



# DETERMINATION OF MERGER NOTIFICATION M/23/026 – FUJIFILM/ CMC MATERIALS

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## Section 21 of the Competition Act 2002

**Proposed acquisition by FUJIFILM Holdings Corporation, through FUJIFILM Holdings America Corporation, of sole control of CMC Materials KMG Corporation.**

**Dated 27 July 2023**

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### **Introduction**

1. On 21 June 2023, in accordance with section 18(1)(a) of the Competition Act 2002, as amended (the “Act”), the Competition and Consumer Protection Commission (the “Commission”) received a notification of a proposed acquisition whereby FUJIFILM Holdings Corporation (“FUJIFILM Holdings”), through FUJIFILM Holdings America Corporation (“FUJIFILM”), would acquire sole control, of CMC Materials KMG Corporation (“CMC Materials”) (the “Proposed Transaction”).

### **The Proposed Transaction**

2. The Proposed Transaction is to be implemented pursuant to a purchase agreement dated 10 May 2023 (the “PA”) between CMC Materials LLC, FUJIFILM, FUJIFILM Holdings and Entegris Inc. Pursuant to the PA, FUJIFILM Holdings will, through its wholly-owned indirect subsidiary FUJIFILM, acquire the entire issued and outstanding equity interests, and thus sole control, of CMC Materials.

### **The Undertakings Involved**

#### ***The Acquirer – FUJIFILM***



3. FUJIFILM is a wholly owned indirect subsidiary of FUJIFILM Holdings. FUJIFILM Holdings is headquartered in Tokyo, Japan, and is listed on the Tokyo Stock Exchange. FUJIFILM Holdings is a multinational conglomerate operating a wide range of businesses active across the healthcare, materials, business innovation and imaging sectors.
4. FUJIFILM controls several subsidiaries that are active across a range of sectors globally, including electronic materials, chemicals, electronic imaging, graphic arts and printing, industrial products, optical devices, recording media, imaging colorants, healthcare and pharmaceuticals.
5. FUJIFILM Ultra Pure Solutions, Inc ("FUJIFILM Ultra"), a subsidiary of FUJIFILM, manufactures high purity chemicals, serving the semiconductor, disk drive, flat panel, pharmaceutical, and bio-technology industries. FUJIFILM Ultra also supplies a range of solvents, including ultra-pure solvent blends and ultra-pure primary solvents used in the semiconductor manufacturing process. These high purity primary solvents include hexamethyldisilazane ("HMDS"), n-butyl acetate, ethyl lactate, propylene glycol methyl ether acetate ("PGMEA"), tetramethylammonium hydroxide ("TMAH"), hydrofluoric acid ("HF"), and xylene.
6. In the State, FUJIFILM is active in the sale of PGMEA, HF, n-butyl acetate and ethyl lactate.
7. PGMEA is a type of glycol ether used as a solvent in coatings and is commonly used as a solvent for cleaning solutions in the semiconductor manufacturing process.
8. HF is an acid used for residue removal and etching in the semiconductor manufacturing process, and is available in various concentrations and blends, although all are used for the same purpose as part of the semiconductor manufacturing process.



9. For the financial year ending 31 March 2023, FUJIFILM’s worldwide turnover was approximately €20.29 billion, of which approximately [...] was generated in the State.

### *The Target – CMC Materials*

10. CMC Materials is an indirect subsidiary of Entegris, Inc. (“Entegris”), and operates the Entegris’ electronic chemicals business. CMC Materials manufactures and sells high purity chemicals (acids, solvents and other wet chemicals) used to clean, etch and dry silicon wafers used in the production of semiconductors, photovoltaics, and flat panel displays in multiple stages of their manufacturing processes. These chemical products include PGMEA<sup>1</sup> and HF.
11. For the financial year ending 30 September 2022, CMC Materials had a turnover of approximately [...],<sup>2</sup> of which approximately [...] was generated in the State.<sup>3</sup>

### **Rationale for the Proposed Transaction**

12. The parties state in the notification that:

*“Through the Proposed Transaction, [FUJIFILM] aims to offer its customers a broader portfolio of electronic chemicals, including [CMC Materials’] product offerings of high purity chemicals, a growing segment of materials used in silicon wafer fabrication. These high purity chemical products are used to clean, etch and dry silicon wafers in the production of semiconductors, photovoltaics (solar cells), and flat panel displays. [CMC Materials’] high purity chemical product offerings are complementary to the high purity chemical*

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<sup>1</sup> On page 5 of the notification, the parties state that [...].

<sup>2</sup> Based on ECB 2022 exchange rate of €1= \$1.11:.

<sup>3</sup> Based on ECB 2022 exchange rate of €1= \$1.11.



*products [FUJIFILM] offers, with only limited horizontal overlaps in the State or more broadly in the EEA or worldwide.*

*The Proposed Transaction expands [FUJIFILM]'s opportunities in a growing market segment and strengthens supply chain continuity. It provides customers with a broader portfolio of products that are subject to [FUJIFILM]'s continuous improvement processes and innovations, to meet their short-term and long-term needs. Because [CMC Materials'] global footprint is strategically located in close proximity to the world's top semiconductor manufacturers, the Proposed Transaction will provide enhanced supply chain security for high purity chemical products for customers.*

*The combined resources of both [FUJIFILM] and [CMC Materials] will also accelerate innovation and new product development across the broad category of high purity chemicals.”<sup>4</sup>*

#### **Contact with the Undertakings Involved**

13. During the Phase 1 investigation, the Commission requested and received, on an on-going basis, further information and clarifications from the parties.

#### **Market Enquiries**

14. During its review of the Proposed Transaction, the Commission contacted CMC Materials' [...] customers of HF and PGMEA in the State. These were HF Customer 1, who is a customer of HF, and PGMEA Customer 1, who is a customer of PGMEA.

#### **Third-Party Submissions**

15. No third-party submissions were received.

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<sup>4</sup> Page 10 of the notification.



## Competitive Analysis

### Horizontal Overlap

16. There are two horizontal overlaps between the activities of the parties in the State in respect of:
- (a) The supply of PGMEA; and
  - (b) The supply of HF.

### Vertical Relationship

17. The parties state in the notification that there is no vertical relationship between FUJIFILM and CMC Materials in the State. The Commission has not identified any vertical relationship between the parties. Therefore, the Commission considers that the Proposed Transaction does not give rise to any vertical competition concerns in the State.

## Market Definition

### Relevant Product Market

#### The supply of PGMEA

18. In the Notification, the parties identify a market for the supply of PGMEA; however, they submit that the precise product market definition can be left open.
19. The Commission has not previously considered the market for the supply of PGMEA.
20. The European Commission (“EC”) has previously examined the supply of PGMEA in case M.3435 *Lyondell/ Millennium*.<sup>5</sup> In this case, the notifying parties argued that

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<sup>5</sup> See European Commission, decision of 10 June 2004 *Lyondell/Millennium*, case No. COMP M.3435 (“*Lyondell*”), available [here](#).



PGMEA could be considered as part of a market with propylene glycol methyl ether (“PM”), as (i) PGMEA is a product downstream of PM, and (ii) all PM producers also sell PGMEA. The EC assessed the narrowest possible product market, i.e., the market for PGMEA alone, but ultimately left the product market open as the transaction did not give rise to competitive concerns regardless of market definition.

21. High purity chemicals include acids, solvents and other wet chemicals, and are used to clean, etch and dry silicon wafers in the production of semiconductors, photovoltaics, and flat panel displays in different stages of their manufacturing processes.<sup>6</sup> PGMEA specifically is a high purity primary solvent used as a solvent in coatings and for cleaning solutions in the semiconductor manufacturing process.
22. PGMEA is an individual chemical molecule, distinct from other high purity primary solvents. With regard to its use in semiconductor manufacturing, it cannot be substituted with any other high purity chemical or high purity primary solvent.<sup>7</sup>
23. The Commission defines the market to the extent necessary depending on the particular circumstances of a given case. In this instance, it is not necessary for the Commission to define the precise relevant product market since its conclusion on the competitive impact of the Proposed Transaction will be unaffected whether the potential product market is defined narrowly (i.e., the market for the supply of PGMEA alone) or more broadly (the market for the supply of several or all high purity primary solvents). Therefore, for the purpose of its competitive assessment of the Proposed Transaction, the Commission has assessed the likely competitive effects of the Proposed Transaction by reference to the supply of PGMEA.

#### The supply of HF

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<sup>6</sup> Page 11 of the notification.

<sup>7</sup> Page 1 of Call Note with PGMEA Customer 1, dated 26 July 2023.



24. In the notification, the parties identify a market for the supply of HF; however, they submit that the precise product market definition can be left open.
25. Neither the Commission nor the EC has previously considered the market for the supply of HF.
26. As stated at paragraph 21 above, high purity chemicals include acids, solvents and other wet chemicals that are used to clean, etch and dry silicon wafers in the production of semiconductors, photovoltaics, and flat panel displays in different stages of their manufacturing processes.<sup>8</sup> HF specifically is a high purity chemical product. It is an acid used for residue removal and etching in the semiconductor manufacturing process.
27. HF is an individual chemical molecule, distinct from other high purity chemicals. With regard to its use in semiconductor manufacturing, HF Customer 1 stated that [...].<sup>9</sup>
28. The Commission defines the market to the extent necessary depending on the particular circumstances of a given case. In this instance, it is not necessary for the Commission to define the precise relevant product market since its conclusion on the competitive impact of the Proposed Transaction will be unaffected whether the potential product market is defined narrowly (i.e., the market for the supply of HF alone), or more broadly (the market for the supply of several or all high purity chemicals). Therefore, for the purpose of its competitive assessment of the Proposed Transaction, the Commission has assessed the likely competitive effects of the Proposed Transaction by reference to the supply of HF.

### Relevant Geographic Market

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<sup>8</sup> Page 11 of the notification.

<sup>9</sup> Page 1 of Call Note with HF Customer 1, dated 18 July 2023.



### The supply of PGMEA

29. In the notification, the parties submit that the geographic market for the supply of PGMEA is at least the European Economic Area (“EEA”), but submit that the precise geographic market definition can be left open.
30. The Commission has not previously considered the geographic market for the supply of PGMEA.
31. The EC in *Lyondell* found that the market for PGMEA was at least EEA-wide.
32. In the notification, the parties state the following with regard to how PGMEA is sourced: “[o]n the island of Ireland, high purity chemicals, including PGMEA and HF, are typically purchased from manufacturers and bulk suppliers located in the EEA, the UK and further afield, with products shipped to Ireland from these locations”.<sup>10</sup>
33. CMC Materials [...] for PGMEA in the State, PGMEA Customer 1. In a call with the Commission, PGMEA Customer 1 stated that it uses the same suppliers of chemicals for all of its manufacturing sites globally, and would not consider any potential supplier on a State-only basis.<sup>11</sup>
34. The Commission understands that there are no suppliers of PGMEA who only supply in the State.
35. The Commission defines the market to the extent necessary depending on the particular circumstances of a given case. In this instance, based on the information provided by PGMEA Customer 1 and the parties, the Commission understands that PGMEA is procured by customers on an at least EEA-wide basis. Therefore, for the

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<sup>10</sup> Page 16 of the notification.

<sup>11</sup> Page 1 of Call Note with PGMEA Customer 1, dated 26 July 2023.





purpose of its competitive assessment of the Proposed Transaction, the Commission has assessed the likely competitive effects of the Proposed Transaction with regard to the potential market for the supply of PGMEA in the EEA.

#### The supply of HF

36. In the notification, the parties submit that the geographic market for the supply of HF is at least EEA-wide, but submit that the exact geographic market definition can be left open.
37. Neither the Commission nor the EC has previously considered the geographic market for the supply of HF.
38. In the notification, the parties state the following with regard to how HF is sourced: *“[o]n the island of Ireland, high purity chemicals, including PGMEA and HF, are typically purchased from manufacturers and bulk suppliers located in the EEA, the UK and further afield, with products shipped to Ireland from these locations”*.<sup>12</sup>
39. CMC Materials [...] for HF in the State, HF Customer 1. In a call with the Commission, HF Customer 1 stated that the supply of HF to its semiconductor manufacturing site in the State: *“would be considered on a European level, and [...]”*.<sup>13</sup>
40. The Commission understands that there are no suppliers of HF who only supply in the State..
41. The Commission defines the market to the extent necessary depending on the particular circumstances of a given case. In this instance, based on the information provided by HF Customer 1 and the parties, the Commission understands that HF is

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<sup>12</sup> Page 16 of the notification.

<sup>13</sup> Page 1 of the Call Note with HF Customer 1, dated 18 July 2023.



procured by customers on an at least EEA-wide basis. Therefore, for the purpose of its competitive assessment of the Proposed Transaction, the Commission has assessed the likely competitive effects of the Proposed Transaction with regard to the potential market for the supply of HF in the EEA.

#### Conclusion on relevant markets

42. For the purposes of carrying out its competitive assessment of the Proposed Transaction, the Commission analysed its impact by reference to two potential markets, namely:
- (a) The potential market for the supply of PGMEA in the EEA; and
  - (b) The potential market for the supply of HF in the EEA.

#### **The supply of PGMEA in the EEA**

43. On the basis of the information available to the Commission during its review of the Proposed Transaction, the Commission considers that the Proposed Transaction raises no horizontal competition concerns in the supply of PGMEA in the EEA for the reasons set out below.
44. Table 1 below sets out the parties' estimates market shares of PGMEA suppliers in the EEA in 2022.

*Table 1: Market Shares in the supply of PGMEA in the EEA in 2022*

Company	Market Share
FUJIFILM	[0-5]%
CMC Materials	[0-5]%
Combined	[0-5]%



Dow	[25-30]%
Shell	[15-20]%
LyondellBasell	[15-20]%
Eastman	[10-15]%
Other	[20-25]%
Total	100%

Source: The parties<sup>14</sup>

45. First, as can be seen in Table 1 above, the parties estimate FUJIFILM's market share in respect of the supply of PGMEA in the EEA was [0-5]% in 2022. Following the implementation of the Proposed Transaction, FUJIFILM's share of the potential market for the supply of PGMEA in the EEA would face a minimal increment of [0-5].
46. Second, in the notification the parties state: [...].<sup>15</sup>
47. Third, as illustrated in Table 1 above, following the implementation of the Proposed Transaction, FUJIFILM will continue to face a competitive constraint from a number of suppliers of PGMEA. These include: *Dow*<sup>16</sup> [25-30%]; *Shell Chemicals*<sup>17</sup> [15-20%]; *LyondellBasell*<sup>18</sup> [15-20%], and; *Eastman*<sup>19</sup> [10-15%]; among others.

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<sup>14</sup>The parties' market share estimates are based on (i) the "Global Propylene Glycol Methyl Ether Acetate PGMEA Market Research Report 2023(Status and Outlook)" report; and (ii) the "Global Propylene Glycol Monomethyl Ether Acetate (PMA) Market Research Report 2023" report.

<sup>15</sup>Page 5 of the notification.

<sup>16</sup>The Dow Chemical Company.

<sup>17</sup>Shell plc.

<sup>18</sup>LyondellBasell Industries N.V.

<sup>19</sup>Eastman Chemical Company.



50. Fourth, CMC Materials' [...] of PGMEA in the State, PGMEA Customer 1, stated that it *“does not have any concerns in relation to the impact of the Proposed Transaction on the supply of PGMEA”* and that there are *“a number of other suppliers”* of PGMEA available to it.<sup>20</sup>

51. In light of the above, the Commission considers that the Proposed Transaction will not lead to any horizontal competition concerns in the market for the supply of PGMEA in the State.

### The supply of HF in the EEA

52. On the basis of the information available to the Commission during its review of the Proposed Transaction, the Commission considers that the Proposed Transaction raises no horizontal competition concerns in the supply of HF in the EEA for the reasons set out below.

53. Table 1 below sets out the parties' estimates market shares of HF suppliers in the EEA in 2022.

Table 2: Market Shares in the supply of HF in the EEA in 2022

Company	Market Share
FUJIFILM	[0-5]%
CMC Materials	[0-5]%
Combined	[0-5]%
HEM	[50-55]%

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<sup>20</sup> Page 1 of Call Note with PGMEA Customer 1, dated 26 July 2023.



BASF	[20-25]%
AUECC	[10-15]%
Other	[10-15]%
Total	100%

Source: *The parties*<sup>21</sup>

54. First, as can be seen in Table 2 above, the parties estimate FUJIFILM's market share in respect of the supply of HF in the EEA was [0-5]% in 2022. Following the implementation of the Proposed Transaction, FUJIFILM's share of the potential market for the supply of HF in the EEA would face a minimal increment of [0-5]%, with FUJIFILM having an estimated [0-5]% share of the potential market post-transaction.

55. Second, as illustrated in Table 2 above, following the implementation of the Proposed Transaction, FUJIFILM will continue to face a competitive constraint from a number of suppliers of HF. These include: *HEM*<sup>22</sup> [50-55%]; *BASF*<sup>23</sup> [20-25%], and; *AUECC*<sup>24</sup> [10-15%], among others.

56. Third, CMC Materials' [...] of HF in the State, HF Customer 1, stated that it "*does not have any concerns in relation to the impact of the Proposed Transaction on the supply of HF*" and that "*it considers there is sufficient competition, with multiple sources of HF available to it in the US and Europe*".<sup>25</sup>

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<sup>21</sup> The Parties' market share estimates are based on Grandview Research, Hydrofluoric Acid Market Size, Share & Trends Analysis Report 2022 -2030 Sample; Report ID GVR-4-68039-915-9.

<sup>22</sup> HEM Chemical Industries Private Limited.

<sup>23</sup> BASF Aktiengesellschaft.

<sup>24</sup> Asia Union Electronic Chemical Corp.

<sup>25</sup> Page 1 of Call Note with HF Customer 1, dated 18 July 2023.



57. In light of the above, the Commission considers that the Proposed Transaction will not lead to any horizontal competition concerns in the market for the supply of HF in the State.

#### **Conclusion of Competitive Analysis**

58. In light of the above, the Commission considers that the Proposed Transaction will not substantially lessen competition in any market for goods or services in the State.

#### **Ancillary Restraints**

59. No ancillary restraints were notified.



### **Determination**

The Competition and Consumer Protection Commission, in accordance with section 21(2)(a) of the Competition Act 2002, as amended, has determined that, in its opinion, the result of the proposed acquisition whereby FUJIFILM Holdings Corporation, through FUJIFILM Holdings America Corporation, would acquire sole control of CMC Materials KMG Corporation, will not be to substantially lessen competition in any market for goods or services in the State, and, accordingly, that the acquisition may be put into effect.

For the Competition and Consumer Protection Commission

**Brian McHugh**

**Member**

**Competition and Consumer Protection Commission**