, the variable costs in the transaction data may not reflect the real opportunity cost present in the market, which is the real driver of the price series.[16]

(d) Co-integration is not adequate evidence of products belonging to same relevant market: Co-integration of two price series can be the result of common cost and demand shock (i.e. a common trend) and this questions its value as valid evidence for relevant market definition. Lack of co-integration is a more accurate indication of the products belonging to separate relevant markets.

(22) The Commission concludes that the limitations in Economic Submissions severely hinder the validity of the results of the Parties' analysis. In particular, the Economic Submissions fail to control for common supply and demand shocks, and do not

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12 See Form CO, paragraphs 281-285.

13 The Commission has been unable to verify the information provided by the Parties in its response to RFI #30 and RFI#31 to substantiate its estimates of annual global sales data and to verify the robustness of these estimations that were based on an extensive set of assumptions. In light of this, the Commission cannot rely on the claim made by the parties on the existence of an asymmetric shock between ink and coating grades.

14 See Response to RFI #27.

15 See Annex II.

16 This means that TiO2 suppliers could use spot feedstock price increases to justify their own price increases even in cases when they still could buy their feedstock on lower prices that were set earlier in long-term contracts with their feedstock suppliers.

adequately deal with the issues related to the non-stationary nature of the price series; two conditions that the Commission outlines in the next section as pre-requisites for an informative price correlation.

6. PRE-REQUISITES FOR AN INFORMATIVE PRICE CORRELATION ANALYSIS

(23) Given the prevalence of false positives in price correlation analyses, the Commission considers that the price correlation analysis should be primarily used as a "separation" test rather than an "inclusion" test for the purpose of relevant market definition.[17] Accordingly, a low correlation coefficient value for two price series is highly likely to indicate the two products belong to different relevant markets, whereas a high correlation coefficient value for two price series does not necessarily support a conclusion that two products are in the same relevant market. A high correlation coefficient value can also be indication of spurious correlation and be of no relevance for the assessment of product market definition.

(24) The Commission considers the following three conditions to be pre-requisites for a price correlation analysis to be considered probative evidence for the purpose of assessing the relevant product market definition:

(a) Common components of the price series have to be controlled for: The correlated price series have to be "cleaned" of all or most of the common components that may affect them simultaneously and in a similar way, such as common cost, common demand patterns (seasonality, cyclicality, common demand shock, etc.) as changes in these common cost or demand components may drive the high correlation between the price series.

(b) Price series have to be stationary: The correlated price series have to be stationary as the (stochastic) trends inherent in non-stationary time series may falsely indicate a strong connection between the two time series.

(c) Price series have to consist of a minimum number of observations and of a minimum number of subsequent observations: Correlation coefficients estimated over a small number of observations or over time series with gaps are often adversely distorted. The minimum number of observations and the minimum number of subsequent observations depend on the maximum time-frame of the dataset and on the frequency of the observations. Hence, this choice has to be made on a case by case basis.

(25) Note that the three conditions listed above are necessary but not sufficient conditions. Even if all the three conditions hold, high correlation coefficients may still not be informative for the purposes of assessing the relevant product market definition.

7. DESCRIPTION OF THE DATA PROVIDED BY THE PARTIES

(26) The price correlation analysis undertaken by the Commission was based on transaction level data for various grades, including grades for coating and printing ink applications) combined with data on input costs submitted by the Parties. These data are referred to together as Transaction Data.

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[17] Two products that are investigated on whether they belong to the same relevant market often have common inputs and very similar manufacturing procedure and price time series are often non-stationary. Conversely, false negatives caused by changes in one price following changes in the other price with a lag can typically be easily detected and accounted for (by looking at the correlation between one price and the lagged values of the other price).

(27) On a more detailed level, the Transaction Data includes:

- for each included transaction: the name of the supplier, the name of the customer, the country and geographic region of the customer, the customer group it belongs to, the year and month of the transaction, the grade involved, the application (best estimate of the Parties) for which the grade was used, the quantity and price involved, the associated variable production costs and transportation costs, the name, country and geographic region of the plant where the grade was produced, the production process (chloride vs. sulphate based) involved and the currency in which the transaction was completed together with the relevant exchange rate (to Euro).
- for each date(month-year)-plant pair: the price (Euro/unit of raw material) of each input and the cost (Euro/metric tonne of final product) of each input
- for each date(month-year)-plant pair: nominal and actual production capacity figures, production figures and utilisation rates

(28) The Transaction Data covers the period of January 2006 to February 2014, with no input cost data for the month of February 2014 as they were not available.

8. METHODOLOGY APPLIED

(29) The Commission performed its price correlation analysis on the monthly average prices of the ten most traded products of the Parties' ink and coating grades (as indicated by the Transaction Data) in the European market during the period of January 2006 to February 2014. The time frame of the analysis covers a longer period than in the Economic Submissions (that covered from 2010 to 2013), and is less influenced by the market shock of 2010-2012.

(30) In particular, the Commission computed the weighted monthly average price of both Parties' ink grades and coating grades. The analysis focused on the European market[18]; therefore only grades produced and sold in Europe have been considered. The sample of grades have been reduced to the ten most traded grades[19] of each Party in the European market in the period covered by the dataset,[20] as they are considered the most representative of the market.

(31) The ten top grades of each Party have been categorized by their production plant, as some of them have been produced at different European sites. The main difference between plants in the market is their production process: chloride or sulphate based. Only one of the Parties' plants is chloride based (Greatham), while all the others are sulphate based. However, the Commission's investigation highlighted that even in different sulphate based plants some raw materials may not be the same, and some

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[18] The Commission used the definition of Europe provided by the Parties, which is broader than EEA. In the analysis Europe includes the following countries: Albania, Armenia, Austria, Azerbaijan, Belarus, Belgium, Bosnia Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Republic of Macedonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Kazakhstan, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, San Marino, Serbia & Montenegro, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, Ukraine.

[19] The ten most traded grades account for more than 80% of the total sales of ink and coating grades of each Party.

[20] For Huntsman it was only possible to calculate the most traded grades for the period between 2009 and February 2014, as Huntsman was not able to specify the application of each transaction for the period prior 2009.

feedstock has been discontinuously employed in certain plants and not in others.[21] The object of the categorization by plant is to better control for the existing differences across plants.

(32) Out of the ten top grades of Huntsman nine have been considered as "coating grades", one has been considered as "ink grade". For Sachtleben, out of the ten grades eight have been considered as "coating grades", one has been considered as "ink grade", and one has been considered as "ink/coating grade". The Parties provided their best guess about the application (ink, coating, polymers, etc…) of each grade for each transaction in the transaction dataset. The information has been used by the Commission to establish the main application of each of the ten grades considered in the analysis. If the vast majority of the applications indicated by the Parties for the same grade was coating, then the grade has been considered as a "coating grade"; similarly for ink.

(33) For one grade, Sachtleben's RDDI, such clear cut division was not possible, as the data show that RDDI is used in […]* proportion for both coating and ink application. The market investigation highlighted that both Sachtleben and the ink customers consider RDDI as an ink grade. However, the Commission decided to take a conservative approach, and produced two different scenarios whereby RDDI is considered to be either a "coating grade" or an "ink grade".

(34) Table 1 indicates the grade-plant pairs and their applications for each Party. Each pair corresponds to a price series used in the price correlation analysis.

Table 1: Grade-plant pairs used in the analysis

Huntsman		**Sachtleben**	
Grade-plant	**Application**	**Grade-plant**	**Application**
DELTIO81X Greatham	Coating	R210 Duisburg	Coating
DELTIO90X Greatham	Coating	R611 Duisburg	Coating
HD2_Calais	Coating	R660_Pori	Coating
RXL Scarlino	Coating	RD3 Pori	Coating
TC90 Greatham	Coating	RDDI Pori	Ink/Coating
TR52_Calais	Ink	RDIS_Pori	Ink
TR81 Greatham	Coating	RFDI Uerdingen	Coating
TR85 Calais	Coating	RKB2 Uerdingen	Coating
TR88_Greatham	Coating	RKB5_Uerdingen	Coating
TR92_Calais	Coating	RKB6_Uerdingen	Coating
TR92 Grimsby[22]	Coating		
TR92_Scarlino	Coating		

Source: Transaction Data

[21] See Section 8.4.

[22] Note that TR92_Grimsby has been discarded from the analysis because it did not reach the minimum number of observations required. See Section 6.3.

(35) The Commission introduced the following steps in the analysis to ensure that the conditions outlined in Section 6 were fulfilled so far as possible. .

8.1. Condition I: Common components of the price series have to be controlled for

(36) As explained earlier in Sections 3 and 6, if common demand and/or supply components are in the price series, the results of the analysis may present false positives.

(37) The Commission employed *partial correlation analysis*, in addition to the simple correlation analysis used in the Economic Submissions, to address this problem. Partial correlation analysis differs from the simple correlation analysis because – in principle – it is able to distil the impact of common factors. Partial correlation tries to assess whether product-specific shocks (shocks that affect only one product) have any effect on the price of the other potentially substitute products. Hence, a high correlation coefficient between two price series using partial correlation is a stronger indication than a high correlation coefficient obtained from a simple correlation that the two underlying products belong to the same relevant market.

(38) The partial correlation analysis developed by the Commission includes the following two steps:

(a) Regression of each price series on common components: Each price series under analysis is regressed on the common factors using Ordinary Least Squares (OLS). The common factors are chosen based on a priori knowledge (obtained from the Form CO, Parties' various submissions and market investigation). The residuals of such regression are considered as the price series 'net of' common factors. More formally, the Commission analyzed the following model:

$$\Delta p_{ikt} = \alpha_{ik} \Delta c_{kt} + u_{ikt} \quad (1)$$

where p_{ikt} denotes the price of grade *i* produced in plant *k* at time *t*, c_{kt} denotes the common cost vector for all the grades produced in plant *k* time *t* and u_{ikt} denotes the residual obtained after filtering out the impact of common costs c_t on prices p_{ikt}.

(b) Simple correlation of the residuals: The simple correlation coefficients for these residual series are then calculated.

(39) Although partial correlation analysis is a more sophisticated tool than simple correlation analysis, the results may still be spurious if controlling for all the common factors in the price series is problematic or if the common factors are incorrectly chosen.

(40) In the current case control variables have been chosen to control for factors that are common across grades, e.g. seasonality, the Parties' capacity both at the plant and aggregate level and the costs of the common inputs employed in the production process of ink grades and coating grades. Quarterly dummies have been introduced in the partial correlation to account for seasonality, while the capacity figures of each plant have been used in different aggregation to control for the Parties' capacity. The common cost components have been accounted for by introducing the costs of the main feedstock for the sulphate production process (Ilmenite and Slag), and the costs of the energy used in the production process (Energy, Gas and Steam in some specifications). In one specification of the analysis, the Commission introduced more common costs such as Caustic Soda, Acid and "Other Materials".

8.2. Condition II: Price series have to be stationary

(41) If non-stationary price series are used, the results of the correlation analysis may present false positives as the (stochastic) trends inherent in non-stationary time series may falsely indicate a strong connection between the two time series.

(42) To avoid non-stationary price series, the Commission focused its analysis on the first difference of the price series:

$$\Delta p_{it} = p_{it} - p_{it-1}$$

(43) If a price series is integrated of order one, its first difference will be integrated of order zero and therefore stationary.

(44) The Commission assessed the stationarity/non-stationarity of the price time series by applying the Augmented Dickey Fuller (ADF) test on each price series. The optimal number of lags to be introduced in the ADF specification was computed by using an iterated Q-test on the residuals of the ADF's auxiliary regression.[23]

8.3. Condition III: Price series have to consist of a minimum number of observations and of a minimum number of subsequent observations

(45) The time-frame of the Transaction Data dataset covers the period from January 2006 to February 2014. Within that dataset, no input costs are available for the last month, i.e. February 2014. The Commission computed monthly weighted average prices by grade-plant pairs for its analysis. Therefore, depending on the specification of the analysis, i.e. whether input costs are included as explanatory variables or not, the maximum time length of the dataset includes 98 or 97 months (i.e. each price series can have at most 98 or 97 observations).

(46) Given this time dimension and the monthly frequency of the observations, the Commission discarded the grade-plant price series with less than two years of consecutive observations (less than 24 subsequent observations). Additionally, the Commission did not consider in its analysis the correlation coefficients computed using less than 48 observations in total in FDC. That is, if two products were not present simultaneously for at least 48 months in total, their correlation coefficient has been discarded. The Commission considers that these observation number requirements provide a good balance in limiting the distortions delivered by short price series or price series with gaps and the availability of a sample with enough price series to have a rich comparison in the price correlation analysis.

8.4. Empirical Limitations

(47) The Commission tried to address the general limitations and shortcomings of price correlation analysis for the purpose of product market definition with the steps outlined above. However, the case under investigation presented further limitations to the Commission's analysis.

(48) The input costs data significantly vary across companies and across plants. Table 2 shows a comparison of the monthly costs per unit of output in June 2013 across the Parties' plants that entered the analysis.

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[23] The Q-test measures the autocorrelation of the residuals. If the Q-test could not exclude the presence of autocorrelation, one more lag was introduced in the auxiliary regression and the Q-test was performed again. The optimal number of lags was chosen as the one for which the Q-test could exclude autocorrelation.

Table 2: Comparison of monthly costs per unit of output across plants in June 2013						
Plant	**Company**	**Electricity**	**Gas**	**Ilmenite**	**Propane**	**Slag**
Greatham	Huntsman	[…]*	[…]*	[…]*	[…]*	[…]*
Calais	Huntsman	[…]*	[…]*	[…]*	[…]*	[…]*
Scarlino	Huntsman	[…]*	[…]*	[…]*	[…]*	[…]*
Pori	Sachtleben	[…]*	[…]*	[…]*	[…]*	[…]*
Uerdingen	Sachtleben	[…]*	[…]*	[…]*	[…]*	[…]*
Duisburg	Sachtleben	[…]*	[…]*	[…]*	[…]*	[…]*

(49) Greatham, for example, does not employ [a raw material]* in the production process and uses [another raw material]* because it is a chloride based plant. Pori does not employ [an energy source]* as a source of energy, but uses [another energy source]*. Table 2 shows also considerable differences in the cost of the feedstock across companies and even across the plants of the same Party. The differences in costs are present throughout the whole period in the dataset, and some feedstocks are used discontinuously in the same plant. Therefore, the input costs data seem to be very plant specific, which contrasts with their use to control for common costs in the production process.

(50) In addition, it is not clear whether the input costs data represents the real opportunity-cost in the market. The historical analysis on market dynamics suggests that the general trend of the feedstock cost in the market followed a path that is not fully reflected in the data submitted by the Parties. For example, the input costs data provided by the Parties shows that the price of the main feedstock used in the production process started to rise in a period between the […]* of [2010-2012] and the […]* of [2010-2012]. This contrasts with the trends described in market intelligence sources that indicate that the increase in feedstock price started one year earlier, towards the end of 2010.[24] Therefore, the Commission considers that the input cost data are imperfect proxies of common cost components of the supply side.[25]

(51) The analysis of the market dynamics also underlined the presence of strong common demand component in the market. Demand shocks are typically more difficult to quantify (unless they can be proxied by changes in the GDP, which would not have been the right approach in the current case) and, accordingly, the Commission was not able to find any suitable proxy measures to control for the common demand factors.

(52) Furthermore, price correlation may not be able to fully measure the substitutability between the products under investigation. As explained in Section 2, the economic intuition behind price correlation analysis for product market definition assumes two ways substitution between the products without any constraint. However, the product market definition based on qualitative evidence points towards a one-way

[24] See Annex II, paragraph 7.

[25] It should be noted that the Commission is not contesting the reliability of the input costs data provided by the Parties, but their ability to deliver a valid proxy measure to the opportunity-cost in the market, which is generally the main driver of the price movement from the supply side of the market.

substitution of the products[26]. Ink grades can be used for coating application, but coating grades cannot be extensively used in ink applications. Price correlation is not able to distinguish between one-way and two-way substitutability, which presents another limitation to the economic interpretation of the correlation coefficients.

8.5. Three different analyses with different scope

(53) Within the framework presented above, i.e. accounting for possible common factors as well as potential non-stationarity of price series, the Commission has attempted to address the further limitations of the present case by performing three different price correlation analyses to better control for common components of the price series:

(a) Inter-company price correlation: All the price first difference series are correlated with each other. The benchmark correlation coefficient is the one between each Party's ink grades (TR52_Calais, RDIS_Pori and, depending on the specification, RDDI_Pori). The correlations between ink grades and coating grades will be compared to this benchmark. This analysis uses the following restricted specification of the model in equation (1):

$$\Delta p_{ikt} = \alpha_{ik} \Delta c_t + u_{ikt} \quad (2)$$

where p_{ikt} denotes the price of grade *i* produced in plant *k* at time *t*, c_t denotes the common cost and capacity matrix for all the grades at time *t* and u_{ikt} denotes the residual obtained after filtering out the impact of common costs c_t on prices p_{ikt}. The correlation coefficients were calculated on these residuals.

(b) Intra-company price correlation: The price correlation analysis if performed only among the price first difference series of each Party (i.e. correlation among Huntsman's price first difference series and correlation among Sachtleben's price first difference series). In this case, the benchmark will be the average of the intra-company coating grades correlations. The correlation between each Party's ink grade and coating grades is compared to this benchmark. This analysis uses the following restricted specification of the model in equation (1):

$$\Delta p_{ikt} = \alpha_{ik} \Delta c_{Ct} + u_{ikt} \quad (3)$$

where p_{ikt} denotes the price of grade *i* produced in plant *k* at time *t*, c_{Ct} denotes the common cost and capacity matrix for all the grades produced by company *C* at time *t* and u_{ikt} denotes the residual obtained after filtering out the impact of common costs c_{Ct} on prices p_{ikt}. The correlation coefficients were calculated on these residuals.

(c) Intra-plant price correlation: The price correlation analysis is performed only among the price first difference series of the grades produced in the same plant. In this analysis, the Commission reduced the sample only to Huntsman's Calais plant and Sachtlebens' Pori plant, the only plants where both coating grades and ink grades are produced. In this case, the benchmark was the average of the intra-plant coating grades correlations. The correlation between each Party's

[26] See Section X of the Decision.

ink grade and the coating grades is compared to this benchmark. This analysis uses the following restricted specification of the model in equation (1):

$$\Delta p_{ikt} = \alpha_{ik} \Delta c_{kt} + u_{ikt} \quad (4)$$

where p_{ikt} denotes the price of grade *i* produced in plant *k* at time *t*, c_{kt} denotes the common cost and capacity matrix for all the grades produced in plant *k* at time *t* and u_{ikt} denotes the residual obtained after filtering out the impact of common costs c_{kt} on prices p_{ikt}. The correlation coefficients were calculated on these residuals.

(54) The main difference across the three analyses is the aggregation of the input costs and of the capacity figures. The control variables employed in the partial correlation are meant to capture the influence of common factors present in both price series. Hence, partial correlation must not include control variables that are specific to each product. In the present case, input costs and capacity figures are at month-plant level in the Transaction data. Therefore, the Commission aggregated the control variables to reflect the scope of each analysis.[27]

(55) The Commission's analyses and specifications are summarized in Table 3. The specifications with control variables are performed in the partial correlation analysis framework.

Table 3: Specifications of the Commission's partial correlation analyses

Inter-company price correlation	
Specification	**Controls**[28]
First Difference Correlation (FDC)	-
FDC controlling for Seasonality (FDC_S)	Quarterly dummies
FDC controlling for Seasonality and Capacity (FDC_SC)	Quarterly dummies; monthly total combined capacity of the Parties
FDC controlling for Seasonality, Capacity and Input Costs (FDC_SCAIC)	Quarterly dummies; monthly total combined capacity of the Parties; monthly average combined cost of Slag, Ilmenite and Electricity of the Parties[29]
Intra-company price correlation	
Specification	**Controls**
FDC controlling for Seasonality and Capacity (FDC_SC)	Huntsman: Quarterly dummies; monthly total capacity of Huntsman
	Sachtleben: Quarterly dummies; monthly total capacity of Sachtleben

27 For example, in the inter-company analysis the Commission employs as control variables the total combined capacity of the Parties and the average input costs across all the Parties' plants.

28 Note that all the controls listed are in first difference, except the quarterly dummies.

29 Note that in the partial correlations that control for the input costs (FDC_SCAIC and FDC_SCAIC2), the residuals of the price series of the grades produced in Greatham are not fully reliable, as Greatham is a chloride based plant, while some of the inputs in the partial correlation are only used in sulphate plants.

FDC controlling for Seasonality, Capacity and Input Costs (FDC_SCAIC)	Huntsman: Quarterly dummies; monthly total capacity of Huntsman; monthly average cost of Slag, Ilmenite, Electricity and Gas of Huntsman
	Sachtleben: Quarterly dummies; monthly total capacity of Sachtleben; monthly average cost of Slag, Ilmenite and Electricity of Sachtleben[30]
Intra-plant price correlation	
Specification	**Controls[31]**
FDC controlling for Seasonality and Capacity (FDC_SC)	Huntsman: Quarterly dummies; monthly capacity of Calais
	Sachtleben: Quarterly dummies; monthly capacity of Pori
FDC controlling for Seasonality, Capacity and Input Costs (FDC_SCAIC)	Huntsman: Quarterly dummies; monthly capacity of Calais; monthly cost of Slag, Electricity, Gas and Steam of Calais
	Sachtleben: Quarterly dummies; monthly capacity of Pori; monthly average cost of Slag, Ilmenite, Electricity, Propane, Steam Purchased and Steam Credit of Pori
FDC controlling for Seasonality, Capacity and more Input Costs (FDC_SCAIC2)	Huntsman: Quarterly dummies; monthly capacity of Calais; monthly cost of Slag, Electricity, Gas, Steam, Caustic soda, Acid Sulphur and "Other" costs of Calais
	Sachtleben: Quarterly dummies; monthly capacity of Pori; monthly average cost of Slag, Ilmenite, Electricity, Propane, Steam Purchased, Steam Credit, Caustic soda, Sulphur, Sulphuric Acid, and Other materials of Pori

(56) The table above indicates that the narrower the scope of the analysis (from inter-company to intra-plant) the larger the set of common factors that it is possible to control for. For example, the use of feedstock and, say, energy is more likely to be used in the same way within a certain plant than across the plants of the two Parties. As a result, while inter-company analysis in fact only allows to control for seasonality and monthly total available capacity of the Parties, the intra-plant analysis controls for plant level available capacity as well as for a number of common inputs, including Slag, Electricity, Steam, Caustic soda, Acid Sulphur, etc. For a more comprehensive assessment, the intra-plant analysis includes two separate specifications depending on the set of common cost factors controlled for.

(57) However, by narrowing the scope of the analysis, i.e. moving from inter-company price correlation analysis to intra-plant correlation analysis, the utility of the price correlation analysis as valid evidence for relevant product market definition becomes increasingly limited as it targets a more and more restricted set of TiO2 grades. In particular the intra-company price correlation can only assess the substitutability of the same company's ink and coating grades. It gives an indication on whether, for example, Huntsman's ink grade is in the same market as Huntsman's coating grade; similarly for Sachtleben. The same reasoning applies to the intra-plant price correlation; it can only assess whether grades produced in the same plant are substitutes. The scope of generalization of the results obtained for a narrower set of grades to all the grades remains limited.

30 It was not possible to control for Sachtleben's [energy source] in the aggregate analysis, as Pori employs [another energy source] instead of […]* as an energy source.

31 All the control variables in the Intra-plant price correlation analysis have at least 48 observations in total.

8.6. An alternative framework for the price correlation analysis with different ink and coating price series

(58) In addition to the three correlation analyses (inter-company, intra-company and intra-plant correlation analysis) presented above, the Commission developed an additional, alternative, framework to examine the correlation between grades produced for different applications.

(59) In this alternative framework, the Commission separated transactions of the same grade regarding whether they referred to ink or coating applications.[32][33] For example, a difference was made between sales of TR52 for ink and sales of TR52 for coating applications, creating two separate "subgrades", TR52-ink and TR52-coating. Table 4 presents the grades for which a separation along the application segment could be done.[34]

Table 4: Application specific sales volumes in Europe from 2006 to February 2014 for grades used in both ink and coating application (tones)

Grade[35]	Company	Sales for coating application	Sales for ink application
TR52_Calais	Huntsman	[…]*	[…]*
HD2_Calais	Huntsman	[…]*	[…]*
RXL_Scarlino	Huntsman	[…]*	[…]*
RDIS_Pori	Sachtleben	[…]*	[…]*
RDDI_Pori	Sachtleben	[…]*	[…]*
RD3_Pori	Sachtleben	[…]*	[…]*
RFDI_Uerdingen	Sachtleben	[…]*	[…]*

(60) Table 4 above indicates that there are […]* grades ([…]*) for which substantial sales (i.e. more than […]*kt on average per year) were made both for ink and coating applications.

(61) The Commission used the price series for the subgrades of these four grades to develop the following two price correlation analyses:

i. Correlation for the prices of the two subgrades of the same grade, e.g. TR52-ink and TR52-coating.

ii. Average correlation between the prices of ink grades (and subgrades) with the average correlation between the prices coating grades (and subgrades) and with

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32 This separation was based upon the Parties' best guesses. Although the Commission believes in the Parties' expertise and best effort to provide the most accurate figures, the separation between end applications may include some errors. The magnitude and the direction of this possible bias is unknown, but the Commission is confident that, if present, this bias would not significantly affect the results of the analysis.

33 As Huntsman was not able to provide the application figures for the period prior 2009, the Commission assumed that all the sales for each grade prior to 2009 referred to the application reported in Table 1.

34 There is no controversy for the remaining grades in terms of final application. Each of them is only used for coating applications.

35 Note that the sales figures reported include the Commission's assumption for Huntsman's grades for the period prior to 2009. See footnote 33.

the average correlation between ink and coating grade (and subgrade) price pairs.

(62) The alternative framework has two distinguishing features from the framework developed in Section 8.4:

(a) It increases the number of price series pairs, especially for ink-coating, for which correlation coefficients can be computed.

(b) It permits to highlight potential divergences in the price movements of two subgrades belonging to the same grade, e.g. TR52-ink and TR52-coating

(63) While it could be expected that the price of subgrades of the same grade to move closely together and be, in fact, perfectly correlated, any different result, e.g. a low correlation coefficient between the price series of the two subgrades, would suggest that demand in the two application segments (ink and coating) follows a different dynamics, indicating that the two subgrades are in different relevant markets.

9. RESULTS

9.1. Non-stationarity of price series

(64) The first step of the correlation analysis undertaken by the Commission includes the testing of the stationarity of the considered grades in order to decide whether the correlation analysis should target price levels or first price differences (in case the price series are non-stationary). The following table summarizes the results of the stationarity tests (as specified in paragraph (44)) applied to the selected grades, both at the price level and the level of price first differences.

Table 5: Specifications of the Commission's partial correlation analyses

Huntsman			Sachtleben		
Grade-plant (application)	Stationarity[36]		Grade-plant (application)	Stationarity	
	Levels	First diff		Levels	First diff
DELTIO81X_Greatham (c)	NS	NS	R210_Duisburg (c)	NS	NS
DELTIO90X_Greatham (c)	NS	S	R611_Duisburg (c)	NS	S
HD2_Calais (c)	NS	S	R660_Pori (c)	NS	NS
RXL_Scarlino (c)	NS	NS	RD3_Pori (c)	NS	NS
TC90_Greatham (c)	NS	S	RDDI_Pori (i/c)	NS	S
TR52_Calais (i)	NS	S	RDIS_Pori (i)	NS	NS
TR81_Greatham (c)	NS	S	RFDI_Uerdingen (c)	NS	S
TR85_Calais (c)	NS	S	RKB2_Uerdingen (c)	NS	S
TR88_Greatham (c)	NS	NS	RKB5_Uerdingen (c)	NS	S
TR92_Calais (c)	NS	NS	RKB6_Uerdingen (c)	NS	S
TR92_Scarlino (c)	NS	NS			

[36] S: Stationary. NS: Non-stationary.

(65) The results in the table above indicate that for price levels, none of the series are stationary and that for first differences, some series are stationary and some are non-stationary. Non-stationarity of first differences is of concern only to the extent that it excludes the direct correlation of the first differences of the time series but does not exclude the correlation of the stationary error term obtained by regressing the (non-stationary) price first difference on non-stationary cost first differences.

9.2. Inter-company price correlation analysis

(66) Table 6 presents a sample of the inter-company price correlation analysis' results, limited to TR52_Calais and RDIS_Pori correlated with stationary price series in FDC.[37]

Table 6: Sample of the inter-company analysis' results

First grade	FDC stationary	Application	Second grade	FDC stationary	Company of Second	Application	FDC	FDC_S	FDC_SC	FDC_SCAIC	No of observations
RDIS_Pori	N	I	DELTIO90X_Greatham	Y	H	C	0.64***	0.64***	0.63***	0.64***	51
RDIS_Pori	N	I	HD2_Calais	Y	H	C	0.53***	0 53***	0.53***	0.52***	94
RDIS_Pori	N	I	R611_Duisburg	Y	S	C	0.17	0 18	0.18	0.15	69
RDIS_Pori	N	I	RDDI_Pori	Y	S	I/C	0.64***	0.64***	0.63***	0.64***	97
RDIS_Pori	N	I	RFDI_Uerdingen	Y	S	C	0.61***	0.61***	0.61***	0.64***	97
RDIS_Pori	N	I	RKB2_Uerdingen	Y	S	C	0.52***	0 52***	0.52***	0.55***	97
RDIS_Pori	N	I	RKB5_Uerdingen	Y	S	C	0.69***	0.69***	0.70***	0.68***	78
RDIS_Pori	N	I	RKB6_Uerdingen	Y	S	C	0.71***	0.71***	0.71***	0.71***	97
RDIS_Pori	N	I	TC90_Greatham	Y	H	C	0.56***	0 56***	0.56***	0.55***	97
RDIS_Pori	N	I	TR52_Calais	Y	H	I	0.33***	0 33***	0.34***	0.32***	97
RDIS_Pori	N	I	TR81_Greatham	Y	H	C	0.58***	0 58***	0.58***	0.57***	97
RDIS_Pori	N	I	TR85_Calais	Y	H	C	0.41***	0.41***	0.41***	0.41***	97
TR52_Calais	Y	I	DELTIO90X_Greatham	Y	H	C	0.62***	0.61***	0.58***	0.59***	51
TR52_Calais	Y	I	HD2_Calais	Y	H	C	0.71***	0.70***	0.70***	0.70***	94
TR52_Calais	Y	I	R611_Duisburg	Y	S	C	-0.16	-0.17	-0.18	-0.18	69
TR52_Calais	Y	I	RDDI_Pori	Y	S	I/C	0.20*	0 19*	0.20*	0.19*	97
TR52_Calais	Y	I	RFDI_Uerdingen	Y	S	C	0.20*	0 20*	0.20**	0.22**	97
TR52_Calais	Y	I	RKB2_Uerdingen	Y	S	C	0.18*	0 18*	0.18*	0.17*	97
TR52_Calais	Y	I	RKB5_Uerdingen	Y	S	C	0.24**	0 24**	0.24**	0.20*	78
TR52_Calais	Y	I	RKB6_Uerdingen	Y	S	C	0.34***	0 33***	0.34***	0.32***	97
TR52_Calais	Y	I	TC90_Greatham	Y	H	C	0.66***	0.65***	0.65***	0.64***	97
TR52_Calais	Y	I	TR81_Greatham	Y	H	C	0.72***	0.72***	0.72***	0.71***	97
TR52_Calais	Y	I	TR85_Calais	Y	H	C	0.54***	0 54***	0.54***	0.54***	97

Y: Stationary, N: Non-stationary.

I: Ink application, C: Coating application, I/C: Ink/Coating application

H: Huntsman, S: Sachtleben

***: Significant at 1% level; **: Significant at 5% level; *: Significant at 10% level

[37] The Commission will make available to the Parties the STATA code, the data and the complete results of the analyses.

(67) The specification FDC (or FDC_S at most) is considered to be the most reliable one in this analysis for two reasons:

(a) The scope of the analysis is too wide for the control variables to have any significant impact on the price series. The Commission introduced the total combined capacity of the Parties and the average input costs across all the Parties' plants as control variables for the common supply components. The aggregate and average figures convey a severe loss of information in the control variables, which are not able to capture the effect of common supply components. The poor performance of the control variables is visible in the results table as the correlation coefficients does not differ significantly when moving from one specification to the other one, e.g. from the FDC to the FDC_SCAIC.

(b) Some of the input costs used as control variables are inconsistent for Huntsman's Greatham plant. As explained in Section 8.4, the feedstock costs employed in the analysis (Slag and Ilmenite) are used in sulphate based plant, while Greatham is a chloride based plant which operates with different feedstock (Rutile).

(68) The correlation coefficient between TR52_Calais and RDIS_Pori (Huntsman's and Sachtleben's flagship ink grades) was meant to be the benchmark for this analysis. However, the correlation coefficient is low (0.33). [38] Such a low correlation in FDC between RDIS and TR52 is difficult to reconcile with the results of the market investigation and the qualitative analysis, according to which the two products are the closest substitutes in the TiO2 for printing ink market.

(69) The reason for these contradictory results is twofold. The ADF test reported that the price series RDIS_Pori is non-stationary in first difference. Therefore, the FDC between TR52_Calais and RDIS_Pori is spurious. Furthermore, the specifications of the inter-company analysis are unable to adequately control for the common drivers of the price series. The main reason for this is the substantial variation of common cost factors across plants (see paragraph (48)) as well as the inherent difficulty of controlling for common demand costs.[39]

(70) Table 7 shows the averages of the correlation coefficients among (i) Sachtleben's grades (intra-Sachtleben), (ii) among Huntsman's grades (intra-Huntsman) and (iii) between Sachtleben's and Huntsman's grades (inter-Parties).[40] In FDC the average correlation intra-Sachtleben and intra-Huntsman are much higher (approximately double) than the average correlation inter-Parties. This finding highlights the presence of company-specific factors that have a significant impact on the price series of grades produced within the same company and that cannot be controlled for in the inter-company price correlation analysis.

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38 Additionally, considering Sachtleben's RDDI_Pori as an ink grade, the FDC between TR52 and RDDI is also very low (0.2) and only weakly significantly different from 0 (the estimated correlation coefficient is significant at 10% level).

39 Choosing GDP, one the most natural proxy for demand shocks, as a proxy does not work well here because the large demand shock of 2010-2011 would likely be underestimated by changes in GDP.

40 Only those grade pairs are included in these average calculations for which the price series are stationary and the correlation coefficient for the first difference series (FDC) was significant at least at 10%.

Table 7: Averages of the intra-company and inter-company correlations			
	Average Intra-Sachtleben	**Average Intra-Huntsman**	**Average Inter-Parties**
FDC	0.573	0.707	0.321

(71) The Commission considers that the only (partial) result that can be drawn from the inter-company price correlation analysis is outlined in Table 8 and Table 9 which shows the average of the correlations (significant at least at 10% level in FDC between stationary price series) between ink grades and coating grades, and of the correlations between coating grades and coating grades. The rationale of this comparison is similar to the one in the intra-company and intra-plant analysis: Using the average of the correlations among coating grades as a benchmark for the evaluation of the correlation between ink and coating grades, and in turn, to the definition of the relevant market.

(72) Assuming RDDI to be a coating grade, this computation is only possible for Huntsman's grades, as the first difference price series of Sachtleben's RDIS is non-stationary. For Huntsman, in FDC, the average correlation coefficient between ink grades and coating grades is lower than the average correlation coefficient across coating grades by approximately 0.09, providing some indication that TR52 is not in the same relevant product market with Huntsman's coating grades. [41]

Table 8: Averages of the correlation coefficients between ink grades and coating grades, and between coating grades and coating grades of the inter-company analysis, including RDDI as a coating grade			
	Company	**Average Ink-Coating**	**Average Coating-Coating**
FDC	Huntsman	0.646	0.737

(73) Table 9 shows the same computations considering RDDI as an ink grade. The table indicates that in FDC the average of the correlation coefficients between ink grades and coating grades is lower by approximately 0.18 to the average correlation coefficient among coating grades. Similarly to Huntsman, this suggests that RDDI (considered Sachtleben's only ink grade in this specification as it is the only one having stationary first differences) is in a different market than Sachtleben's coating grades.

Table 9: Averages of the correlation coefficients between ink grades and coating grades, and between coating grades and coating grades of the inter-company analysis, including RDDI as an ink grade			
	Company	**Average Ink-Coating**	**Average Coating-Coating**
FDC	Huntsman	0.646	0.737
FDC	Sachtleben	0.461	0.638

(74) However, due to the serious drawbacks raised in this analysis – namely, the non-stationary nature of RDIS_Pori in first difference and, especially, the difficulty to

[41] The correlation coefficients computed in other specifications (FDC_SC and FDC_SCAIC) do not differ significantly because the control variables used to strip the price series from common factors are sums or averages calculated over each company's plants and are, therefore, not able to perfectly capture the real effect of the common cost factors driving the price series.

control for common supply and demand factors affecting the price series – the Commission considers the inter-company price correlation analysis to be uninformative for the definition of the relevant product market.

9.3. Intra-company price correlation analysis

(75) Similarly to the results reported in Table 8 and Table 9 for the inter-company price correlation, the idea behind the intra-company analysis is to compare the average correlation coefficient between ink grades and coating grades of each Party to a benchmark correlation coefficient, which is the average of the correlation coefficients among the coating grades of the same Party.

(76) The intra-company analysis has similar limitations to the inter-company analysis. In particular, the control variables used to strip the price series from common factors are sums or averages calculated over each company's plants and are, therefore, not able to perfectly capture the real effect of the common cost factors driving the price series. In other words, the average input costs across each company's plants do not adequately capture the effect of the common cost factors in the production process. In addition, some of the input costs are still inconsistent with Huntsman's Greatham plant. Therefore, the Commission considers the specification FDC_SC as being the most reliable for the current analysis, as the input costs are likely to exert significant impact at plant level but not at company level.

(77) In each of the specifications of the intra-company analysis the price series of RDIS_Pori is non-stationary. Therefore, assuming RDDI as a coating grade, the comparison of the average correlations can be performed only for Huntsman. The results are reported in Table 10. As in Table 8, the averages reported in Table 10 only account for correlations significant at least at 10% level of stationary price series.

Table 10: Averages of the correlations between ink grades and coating grades, and between coating grades and coating grades of the intra-company analysis including RDDI as a coating grade

	Company	**Average Ink-Coating**	**Average Coating-Coating**
FDC_SC	Huntsman	0.646	0.724
FDC_SCAIC	Huntsman	0.642	0.643

(78) The results are poor evidence that TR52 belongs to a different market than Huntsman's coating grades. In FDC_SC, the average of the correlations between TR52_Calais and Huntsman's coating grades is lower than the average of the correlations among Huntsman's coating grades (0.646<0.724). However, no significant difference between the two averages is present in the specification FDC_SCAIC (0.642~0.643).

(79) Table 11 reports the same averages assuming RDDI as an ink grade. For Sachtleben, the results of the intra-company analysis are similar to the ones of the inter-company analysis reported in Table 9 and give the indication that RDDI is not in the same market as the Sachtleben's coating grades. The average of the correlations between RDDI and the coating grades in lower than the average of the correlations among coating grades by approximately 0.18 in both FDC_SC and FDC_SCAIC.

Table 11: Averages of the correlations between ink grades and coating grades, and between coating grades and coating grades of the intra-company analysis assuming RDDI as an ink grade			
	Company	**Average Ink-Coating**	**Average Coating-Coating**
FDC_SC	Huntsman	0.646	0.724
FDC SCAIC	Huntsman	0.642	0.643
FDC SC	Sachtleben	0.462	0.636
FDC_SCAIC	Sachtleben	0.46	0.639

(80) However, due to the difficulty to fully strip the price series from common components, the Commission considers the intra-company price correlation analysis remains uninformative for the definition of the relevant product market.

9.4. Intra-plant price correlation analysis

(81) The objective of the analysis is to compare the average of the correlation coefficients between the ink grade and coating grades produced in the same plant for each Party, with the average of the correlations among coating grades produced in the same plant. The analysis is restricted to the plants of Calais (Huntsman) and Pori (Sachtleben), as these are the only production sites of Huntsman's TR52 and Sachtleben's RDIS and RDDI grades.

(82) In principle, the intra-plant analysis is not subject to the same limitations as the previous analyses, as the capacity and the input costs associated with a plant can be used directly as control variables in the partial correlation analysis. The Commission relies on two specifications with different sets of input costs as control variables. The specification FDC_SCAIC controls for the main input costs (main feedstock used in the production process and energy), while the specification FDC_SCAIC2 widens the spectrum of control variables to account for more common costs (see Table 3).

(83) The residuals of the regression in the specifications FDC_SCAIC and FDC_SCAIC2 for the price series RDIS_Pori results are stationary (according to the ADF test), a result, which is different from the analyses in the previous two sections.

(84) Table 12 reports the results of the intra-plant analysis assuming RDDI to be a coating grade. As in the previous analyses, the averages are computed for the correlation coefficients that are significant at least at 10% level between stationary series.

Table 12: Averages of the correlations between ink grades and coating grades, and between coating grades and coating grades of the intra-plant analysis assuming RDDI as a coating grade			
	Company	**Average Ink-Coating**	**Average Coating-Coating**
FDC SC	Huntsman	0.623	0.746
FDC SCAIC	Huntsman	0.644	0.743
FDC SCAIC2	Huntsman	0.582	0.775
FDC SC	Sachtleben	0.738	0.616
FDC SCAIC	Sachtleben	0.562	0.478
FDC SCAIC2	Sachtleben	0.559	0.51

(85) The figures in Table 12 indicate that the results of the analysis differ for the two companies when Sachtleben's RDDI is considered a coating grade. In particular, for Huntsman there is a significant difference between the average of the correlation coefficients between ink and coating grades for the Calais (Huntsman) plant, and the average of the correlation coefficients among the coating grades produced in the same plant; in fact, in the more flexible specification (FDC_SCAIC2) the average ink-coating correlation coefficient is lower than the average coating-coating correlation coefficient by almost 0.2. This could be interpreted as a strong indication that TR52 and Huntsman's coating grades do not belong to the same market. However, this contrasts with the results of the same analysis for the Pori (Sachtleben) plant that indicates that RDIS has a higher co-movement with the coating grades, than the coating grades with each other. However, in the specification FDC_SCAIC2 the average ink-coating is higher than the average coating-coating by just 0.05.

(86) However, the results for Sachtleben change if RDDI is assumed to be an ink grade. As reported in Table 13, the average of the correlations between ink grades and coating grades is lower than the average of the correlations among coating grades by approximately 0.15 in FDC_SCAIC and 0.11 in FDC_SCAIC2. Similarly to Huntsman, this could be an indication of the ink grades not being in the same market as the coating grades.

Table 13: Averages of the correlations between ink grades and coating grades, and between coating grades and coating grades of the intra-plant analysis assuming RDDI as an ink grade

	Company	**Average Ink-Coating**	**Average Coating-Coating**
FDC SC	Huntsman	0.623	0.746
FDC SCAIC	Huntsman	0.644	0.743
FDC SCAIC2	Huntsman	0.582	0.775
FDC SC	Sachtleben	0.677	0.715
FDC SCAIC	Sachtleben	0.497	0.648
FDC SCAIC2	Sachtleben	0.521	0.629

(87) Additionally, by assuming RDDI is an ink grade it is possible to use the correlation between RDIS_Pori and RDDI_Pori as a benchmark correlation for Sachtleben's Pori plant. Table 14 reports the Intra-plant correlation coefficients of RDDI_Pori and RDIS_Pori.

(88) The results deliver a mixed figure whereby there is no clear indication about the substitutability between ink grades and coating grades. The benchmark coefficient (the correlation between RDDI and RDIS) is 0.49 both in FDC_SCAIC and in FDC_SCAIC2. The correlations coefficient between RDIS_Pori and the two coating grades produced in Pori that are included in the sample (RD3 and R660) are higher than the benchmark correlation coefficient in both FDC_SCAIC and FDC_SCAIC2. For RDDI, the correlation coefficient with RD3 is similar to the benchmark in FDC_SCAIC (0.5) and slightly higher in FDC_SCAIC2 (0.56), while the correlation coefficient with R660 is lower than the benchmark in both specification (0.29 in FDC_SCAIC and 0.34 in FDC_SCAIC2).

Table 14: Intra-plant correlation analysis' results for RDIS_Pori and RDDI_Pori				
First	Second	FDC_SCAIC	FDC_SCAIC2	OBS FDC_SCAIC
RDDI_Pori	R660_Pori	0.29**	0.34***	72
RDDI Pori	RD3 Pori	0.50***	0.56***	72
RDDI Pori	RDIS Pori	0.49***	0.49***	72
RDIS_Pori	R660_Pori	0.61***	0.56***	72
RDIS_Pori	RD3_Pori	0.59***	0.62***	72

(89) The Commission's preliminary view is that these contradictory results are explicable on the grounds that the main application of RDDI is mixed and that it is not possible to fully control for common factors.

(90) The validity of the input costs as proxy measures of the opportunity-costs in the market is questionable even in the intra-plant analysis. Additionally, the presence of strong demand factors that the Commission was not able to control for represents a bias in the price correlation analyses that is difficult to quantify. Thus, even at plant level, the difficulty to fully control for common demand and supply factors that influence the evolution of the price series of various grades severely undermines the reliability of the results.

(91) As discussed above, these considerations restrict the role of the intra-plant price correlation as valid evidence for the definition of the relevant product market.

9.5. Alternative Framework Results

(92) The alternative framework's analysis (where the grades are divided in sub-grades that account for their application in the transactions) broadly confirms the findings outlined above. Table 15 summarises the results of the three analyses (inter-company, intra-company and intra-plant) performed with the alternative framework.

Table 15: Summary of the alternative framework analyses' results				
	Specification	**Company/plant**	**Average Ink-Coating**	**Average Coating-Coating**
Inter-Company Analysis	**FDC**	Huntsman	0.552	0.643
	FDC	Sachtleben	0.234	0.544
Intra-Company Analysis	**FDC_SC**	Huntsman	0.59	0.677
	FDC_SCAIC	Huntsman	0.631	0.589
	FDC_SC	Sachtleben	0.235	0.546
	FDC_SCAIC	Sachtleben	0.275	0.554
Intra-Plant Analysis	**FDC_SC**	Calais	0.573	0.666
	FDC_SCAIC	Calais	0.588	0.627
	FDC_SCAIC2	Calais	0.547	0.667
	FDC_SC	Pori	0.555	0.524
	FDC_SCAIC	Pori	0.395	0.452
	FDC_SCAIC2	Pori	0.393	0.439

(93) The results show that the average of the correlation coefficients between ink grades and coating grades is always lower than the average of the correlation coefficients among coating grades in the specification that the Commission considered to be the most reliable in each analysis.[42] The magnitude between these differences changes according to the analyses. Yet, the results point towards ink grades and coating grades not belonging to the same relevant product market.

(94) However, the analyses performed with the alternative framework suffer from the same limitations explored in the previous sub-sections, namely: the inability to control for common demand components and the risk that the costs figures do not reflect the real opportunity-cost in the market.

(95) In addition, as mentioned in Section 8.6, the alternative framework enables to evaluate the co-movement between the price series of two subgrades of the same grade e.g. TR52-ink and TR52-coating. Table 16 summarizes the results of the correlation analysis for four pair of subgrades that used the same partial correlation specifications as the ones defined in Table 3.

[42] That is, FDC for the Inter-Company analysis, FDC_SC for the Intra-company analysis and FDC_SCAIC and FDC_SCAIC2 for the Intra-plant analysis

Table 16: Correlations between price series of the same grade sold for different application.						
		Inter-company		Intra-company	Intra-plant	
First	Second	SC	FDC	FDC_SC	FDC_SCAIC	FDC_SCAIC 2
TR52_I_Calais	TR52_C_Calais	0.96***	0.51***	0.53***	0.51***	0.56***
RD3_I_Pori	RD3_C_Pori	-	-	-	0.17	0.22*
RDDI I Pori	RDDI C Pori	-	-	-	-0.07	-0.11
RDIS_I_Pori	RDIS_C_Pori	-	-	-	0.49***	0.48***

(96) No correlation coefficient is reported in the table above for cases when at least one of the price first difference series is non-stationary. The table indicates that the price first differences are non-stationary for the Sachtleben grades and they, or in fact their regression residuals, only become stationary once common costs are controlled for.

(97) The most important insight provided by Table 16 is that the correlation coefficients for the price first differences of any two subgrades belonging to the same grade are low (always below 0.6) and not even significantly different from zero in some cases. This, in turn, suggests that the relationship between the changes in the prices of subgrades belonging to the same grade is not particularly strong, which is not consistent with the two subgrades belonging to the same relevant market.

10. CONCLUSION

(98) The Commission conducted an in-depth price correlation analysis to assess the relevant product market for TiO2. The analysis focused on the substitutability between TiO2 primarily used for printing ink applications and TiO2 primarily used for coating applications in response to the Parties' Economic Submission and as a complement to the qualitative market investigation.

(99) The Commission found several limitations in the Parties' Economic Submissions that severely hindered the validity of its results. Consequently, the Commission refined and augmented the Parties' economic analysis in the attempt to solve such limitations.

(100) Overall, the Commission found that the prices of coating grades are slightly more correlated with each other than with the prices of ink grades. The results give an indication that ink grades and coating grades do not belong to the same product market, the conclusion also reached in the qualitative analysis of the relevant product market definition.

(101) However, the Commission believes that due to the serious limitations identified for each correlation analysis, none of the different approaches delivered reliable results about the relevant product market definition.

(102) The data available did not allow for an adequate control of common supply and demand factors across grades and the Commission could not find suitable proxy

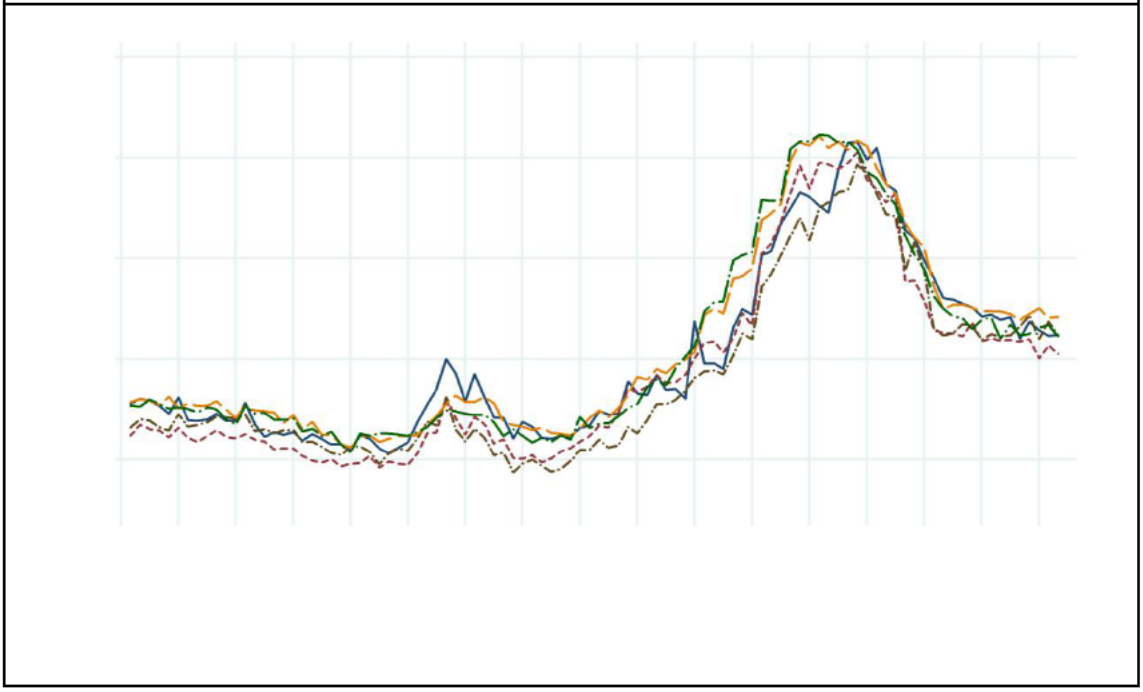
measures to control for common demand components. Furthermore, the Commission believes that the input costs data provided by the Parties does not adequately reflect the real opportunity-cost present in the market, which is indicated by market intelligence to be the main common driver of the price series from the supply side of the market.

(103) In conclusion, the Commission considers the price correlation analysis, even when extended relative to the analysis presented in the Economic Submissions made by the Parties, remains uninformative for the purposes of defining the relevant product market for printing ink and coating grades. This analysis therefore does not contradict or put into question the strong indications from the qualitative evidence on the lack of demand and/or supply side substitution between ink and coating grades.

Annex II – Price evolution and market dynamics of TiO2 pigments for coating and printing ink applications

(1) The information and data submitted by the Notifying Party, together with the available market intelligence provide detailed information on the evolution of the TiO2 market and prices for coating and printing ink applications over the past few years. The following figure indicates the overall price evolution (in Euros)[1] between January 2006 and February 2014[2] for a number of coating and printing ink TiO2 grades produced by Huntsman and Sachtleben.[3]

Figure 5 - The evolution of coating and ink grades prices over time



Source: Commission computations using Parties' Transaction Data[4]

(2) Figure 5 indicates a very similar evolution for the grades used in coating and printing ink applications. This evolution pattern needs to be evaluated by keeping in mind the partially common cost structure of the included pigments as well as the common cost and demand shocks. In particular, it must be taken into account that these pigments use the same feedstock (ilmenite, rutile and slag) and also that energy (electricity and

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1 Prices displayed are weighted average prices, on a monthly basis, over all worldwide transactions of a given grade.

2 The selected period covered was chosen to be consistent with the time period covered by the Transaction Data submitted by the Parties.

3 For the sake of readability, the figure represents the price evolution of the following grades: (i) […]*, a grade mostly used for printing ink applications that is produced in Huntsman's sulphate-based plant in […]*; (ii) […]*, a grade mostly used for coating applications that is produced in Huntsman's sulphate-based plant in […]*; (iii) […]*, a grade mostly used for coating ink applications that is produced in Huntsman's chloride-based plant in […]*; (iv) […]*, a grade mostly used for printing ink applications that is produced in Sachtleben's sulphate-based plant in […]*; and (v) […]*, a grade mostly used for coating applications that is produced in Sachtleben's sulphate-based plant in […]*. The three grades by Huntsman are among the […]* of its most traded grades, whereas the two grades by Sachtleben are among the […]* most traded grades by Sachtleben.

4 The Transaction Data is defined in the Decision, footnote 149.

gas) is another key input for them, indicating that common cost components are significant across these grades.[5] However, at the same time, there is also a variation across plants in the exact ratio of the costs related to these inputs.[6] Finally, the Form CO describes TiO2 as "lifestyle" products since "*demand for the pigment can be correlated with demand for consumer products such as paint, and appliances such as fridges, microwaves, kettles and mobile phones*"[7], indicating that demand shocks driven by general economic conditions will have an impact across the grades. This, in turn, indicates the potential biases resulting from the inability to control for this large common demand shock.

(3) In particular, Figure 5 indicates a slightly decreasing trend for the prices of both printing and ink grades in 2006 and 2007. This, together with mostly stable energy and feedstock prices in 2006 and at least up till mid-2007, lead to shrinking margins for TiO2 manufacturers over the period.

(4) This trend was stopped by the sharp increase of energy prices that started in the second half of 2007 and that prompted TiO2 suppliers from all over the world to engage in a series of price increase announcements as of early 2008 that were followed by others later on that year.[8] Some of these price increases were labelled "energy surcharges"[9] by the TiO2 suppliers, while others were facilitated by the shortening or elimination of the "transitional price protection period" that these suppliers had previously offered to their customers.[10] It must be noted, however, that the pass on of rising input costs to customers has been reported to be only partial, leading to a further decrease in the margins of TiO2 suppliers.[11]

(5) The trend of rising TiO2 prices throughout the first three quarters of 2008[12] was reversed by the global financial and economic crisis in the early autumn of 2008. In particular, global TiO2 demand started to fall and energy prices collapsed too, leading to falling TiO2 prices.[13] Furthermore, the decreasing demand for TiO2 and falling margins (for years) lead a number of suppliers to decide about reducing production by closing or moderating the capacity.[14]

(6) As the global economy started recovering following the extreme decline of late 2008 and early 2009, the demand for TiO2, driven to a considerable extent by the Chinese

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5 One can make further distinction between two different types of inputs: (i) inputs, like energy, the prices of which is not directly influenced by changes in the TiO2 market and (ii) inputs, like feedstock, the prices of which are more likely to be directly linked to the changes in the TiO2 market. Regarding the latter type of input, a strong increase (decrease) in demand for TiO2, which in turn would lead to higher (lower) TiO2 prices, is likely to lead to an increase in the demand for TiO2 feedstock, exerting an upward (downward) pressure on the prices of the latter.

6 See for example, the Huntsman response to question 1 of the RFI #10 of 31 January 2014 that presents a detailed account of input costs for Huntsman as well as Annex I, paragraph 47-48.

7 Form CO, paragraph 281.

8 Huntsman's internal documents, […]*.

9 Huntsman's internal documents, […]*.

10 Huntsman's internal documents, […]*.

11 Huntsman's internal documents, […]*.

12 The "bump" in TiO2 prices in 2008-2009 was more profound in the US than in Europe, which can be explained by the change in the value of the Euro with respect to the USD.

13 Form CO, paragraph 281: "*[o]n a quarterly basis, demand for TiO2 fell as much as 30% in Q4 of 2008*". In its reply to question 2 of the RFI#27, the Notifying Party notes that signs of decreasing demand could be observed even earlier in 2008, indicating that the TiO2 price rise in 2008 was more related to the increasing costs, rather than increasing demand and lack of free capacity. Moreover, according to Huntsman's internal document, […]* Furthermore, the same issue of the […]*.

14 For example, Huntsman […]*.

demand also, started to recover by the end of 2009.[15] This continuing increase in demand, together with the earlier moderation and closure of TiO2 production capacity, lead to a tight supply/demand balance and, in turn, to increasing prices as of 2010.[16] The situation was further exacerbated by the fact that customers began to stockpile TiO2 in order to avoid running out of the pigment and to hedge against future prices while in parallel some suppliers started to have difficulties with obtaining the required amount of feedstock.[17]

(7) With the increasing demand also reaching the upstream layers of the supply chain, the arising scarcity of feedstock translating in feedstock prices increase in the second half of 2010, put further upward pressure on TiO2 prices.[18] The feedstock shortages also allowed feedstock suppliers to successfully shorten the length of their contracts, giving them more flexibility to respond to changes in demand or supply.[19] This TiO2 price increase lasted over a large part of 2011.

(8) The continuing sharp price increase in TiO2 prices started to reach its limits in the last quarter of 2011 when the first signs of a possible demand weakening appeared.[20,21] Some of this weakening was due to customers starting running down their stocks and to make greater use of pigment extenders.[22,23] The impact of weakening demand on TiO2 prices was first offset to some extent by the high feedstock prices.[24] However, later in 2012 when demand decreased further, TiO2 prices started to fall too.[25] TiO2 prices continued to fall throughout 2012 because of the further weakening demand from various downstream sectors.[26] This, in turn, translated to decreasing demand and falling prices for feedstock.[27] As the supply and demand balance recovered in the market, TiO2 prices stabilised towards the end of 2012 and throughout 2013, up till the first quarter of 2014, the end date for the current analysis.[28]

(9) The description above indicates that the evolution of prices for various grades appears to have been strongly influenced by changes in common costs and demand patterns over the examined period. In particular, the upward move in prices in early 2008 seems to be driven by an increase in common (energy) costs. In contrast, both the decline in late 2008 and in the first half of 2009 and the large price increase in 2010 and 2011 and the price decrease in 2012 were predominantly driven by common demand shocks. Furthermore, feedstock (common input) prices also responded (with a lag) to increasing (and later falling) demand for TiO2 in 2010-

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15 Huntsman's internal documents, […]*.

16 Huntsman internal documents, […]*.

17 Sachtleben's internal documents, […]*.

18 Huntsman's internal document, […]*.
Sachtleben's internal documents, […]*.

19 Huntsman's internal documents, […]*.

20 Sachtleben's internal documents […]*.

21 Huntsman's internal documents, […]*.

22 Sachtleben's internal documents, […]*.

23 Huntsman's internal documents, […]*.

24 Sachtleben's internal documents, […]*.

25 Sachtleben's internal documents, […]*
Sachtleben's internal documents, […]*.

26 Sachtleben's internal documents, […]*.

27 Sachtleben's internal documents, […]*.

28 Form CO, paragraph 285. The same price patterns are also supported by the Transaction Data.

2011 (and 2012 for demand decrease), having a second order effect on TiO2 price movements.[29]

(10) The presence of a large common demand shock in 2010-2012, together with its substantial impact on the prices of some inputs explains the difficulty of undertaking a price correlation analysis in the absence of a suitable control for the demand shock.

(11) Furthermore, the fact that ink and coating grades are produced jointly and are thus subject to a common capacity constraint, should be expected to reinforce the co-movement of prices in the presence of variations in demand. In a situation with joint production and thus a joint capacity constraint, even if the demand shocks across ink and coating grades are not perfectly symmetric, they can still produce strong co-movement of prices, as suppliers that can produce both grades optimise their production, utilising their overall capacity in the most profitable way.[30] This co-movement however does not indicate the presence of neither demand side substitution, nor supply side substitution by sulphate-based suppliers that are currently not active in the production of ink grades.

(12) In conclusion, the analysis indicates the presence of strong demand and supply components that are common for ink and coating grades. The common factors largely determine the co-movement of ink and coating grades' prices. Therefore, the inability to fully control for these common components severely hinders the use of price correlation as a tool for product market definition.

[29] The output decline in early 2009 was also coupled with decreasing energy prices driven by the first wave of the global economic crisis.

[30] For example, in the presence of a stronger demand shock for coating than for ink, suppliers should be expected to shift more of their production to coating rather than to ink, moderating the price increase of the coating grade and leading to a stronger price increase for ink, thus leading to stronger price correlation (relative to a benchmark with no reallocation of production).

Case No. COMP/M.7061

HUNTSMAN CORPORATION /

EQUITY INTERESTS HELD BY ROCKWOOD HOLDINGS

COMMITMENTS TO THE EUROPEAN COMMISSION

PURSUANT TO ARTICLE 8(2)
OF REGULATION (EC) No. 139/2004

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27 August 2014

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Case COMP/M.7061

Huntsman Corporation / Equity Interests Held By Rockwood Holdings

Commitments to the European Commission

Pursuant to Articles 8(2) and 10(2) of Council Regulation (EC) No 139/2004 (the "**Merger Regulation**"), Huntsman Corporation ("**Huntsman**") (the "**Notifying Party**") hereby enters into the following Commitments (the "**Commitments**") vis-à-vis the European Commission (the "**Commission**") with a view to rendering the proposed acquisition by Huntsman from Rockwood Specialties Group Inc. ("**Rockwood**") (together with Huntsman, the "**Parties**") of various equity interests (the "**Concentration**") compatible with the internal market and the functioning of the EEA Agreement.

This text shall be interpreted in light of the Commission's decision pursuant to Article 8(2) of the Merger Regulation to declare the Concentration compatible with the internal market and the functioning of the EEA Agreement (the "**Decision**"), in the general framework of European Union law, in particular in light of the Merger Regulation, and by reference to the Commission Notice on remedies acceptable under Council Regulation (EC) No 139/2004 and under Commission Regulation (EC) No 802/2004 (the "**Remedies Notice**").

Section A. Definitions

(1) For the purpose of the Commitments, the following terms shall have the following meaning:

Affiliated Undertakings: undertakings controlled by the Parties and/or by the ultimate parents of the Parties, whereby the notion of control shall be interpreted pursuant to Article 3 of the Merger Regulation and in light of the Commission Consolidated Jurisdictional Notice under Council Regulation (EC) No 139/2004 on the control of concentrations between undertakings (the "**Consolidated Jurisdictional Notice"**).

Assets: the assets that contribute to the current operation or are necessary to ensure the viability and competitiveness of the Divestment Business as indicated in Section B, paragraph 6 and described in more detail and defined in the Schedule.

Closing: the transfer of the legal title to the Divestment Business to the Purchaser.

Closing Period: the period of 3 months from the approval of the Purchaser and the terms of sale by the Commission.

Confidential Information: any business secrets, know-how, commercial information, or any other information of a proprietary nature that is not in the public domain.

Conflict of Interest: any conflict of interest that impairs the Trustee's objectivity and independence in discharging its duties under the Commitments.

Divestment Business: the business as defined in Section B and in the Schedule that the Notifying Party commits to divest.

Divestiture Trustee: one or more natural or legal person(s) who is/are approved by the Commission and appointed by Huntsman and who has/have received from Huntsman the exclusive Trustee Mandate to sell the Divestment Business to a Purchaser at no minimum price.

Effective Date: the date of adoption of the Decision.

First Divestiture Period: the period of […]* from the Effective Date.

Hold Separate Manager: the person appointed by Huntsman for the Divestment Business to manage the day-to-day business under the supervision of the Monitoring Trustee.

Key Personnel: all personnel necessary to maintain the viability and competitiveness of the Divestment Business, as listed in the Schedule, including the Hold Separate Manager.

Monitoring Trustee: one or more natural or legal person(s) who is/are approved by the Commission and appointed by Huntsman or a Huntsman Affiliated Undertaking, and who has/have the duty to monitor compliance by Huntsman or a Huntsman Affiliated Undertaking with the conditions and obligations attached to the Decision.

Purchaser: the entity approved by the Commission as acquirer of the Divestment Business in accordance with the criteria set out in Section D.

Purchaser Criteria: the criteria laid down in paragraph (16) of these Commitments that the Purchaser must fulfil in order to be approved by the Commission.

Schedule: the schedule to these Commitments describing more in detail the Divestment Business.

Trustee(s): the Monitoring Trustee and/or the Divestiture Trustee as the case may be.

Trustee Divestiture Period: the period of […]* from the end of the First Divestiture Period.

Section B. The commitment to divest and the Divestment Business

Commitment to divest

(2) In order to maintain effective competition, Huntsman commits to divest, or procure the divestiture of the Divestment Business by the end of the Trustee Divestiture Period as a going concern to the Purchaser on terms of sale approved by the Commission in accordance with the procedure described in paragraph (17) of these Commitments. To carry out the divestiture, Huntsman commits to find the Purchaser and to enter into a final binding sale and purchase agreement for the sale of the Divestment Business within the First Divestiture Period. If Huntsman has not entered into such an agreement at the end of the First Divestiture Period, Huntsman shall grant the Divestiture Trustee an exclusive mandate to sell the Divestment Business in accordance with the procedure described in paragraph (29) in the Trustee Divestiture Period.

(3) The proposed concentration shall not be implemented before Huntsman or the Divestiture Trustee has entered into a final binding sale and purchase agreement for the sale of the Divestment Business and the Commission has approved the Purchaser and the terms of sale in accordance with paragraph (17).

(4) Huntsman shall be deemed to have complied with this commitment if:

(a) by the end of the Trustee Divestiture Period, Huntsman or the Divestiture Trustee has entered into a final binding sale and purchase agreement and the Commission approves the proposed Purchaser and the terms of sale as being consistent with the Commitments in accordance with the procedure described in paragraph (17); and

(b) the Closing of the sale of the Divestment Business to the Purchaser takes place within the Closing Period.

(5) In order to maintain the structural effect of the Commitments, the Notifying Party shall, for a period of ten (10) years after Closing, not acquire, whether directly or indirectly, the possibility of exercising influence (as defined in paragraph 43 of the Remedies Notice, footnote 3) over the whole or part of the Divestment Business, unless, following the submission of a reasoned request from the Notifying Party showing good cause and accompanied by a report from the Monitoring Trustee (as provided in paragraph (43) of these Commitments), the Commission finds that the structure of the market has changed to such an extent that the absence of influence over the Divestment Business is no longer necessary to render the proposed concentration compatible with the internal market.

Structure and definition of the Divestment Business

(6) The Divestment Business consists of the global TR52 business operated by Huntsman. The Divestment Business, described in more detail in the Schedule, includes all assets and staff that contribute to the current operation or are necessary to ensure the viability and competitiveness of the Divestment Business, in particular:

(a) all tangible and intangible assets (including the Exclusively and Uniquely Used Technology, the Primarily Used Technology and the Licenced Technology);

(b) all licences, permits and authorisations issued by any governmental organisation for the benefit of the Divestment Business;

(c) all contracts, leases, commitments and customer orders of the Divestment Business; all customer, credit and other records of the Divestment Business;

(d) unless not required by the Purchaser and subject to applicable local employment legislation, the Key Personnel;

(e) a transitional supply or toll manufacturing agreement for TR52 at […]*, for a transitional period of up to […]* after Closing on the terms set out in the Schedule. This agreement can be extended by the Monitoring Trustee for a time not exceeding […]*, as set out in the Schedule.

(f) a technological support agreement for the provision by Huntsman or Affiliated Undertakings of necessary technical support and training for the implementation of the transferred and licensed know-how in the production plants of a Purchaser for a

transitional period of up to […]* after Closing on the terms set out in the Schedule. This agreement can be extended by the Monitoring Trustee for a time not exceeding […]*, as set out in the Schedule; and

(g) a transitional support agreement for the provision by Huntsman or Affiliated Undertakings of necessary support in sourcing the necessary equipment and raw materials for the production of TR52, and procuring logistics and distribution services for the distribution of TR52 in the EEA, for a transitional period of up to […]* after Closing on the terms set out in the Schedule. This agreement can be extended by the Monitoring Trustee for a time not exceeding […]*, as set out in the Schedule.

(7) Strict firewall procedures will be adopted so as to ensure that any competitively sensitive information related to, or arising from these transitional arrangements (for example, product roadmaps) will not be shared with, or passed on to, anyone, other than for the manufacture and supply of TR52 under the transitional supply or toll manufacturing agreement.

Section C. Related commitments

Preservation of viability, marketability and competitiveness

(8) From the Effective Date until Closing, the Notifying Party shall preserve or procure the preservation of the economic viability, marketability and competitiveness of the Divestment Business, in accordance with good business practice, and shall minimise as far as possible any risk of loss of competitive potential of the Divestment Business. In particular Huntsman undertakes:

(a) not to carry out any action that might have a significant adverse impact on the value, management or competitiveness of the Divestment Business or that might alter the nature and scope of activity, or the industrial or commercial strategy or the investment policy of the Divestment Business;

(b) to make available, or procure to make available, sufficient resources for the development of the Divestment Business, on the basis and continuation of the existing business plans;

(c) to take all reasonable steps, or procure that all reasonable steps are being taken, including appropriate incentive schemes (based on industry practice), to encourage all Key Personnel to remain with the Divestment Business, and not to solicit or move any Personnel to Huntsman's remaining business. Where, nevertheless, individual members of the Key Personnel exceptionally leave the Divestment Business, Huntsman shall provide a reasoned proposal to replace the person or persons concerned to the Commission and the Monitoring Trustee. Huntsman must be able to demonstrate to the Commission that the replacement is well suited to carry out the functions exercised by those individual members of the Key Personnel. The replacement shall take place under the supervision of the Monitoring Trustee, who shall report to the Commission.

Hold-separate obligations

(9) The Notifying Party commits, from the Effective Date until Closing, to procure that the Divestment Business is kept separate from the business that the Notifying Party will be retaining and, after closing of the notified transaction to keep the Divestment Business Separate from the business that the Notifying Party is retaining and to ensure that unless explicitly permitted under these Commitments: (i) management and staff of the business retained by Huntsman have no involvement in the Divestment Business; (ii) the Key Personnel of the Divestment Business have no involvement in any business retained by Huntsman and do not report to any individual outside the Divestment Business.

(10) Until Closing, Huntsman shall assist the Monitoring Trustee in ensuring that the Divestment Business is managed as a distinct and saleable entity separate from the business which Huntsman is retaining. Immediately after the adoption of the Decision, Huntsman shall appoint a Hold Separate Manager. The Hold Separate Manager, who shall be part of the Key Personnel, shall manage the Divestment Business independently and in the best interest of the business with a view to ensuring its continued economic viability, marketability and competitiveness and its independence from the businesses retained by Huntsman. The Hold Separate Manager shall closely cooperate with and report to the Monitoring Trustee and, if applicable, the Divestiture Trustee. Any replacement of the Hold Separate Manager shall be subject to the procedure laid down in paragraph (8)(c) of these Commitments. The Commission may, after having heard Huntsman, require Huntsman to replace the Hold Separate Manager.

Ring-fencing

(11) Huntsman shall implement, or procure to implement, all necessary measures to ensure that it does not, after the Effective Date, obtain any Confidential Information relating to the Divestment Business and that any such Confidential Information obtained by Huntsman before the Effective Date will be eliminated and not be used by Huntsman. Huntsman may obtain or keep information relating to the Divestment Business which is reasonably necessary for the implementation of the sale and purchase agreement (and ancillary agreements) or the disclosure of which to Huntsman is required by law.

Non-solicitation clause

(12) The Parties undertake, subject to customary limitations, not to solicit, and to procure that Affiliated Undertakings do not solicit, the Key Personnel transferred with the Divestment Business for a period of three (3) years after Closing.

Due diligence

(13) In order to enable potential Purchasers to carry out a reasonable due diligence of the Divestment Business, Huntsman shall, subject to customary confidentiality assurances and dependent on the stage of the divestiture process:

(a) provide to potential Purchasers sufficient information as regards the Divestment Business;

(b) provide to potential Purchasers sufficient information relating to the Key Personnel and allow them reasonable access to the Key Personnel.

Reporting

(14) Huntsman shall submit written reports in English on potential Purchasers of the Divestment Business and developments in the negotiations with such potential Purchasers to the Commission and the Monitoring Trustee no later than 10 days after the end of every month following the Effective Date (or otherwise at the Commission's request). Huntsman shall submit a list of all potential Purchasers having expressed interest in acquiring the Divestment Business to the Commission at each and every stage of the divestiture process, as well as a copy of all the offers made by potential Purchasers within five days of their receipt.

(15) Huntsman shall inform the Commission and the Monitoring Trustee on the preparation of the data room documentation and the due diligence procedure and shall submit a copy of any information memorandum to the Commission and the Monitoring Trustee before sending the memorandum out to potential Purchasers.

Section D. The Purchaser

(16) In order to be approved by the Commission, the Purchaser must fulfil the following criteria:

(a) The Purchaser shall be independent of and unconnected to the Notifying Party and its Affiliated Undertakings (this being assessed having regard to the situation following the divestiture);

(b) The Purchaser shall have the financial resources, proven expertise and incentive to maintain and develop the Divestment Business as a viable and active competitive force in competition with the Parties and other competitors;

(c) The acquisition of the Divestment Business by the Purchaser must neither be likely to create, in light of the information available to the Commission, *prima facie* competition concerns nor give rise to a risk that the implementation of the Commitments will be delayed. In particular, the Purchaser must reasonably be expected to obtain all necessary approvals from the relevant regulatory authorities for the acquisition of the Divestment Business;

(d) The Purchaser shall already be a sulphate-based TiO_2 producer;

(e) The Purchaser shall, by the end of the transitional timeframe, have sufficient sulphate-based TiO2 capacity and scope to meet current and reasonably foreseeable TR52 demand worldwide; and

(f) The Purchaser shall have, or reasonably be expected to have within the transitional timeframe, the ability to distribute TR52 in the EEA.

(17) The final binding sale and purchase agreement (as well as ancillary agreements) relating to the divestiture of the Divestment Business shall be conditional on the Commission's approval. When Huntsman has reached an agreement with a Purchaser, it shall submit a fully documented and reasoned proposal, including a copy of the final agreement(s), within

one week to the Commission and the Monitoring Trustee. Huntsman must be able to demonstrate to the Commission that the Purchaser fulfils the Purchaser Criteria and that the Divestment Business is being sold in a manner consistent with the Commission's Decision and the Commitments. For the approval, the Commission shall verify that the Purchaser fulfils the Purchaser Criteria and that the Divestment Business is being sold in a manner consistent with the Commitments including their objective to bring about a lasting structural change in the market. The Commission may approve the sale of the Divestment Business without one or more Assets or Key Personnel, or by substituting one or more Assets or Key Personnel with one or more different assets or different personnel, if this does not affect the viability and competitiveness of the Divestment Business after the sale, taking account of the proposed Purchaser.

Section E. Trustee

I. Appointment procedure

(18) Huntsman shall appoint a Monitoring Trustee to carry out the functions specified in these Commitments for a Monitoring Trustee. The Notifying Party commits not to close the concentration before the appointment of the Monitoring Trustee.

(19) If Huntsman has not entered into a binding sale and purchase agreement regarding the Divestment Business one month before the end of the First Divestiture Period or if the Commission has rejected a purchaser proposed by Huntsman at that time or thereafter, Huntsman shall appoint a Divestiture Trustee. The appointment of the Divestiture Trustee shall take effect upon the commencement of the Trustee Divestiture Period.

(20) The Trustee shall:

(a) at the time of appointment, be independent of the Notifying Party and its Affiliated Undertakings;

(b) possess the necessary qualifications to carry out its mandate, for example have sufficient relevant experience as an investment banker or consultant or auditor; and

(c) neither have nor become exposed to a Conflict of Interest.

(21) The Trustee shall be remunerated by the Notifying Party in a way that does not impede the independent and effective fulfilment of its mandate. In particular, where the remuneration package of a Divestiture Trustee includes a success premium linked to the final sale value of the Divestment Business, such success premium may only be earned if the divestiture takes place within the Trustee Divestiture Period.

Proposal by Huntsman

(22) No later than one week after the Effective Date, Huntsman shall submit the name or names of one or more natural or legal persons whom Huntsman proposes to appoint as the Monitoring Trustee to the Commission for approval. No later than one month before the end of the First Divestiture Period or on request by the Commission, Huntsman shall submit a list of one or more persons whom Huntsman proposes to appoint as Divestiture Trustee to the Commission for approval. The proposal shall contain sufficient information

for the Commission to verify that the person or persons proposed as Trustee fulfil the requirements set out in paragraph (20) and shall include:

(a) the full terms of the proposed mandate, which shall include all provisions necessary to enable the Trustee to fulfil its duties under these Commitments;

(b) the outline of a work plan which describes how the Trustee intends to carry out its assigned tasks; and

(c) an indication whether the proposed Trustee is to act as both Monitoring Trustee and Divestiture Trustee or whether different trustees are proposed for the two functions.

Approval or rejection by the Commission

(23) The Commission shall have the discretion to approve or reject the proposed Trustee(s) and to approve the proposed mandate subject to any modifications it deems necessary for the Trustee to fulfil its obligations. If only one name is approved, Huntsman shall appoint or cause to be appointed the person or persons concerned as Trustee, in accordance with the mandate approved by the Commission. If more than one name is approved, Huntsman shall be free to choose the Trustee to be appointed from among the names approved. The Trustee shall be appointed within one week of the Commission's approval, in accordance with the mandate approved by the Commission.

New proposal by Huntsman

(24) If all the proposed Trustees are rejected, Huntsman shall submit the names of at least two more natural or legal persons within one week of being informed of the rejection, in accordance with paragraphs (18) and (20) of these Commitments.

Trustee nominated by the Commission

(25) If all further proposed Trustees are rejected by the Commission, the Commission shall nominate a Trustee, whom Huntsman shall appoint, or cause to be appointed, in accordance with a trustee mandate approved by the Commission.

II. Functions of the Trustee

(26) The Trustee shall assume its specified duties and obligations in order to ensure compliance with the Commitments. The Commission may, on its own initiative or at the request of the Trustee or Huntsman, give any orders or instructions to the Trustee in order to ensure compliance with the conditions and obligations attached to the Decision.

Duties and obligations of the Monitoring Trustee

(27) The Monitoring Trustee shall:

(a) propose in its first report to the Commission a detailed work plan describing how it intends to monitor compliance with the obligations and conditions attached to the Decision.

(b) oversee, in close co-operation with the Hold Separate Manager, the on-going management of the Divestment Business with a view to ensuring its continued economic viability, marketability and competitiveness and monitor compliance by

Huntsman with the conditions and obligations attached to the Decision. To that end the Monitoring Trustee shall:

(i) monitor the preservation of the economic viability, marketability and competitiveness of the Divestment Business, and the keeping separate of the Divestment Business from the business retained by the Parties, in accordance with paragraphs (9) and (10) of these Commitments;

(ii) supervise the management of the Divestment Business as a distinct and saleable entity, in accordance with paragraph (8) of these Commitments;

(iii) with respect to Confidential Information and subject to the transitional agreements referred to in paragraph (2)(k) of the Schedule:

(A) determine all necessary measures to ensure that Huntsman does not after the Effective Date obtain any Confidential Information relating to the Divestment Business,

(B) in particular strive for the severing of the Divestment Business' participation in a central information technology network to the extent possible, without compromising the viability of the Divestment Business,

(C) make sure that any Confidential Information relating to the Divestment Business obtained by Huntsman before the Effective Date is eliminated and will not be used by Huntsman and

(D) decide whether such information may be disclosed to or kept by Huntsman as the disclosure is reasonably necessary to allow Huntsman to carry out the divestiture or as the disclosure is required by law;

(c) monitor the splitting of assets and allocation of personnel listed in Confidential Annex 2 between the Divestment Business and Huntsman or Affiliated Undertakings where applicable;

(d) propose to Huntsman such measures as the Monitoring Trustee considers necessary to ensure Huntsman's compliance with the conditions and obligations attached to the Decision, in particular the maintenance of the full economic viability, marketability or competitiveness of the Divestment Business, the holding separate of the Divestment Business and the non-disclosure of competitively sensitive information;

(e) review and assess potential Purchasers as well as the progress of the divestiture process and verify that, dependent on the stage of the divestiture process, potential Purchasers receive sufficient and correct information relating to the Divestment Business in particular by reviewing, if available, the data room documentation, the information memorandum and the due diligence process;

(f) act as a contact point for any requests by third parties, in particular potential Purchasers, in relation to the Commitments;

(g) provide to the Commission, sending Huntsman a non-confidential copy at the same time, a written report within 15 days after the end of every month that shall cover the operation and management of the Divestment Business as well as the splitting of the assets and the allocation of personnel listed in Confidential Annex 2 to the Schedule so that the Commission can assess whether the business is held in a manner consistent with the Commitments, as well as the progress of the divestiture process as well as potential Purchasers;

(h) promptly report in writing to the Commission, sending Huntsman a non-confidential copy at the same time, if it concludes on reasonable grounds that Huntsman is failing to comply with these Commitments;

(i) within one week after receipt of the documented proposal referred to in paragraph (17) of these Commitments, submit to the Commission, sending Huntsman a non-confidential copy at the same time, a reasoned opinion as to the suitability and independence of the proposed Purchaser and the viability of the Divestment Business after the divestiture and as to whether the Divestment Business is sold in a manner consistent with the conditions and obligations attached to the Decision, in particular, if relevant, whether the divestiture of the Divestment Business without one or more Assets or not all of the Key Personnel affects the viability of the Divestment Business after the divestiture, taking account of the proposed Purchaser;

(j) assume the other functions assigned to the Monitoring Trustee under the conditions and obligations attached to the Decision.

(28) If the Monitoring and Divestiture Trustee are not the same legal or natural persons, the Monitoring Trustee and the Divestiture Trustee shall cooperate closely with each other during and for the purpose of the preparation of the Trustee Divestiture Period in order to facilitate each other's tasks.

Duties and obligations of the Divestiture Trustee

(29) Within the Trustee Divestiture Period, the Divestiture Trustee shall sell at no minimum price the Divestment Business to a purchaser, provided that the Commission has approved both the purchaser and the final binding sale and purchase agreement (and ancillary agreements) as in line with the Commission's Decision and the Commitments in accordance with paragraphs (16) and (17) of these Commitments. The Divestiture Trustee shall include in the sale and purchase agreement (as well as in any ancillary agreements) such terms and conditions as it considers appropriate for an expedient sale in the Trustee Divestiture Period. In particular, the Divestiture Trustee may include in the sale and purchase agreement such customary representations and warranties and indemnities as are reasonably required to effect the sale. The Divestiture Trustee shall protect the legitimate financial interests of Huntsman, subject to the Notifying Party/Notifying Parties' unconditional obligation to divest at no minimum price in the Trustee Divestiture Period.

(30) In the Trustee Divestiture Period (or otherwise at the Commission's request), the Divestiture Trustee shall provide the Commission with a comprehensive monthly report written in English on the progress of the divestiture process. Such reports shall be

submitted within 15 days after the end of every month with a simultaneous copy to the Monitoring Trustee and a non-confidential copy to the Notifying Party.

III. Duties and obligations of the Parties

(31) Huntsman shall provide and shall cause its advisors to provide the Trustee with all such co-operation, assistance and information as the Trustee may reasonably require to perform its tasks. The Trustee shall have full and complete access to any of Huntsman's or the Divestment Business's books, records, documents, management or other personnel, facilities, sites and technical information necessary for fulfilling its duties under the Commitments and Huntsman shall provide the Trustee upon request with copies of any document. Huntsman shall make available to the Trustee one or more offices on their premises and shall be available for meetings in order to provide the Trustee with all information necessary for the performance of its tasks.

(32) Huntsman shall provide the Monitoring Trustee with all managerial and administrative support that it may reasonably request on behalf of the management of the Divestment Business. This shall include all administrative support functions relating to the Divestment Business which are currently carried out at headquarters level. Huntsman shall provide and shall cause its advisors to provide the Monitoring Trustee, on request, with the information submitted to potential Purchasers, in particular give the Monitoring Trustee access to the data room documentation and all other information granted to potential Purchasers in the due diligence procedure. Huntsman shall inform the Monitoring Trustee on possible Purchasers, submit lists of potential Purchasers at each stage of the selection process, including the offers made by potential Purchasers at those stages, and keep the Trustee informed of all developments in the divestiture process.

(33) Huntsman shall grant or procure Affiliated Undertakings to grant comprehensive powers of attorney, duly executed, to the Divestiture Trustee to effect the sale (including ancillary agreements), the Closing and all actions and declarations which the Divestiture Trustee considers necessary or appropriate to achieve the sale and the Closing, including the appointment of advisors to assist with the sale process. Upon request of the Divestiture Trustee, Huntsman shall cause the documents required for effecting the sale and the Closing to be duly executed.

(34) Huntsman shall indemnify the Trustee and its employees and agents (each an "**Indemnified Party**") and hold each Indemnified Party harmless against, and hereby agrees that an Indemnified Party shall have no liability to Huntsman for, any liabilities arising out of the performance of the Trustee's duties under the Commitments, except to the extent that such liabilities result from the wilful default, recklessness, gross negligence or bad faith of the Trustee, its employees, agents or advisors.

(35) At the expense of Huntsman, the Trustee may appoint advisors (in particular for corporate finance or legal advice), subject to Huntsman's approval (this approval not to be unreasonably withheld or delayed) if the Trustee considers the appointment of such advisors necessary or appropriate for the performance of its duties and obligations under the Mandate, provided that any fees and other expenses incurred by the Trustee are reasonable. Should Huntsman refuse to approve the advisors proposed by the Trustee the

Commission may approve the appointment of such advisors instead, after having heard Huntsman. Only the Trustee shall be entitled to issue instructions to the advisors. Paragraph (27) of these Commitments shall apply *mutatis mutandis*. In the Trustee Divestiture Period, the Divestiture Trustee may use advisors who served Huntsman during the Divestiture Period if the Divestiture Trustee considers this in the best interest of an expedient sale.

(36) Huntsman agrees that the Commission may share Confidential Information proprietary to Huntsman with the Trustee. The Trustee shall not disclose such information and the principles contained in Article 17 (1) and (2) of the Merger Regulation apply *mutatis mutandis*.

(37) The Notifying Party agrees that the contact details of the Monitoring Trustee are published on the website of the Commission's Directorate-General for Competition and they shall inform interested third parties, in particular any potential Purchasers, of the identity and the tasks of the Monitoring Trustee.

(38) For a period of ten (10) years from the Effective Date the Commission may request all information from the Parties that is reasonably necessary to monitor the effective implementation of these Commitments.

IV. Replacement, discharge and reappointment of the Trustee

(39) If the Trustee ceases to perform its functions under the Commitments or for any other good cause, including the exposure of the Trustee to a Conflict of Interest:

(a) the Commission may, after hearing the Trustee and Huntsman, require Huntsman to replace the Trustee; or

(b) Huntsman may, with the prior approval of the Commission, replace the Trustee.

(40) If the Trustee is removed according to paragraph (39) of these Commitments, the Trustee may be required to continue in its function until a new Trustee is in place to whom the Trustee has effected a full hand over of all relevant information. The new Trustee shall be appointed in accordance with the procedure referred to in paragraphs (18) - (25) of these Commitments.

(41) Unless removed according to paragraph (39) of these Commitments, the Trustee shall cease to act as Trustee only after the Commission has discharged it from its duties after all the Commitments with which the Trustee has been entrusted have been implemented. However, the Commission may at any time require the reappointment of the Monitoring Trustee if it subsequently appears that the relevant remedies might not have been fully and properly implemented.

Section F. The review clause

(42) The Commission may extend the time periods foreseen in the Commitments in response to a request from Huntsman or, in appropriate cases, on its own initiative. Where Huntsman requests an extension of a time period, it shall submit a reasoned request to the Commission no later than one month before the expiry of that period, showing good cause**.** This request shall be accompanied by a report from the Monitoring Trustee, who shall, at

the same time send a non-confidential copy of the report to the Notifying Party. Only in exceptional circumstances shall Huntsman be entitled to request an extension within the last month of any period.

(43) The Commission may further, in response to a reasoned request from the Notifying Party showing good cause waive, modify or substitute, in exceptional circumstances, one or more of the undertakings in these Commitments. This request shall be accompanied by a report from the Monitoring Trustee, who shall, at the same time send a non-confidential copy of the report to the Notifying Party. The request shall not have the effect of suspending the application of the undertaking and, in particular, of suspending the expiry of any time period in which the undertaking has to be complied with.

Section G. Entry into force

(44) The Commitments shall take effect upon the date of adoption of the Decision.

[Signed]

……

duly authorised for and on behalf of Huntsman

SCHEDULE

(1) The Divestment Business consists of the global TR52 business operated by Huntsman.

(2) In accordance with paragraph (6) of these Commitments, the Divestment Business comprises of:

(a) the full global transfer of Huntsman's and its Affiliated Undertakings' TR52 brand (including, where applicable, Huntsman's and its Affiliated Undertakings' trademark rights in the "TR52" mark) to a Purchaser;

(b) the use and registration rights to all distinctive marks containing the terms "TR53", "TR54", "TR55", "TR56", "TR57", "TR58", or "TR59" (the "**Reserved Marks**") and a commitment by Huntsman not to oppose or contest the Purchaser's application, registration, renewal, and/or use of any of the Reserved Marks;

(c) the assignment of all of Huntsman's and its Affiliated Undertakings' TR52 know-how that is used by Huntsman and its Affiliated Undertakings exclusively and uniquely to develop, manufacture, sell and use Huntsman's and its Affiliated Undertakings' TR52 product and any intellectual property rights in such know-how (the "**Exclusively and Uniquely Used Technology**" as detailed in Confidential Annex 1);

(d) the assignment of all of Huntsman's and its Affiliated Undertakings' TR52 know-how that is used by Huntsman and its Affiliated Undertakings primarily to develop, manufacture, sell and use Huntsman's and its Affiliated Undertakings' TR52 product and any intellectual property rights in such know-how (the "**Primarily Used Technology**" as detailed in Confidential Annex 1). The Divestment Business will grant back to Huntsman a royalty-free, irrevocable, non-exclusive, global license for the Primarily Used Technology for sole use in non-inks applications. For the avoidance of doubt, following the assignment, Huntsman will not be able to use the Primarily Used Technology to manufacture or market TR52 or equivalent grades (other than pursuant to the transitional supply agreement with the Purchaser);

(e) to the extent required by the Purchaser, a royalty-free, irrevocable, non-exclusive, global license under Huntsman's other intellectual property rights to use all know-how currently used by Huntsman to manufacture, sell and use TR52 but which is also used on other grades or is otherwise not primarily used for TR52 production, in each case solely for the manufacture, sale, development and use for printing inks applications (the "**Licenced Technology**" as detailed in Confidential Annex 1);

(f) a list of all customers for TR52 for 2010 - Q2 2014 as well as, where applicable, the assignment of any supply arrangements, contracts, contract rights, customer records, customer reports, transactional data, customer accreditations and other customer documentation for 2010 - Q2 2014 which contribute to the current operation or are necessary to ensure the viability and competitiveness of the Divestment Business provided however, that Huntsman shall not be required to transfer any such supply arrangements, contracts, contract rights, customer records, customer reports, transactional data, customer accreditations or other customer documentation that do not form part of the Divestment Business;

(g) to the extent applicable, the transfer of all licences, permits and authorisations issued by any governmental organisation which contribute to the current operation or are necessary to ensure the viability and competitiveness of the Divestment Business;

(h) to the extent applicable, the transfer of: (i) books, records and files relating to the prosecution and maintenance of the TR52 trademark; (ii) all records of customers and suppliers, price lists, catalogues and mailing lists related to the Divestment Business; and (iii) all advertising, marketing, sales, publicity and presentational materials related to the Divestment Business, or copies thereof, where any items covered by (i), (ii) and (iii) of this paragraph (e) also relate to a product retained by Huntsman;

(i) any TR52 inventory existing at the time of Closing, which would be held separate and sold over time to the Purchaser under the terms of the supply or toll manufacturing agreement;

(j) unless not required by the Purchaser and subject to applicable local employment legislation the Key Personnel including the Hold Separate Manager: (i) an employee with product/applications knowledge and customer technical service knowledge; (ii) an employee with manufacturing/operations know-how; and (iii) a sales employee with inks market and customer knowledge; subject to the consent of those employees, provided that Huntsman and its Affiliated Undertakings will take any reasonable steps, including implementing appropriate incentive schemes (based on industry practice) to encourage such employees to move to a Purchaser. The Key Personnel will be selected by the Purchaser from the employees identified in Confidential Annex 2. Additional personnel may be included in the Divestment Business if reasonably requested by the Purchaser and as overseen by the Monitoring Trustee.

(k) Huntsman will enter with the Purchaser into the following arrangements which will be subject to customary confidentiality restrictions:

(i) A transitional supply or toll manufacturing agreement for TR52 […]*, for a transitional period of up to […]* after Closing at current quality and quantity levels or quantities otherwise agreed between the Parties that reflect changes in customer demand, all as overseen by the Monitoring Trustee, but not to exceed […]* per annum or at the reasonable request of the Purchaser as overseen by the Monitoring Trustee an additional […]* and in any event no greater than Huntsman's actual TR52 manufacturing capability. The transitional supply or toll manufacturing agreement can be extended by the Monitoring Trustee for a time not exceeding […]* if in the judgment of the Monitoring Trustee, the need for an extension did not come as a result of the Purchaser's failure to use reasonable best efforts to complete the transfer. In the event of a dispute between Huntsman and the Purchaser regarding the full manufacturing cost of TR52, the matter shall be referred to the Monitoring Trustee for resolution. To resolve the dispute, the Monitoring Trustee shall have the option to appoint an expert if required, the cost of which will be borne by Huntsman;

(ii) a technological support agreement for the provision by Huntsman or Affiliated Undertakings of necessary technical support and training for the implementation of the transferred and licensed know-how in the production plants of a Purchaser for a transitional period of up to […]* after Closing, including technical service assistance in the technical qualification of the licensed products with customers. This agreement can be extended by the Monitoring Trustee for a time not exceeding […]* if in the judgment of the Monitoring Trustee, the need for an extension did not come as a result of Purchaser's failure to use reasonable best efforts to complete the transfer;

(iii) a transitional support agreement for the provision by Huntsman or Affiliated Undertakings of necessary support in sourcing the necessary equipment and raw materials for the production of TR52, and procuring logistics and distribution services for the distribution of TR52 in the EEA, for a transitional period of up to […]* after Closing, it being understood that where modifications are required to a Purchaser's plant to manufacture TR52, such necessary support shall include, but not be limited to, making available to a Purchaser equipment specifications for equipment needed to manufacture TR52, flow sheets associated with TR52 modifications, process and instrumentation diagrams associated with TR52 specific modifications, and hazard and operability studies specifically related to TR52 manufacture but will not include financial support. This agreement can be extended by the Monitoring Trustee for a time not exceeding […]* if in the judgment of the Monitoring Trustee, the need for an extension did not come as a result of the Purchaser's failure to use reasonable best efforts to complete the transfer;

(3) The Divestment Business shall not include:

(a) any mark other than "TR52" and the Reserved Marks owned or used by Huntsman and its Affiliated Undertakings, including without limitation the mark "Tioxide";

(b) any right to any of Huntsman's manufacturing facilities, warehouses, or other facilities;

(c) any of Huntsman's printing inks grades other than TR52 which Huntsman will continue to manufacture, sell and use.

(4) If there is any asset or personnel which is not covered by paragraph (2) of this Schedule but which is both used (exclusively or not) in the Divestment Business and is necessary for the continued viability and competitiveness of the Divestment Business, that asset or adequate substitute will be offered to potential Purchasers, unless excluded by paragraph (3) of this Schedule.

CONFIDENTIAL ANNEX 1

[REDACTED: Detailed description of the exclusively and uniquely used technology; of the primarily used technology; and of licensed technology]

CONFIDENTIAL ANNEX 2

[REDACTED: Detailed description of the location, role and capabilities of Key Personnel]