

## **SUBSTITUTION PLAN**

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**Substance:** *Chromium trioxide,*  
*EC No: 215-607-8*  
*CAS No: 1333-82-0*

**Use title:** *Functional chrome plating with decorative character*

**Use number:** 3

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### GLOSSARY

Term	Description
<b>Commercialization / Industrialization of <u>qualified</u> alternative</b>	The aim of this phase is to install the alternative process for commercial production, <i>i.e.</i> the phase includes planning, site preparation, plant conversion, process evaluation, production line approvals from customers, training and production ramp-up.
<b>CTAC Consortium or CTAC</b>	An industry group consisting of 154 companies founded in 2012 to collaborate for the gathering of data to submit applications for authorisation of uses of chromium trioxide. REACHLaw is a member of this group. Five (originally six) out of the seven applicants for authorisation of the joint application of Chemservice <i>et al.</i> respectively their legal successors are members of CTAC.
<b>CTACSub Consortium or CTACSub</b>	An industry group consisting of seven companies (formulators and importers respectively their Only Representatives) founded in January 2015 that agreed to file an upstream application for authorisation for certain uses of chromium trioxide based on the data and draft applications for authorisation that had been developed by CTAC. REACHLaw is not a member of the CTACSub Consortium.
<b>Early stage R&amp;D / testing of candidate alternatives</b>	The aim of this phase is to identify the most promising alternative that fulfils all use-specific technical requirements (plating vs. etching) defined for articles and their respective area of application / market sector. Testing is only performed on laboratory scale, <i>i.e.</i> applicability of alternative on industrial / commercial scale is not yet evaluated.
<b>JSC "NPCC"</b>	Joint Stock Company "Novotroitsk Plant of Chromium Compounds" (Promyshlennaya str., 49, Novotroitsk, Orenburg area, 462353, Russia) a non-EU manufacturer of chromium trioxide for supply to the EU market. Through its Only Representative REACHLaw the company has been participating in the CTAC Consortium.
<b>Phase-out of CrVI / ramp-up of production to 100 % alternative</b>	During this phase the last serial production articles requiring the CrVI-based production technology due to contractual obligations are phase out. In parallel, the production of serial production articles manufactured with the alternative process is performed. The time required for this phase allows transition from the CrVI-based technology to the alternative technology under consideration of contractual obligations DUs have.
<b>Plating on Plastics (PoP)</b>	Plating on Plastics (PoP) consists of the deposition of a metal multilayer system on a non-conductive surface.
<b>Qualification of preferred candidate alternative(s)</b>	The aim of this phase is to get all required customer/OEM approvals ( <i>e.g.</i> , testing of lifetime under serial conditions/condition of use) for the article manufactured with the alternative, <i>i.e.</i> <u>qualification</u> of alternative. The manufacturing of the article is not yet performed on industrialized production lines. This phase does not include customer/OEM approvals for the industrialized/commercialized production line (see Commercialization/Industrialization of qualified alternative).
<b>REACHLaw</b>	REACHLaw Ltd. (Vänrikinkuja 3 JK 21, FI-02600 Espoo, Finland). REACHLaw is acting as Only Representative of JSC "NPCC" under REACH Article 8 and has submitted an application for authorisation of certain uses of chromium trioxide using the authorisation dossier prepared by CTAC. REACHLaw and CTACSub have concluded an agreement to collaborate on the preparation of the Substitution Plans as now requested by the Commission for their respective applications for authorisation.

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### ABBREVIATIONS

AfA	Application for Authorisation
CrO <sub>3</sub>	Chromium trioxide
DU	Downstream User
OEM	Original Equipment Manufacturer
PoP	Plating on Plastics



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## IMPORTANT NOTES

The Application for Authorisation of *Chemservice et al.*<sup>1</sup> for the use of chromium trioxide for *functional chrome plating with decorative character (Use 3)* was submitted in 2015.

By letter of February 24, 2020, the European Commission requested the joint applicants to submit a substitution plan for Use 3 by August 24, 2020; an Annex to the letter detailed the requirements for the substitution plan. Pursuant to an extension request filed by the applicants on July 8, 2020, the European Commission prolonged the deadline for submission of the substitution plan to September 24, 2020.

REACHLaw Ltd. (as Only Representative of Joint Stock Company "Novotroitsk Plant of Chromium Compounds" – JSC "NPCC" – Russia) (hereafter REACHLaw (as OR for JSC "NPCC")) submitted its own upstream application for authorisation. This upstream application is based on the same data as the Application for Authorisation of *Chemservice et al.* (see **GLOSSARY** for further background). As REACHLaw received the same request from the Commission to submit a substitution plan for the same use, REACHLaw and the joint applicants *Chemservice et al.* agreed to collaborate on the Substitution Plan. REACHLaw therefore submits the same report as *Chemservice et al.* in response to the same request from the Commission. The information collected from downstream users for the purpose of fulfilling the Commission requests is from both supply chains. No differentiation between the supply chains was performed for the preparation of this report.

In 2012, more than 150 companies, including chromium trioxide suppliers, formulators and downstream users (DUs) from various industry sectors, formed the **Chromium Trioxide Authorisation Consortium (CTAC)**. Between 2013 and 2015, CTAC gathered available information from member companies and the public domain and prepared the documents to support the members' applications for authorisation. Some CTAC members, especially larger companies, adapted the draft applications elaborated to their company situation and submitted their own company specific applications for authorisation, often with longer requested review times based on specific circumstances. Many of these individual applications have been granted already by the European Commission. CTAC also issued licenses to third parties for the draft authorisations and therefore also non-CTAC members have used the data for their own applications for authorisation.

Towards the end of the CTAC work in 2015 and upon request of CTAC members, several CTAC members agreed to submit an upstream application for authorisation under REACH<sup>2</sup>. A new consortium (**CTACSub**) was formed to jointly submit such upstream authorisation. The application covered the use of chromium trioxide across six distinct use groups; Use Group 3 specifically addressed functional chrome plating with decorative character<sup>3</sup>. The upstream application approach enabled different members of industry to pool experience, knowledge and resources during preparation of the application, supported consistency in terminology and expectations for substitution based on state of the science across industry. REACHLaw as OR for JSC "NPCC" is a member of CTAC but did not become a member of CTACSub. As outlined above, it submitted its own application that was using the CTAC reports.

The CTACSub Consortium members or their legal successors are the current joint applicants (for more information on the history of both CTAC<sup>4</sup> and CTACSub<sup>5</sup> please see links in footnotes).

This substitution plan arguments and updates information originally compiled between 2013 and 2015 and submitted by *Chemservice et al.* to ECHA in 2015.

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<sup>1</sup> Formerly LANXESS Deutschland GmbH in its legal capacity as Only Representative of LANXESS CISA (Pty) Ltd.

<sup>2</sup> An upstream application is specifically foreseen by article 62(3) of the REACH Regulation.

<sup>3</sup> Boeing Distribution, Inc. does not intend to make any sales for Use 3.

<sup>4</sup> <http://a1r.52d.myftpupload.com/wp-content/uploads/Press-Release-CTAC-Consortium.pdf>

<sup>5</sup> <http://a1r.52d.myftpupload.com/wp-content/uploads/Press-Release-CTACSub-Consortium-May-2015-Revised.pdf>

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### **DISCLAIMER**

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## SUMMARY

Electroplating of chromium is used in several European industry sectors to impart specific functional performance, including a decorative aspect, to certain parts. These sectors include automotive, sanitary, furniture, medical, and various other sectors. The chromium trioxide-based plating process is complex and involves numerous steps, which depend on the parts to be treated (e.g., substrate, surface area, size, number). In principle, the plating process can be divided into four sub-processes: pre-treatment, intermediate processes, main treatment and post-treatment. Chromium trioxide is used in the main treatment process and also during pre-treatment.

The *Chemservice et al.* application for authorisation was submitted in 2015 and there has been significant progress since 2015 towards the development of alternatives and successful substitution of functional chrome plating with decorative character (Use group 3). In order to gather Downstream User (DU) specific data on the current status of substitution, the CTACSub consortium performed a DU survey via online questionnaire in five languages (English, French, German, Italian, Spanish) from April 06th, 2020 to May 15th, 2020. The questionnaire was distributed as widely as possible via industry associations and in the supply chains of the applicants. The application for authorisation for Use 3 covers both chromium trioxide-based "Pre-treatment (etching)" and chromium trioxide-based main treatment ("Functional chrome plating with decorative character") of both metal and plastic products required by industry sectors in the scope of the application are covered. This is entirely consistent with prevailing guidance for the application process in 2015 (the date of submission of the application) whereas guidance now requests to consider chromium trioxide based pre- and main treatment processes separately. Furthermore, in the 5 years since the application for authorisation was submitted (2015 to 2020), different preferred paths to substitution have emerged for pre-treatment (etching) and main-treatment (plating) processes. Research and development have resulted in a clearer distinction between the substitution profiles for etching and plating as well as the market sector in which the specific product is used. The DU survey was developed accordingly. For a more detailed introduction, please refer to section **1**. The structure of the questionnaire is described in section **1.3**.

In summary, 851 questionnaires of DUs were evaluated for this substitution plan for Use 3. The annual consumption of CrO<sub>3</sub> amongst participating DUs varied. A median annual tonnage of 0.5 tons/a was calculated. The 90<sup>th</sup> percentile was 7.7 tons/a. The group consuming more than 7.7 tons/a comprised of 85 DUs. Around 60 % of the DUs reported that the sectors "Automotive", "Furniture" or "Sanitary" were their largest market sectors. In approximately a third of all cases, the DUs could not identify their market sectors within the pre-determined options and chose "Other" as the largest market sector. In fewer cases, the sectors "Medical" (5 %) or "Cosmetics" (2 %) were chosen. The largest proportion (84.4 %) of DUs reported to perform only chrome plating of metal substrates. The second largest fraction indicated to perform the combined sub-uses of chrome plating and etching of plastic substrates (8.1 %). The general statistics of the survey are presented in section **2**.

The DUs identified a range of challenges regarding substitution. Concerns relate to the unavailability of a "drop-in" alternative, technical (e.g., surface property limitations) and process-related issues with alternatives, process implementation challenges, economic implications, customer and regulatory compliance requirements. For details on the identified challenges please refer to sections **3.1** and **3.2**.

Chromium(III) sulphate-based and Chromium(III) chloride-based electrolytes are currently the preferred alternative to CrO<sub>3</sub> for the chrome plating of plastic or metal substrates. For the etching of plastic substrates, the DUs preferentially chose permanganates and manganese salts as the most promising alternative (90 % of all answers). Sulfuric acid and phosphoric acid were chosen to a lesser extent (34 %). The preferences shifted for the etching of metal substrates, when (75 %) considered sulfuric acid to be the option of choice. However, also 30 % of the DUs employed with the chrome plating of plastic substrates stated that no alternative was generally available. In the group of DUs performing chrome plating of metal substrates, 50 % were in favor of this view. Regarding the etching, 22 % of the DUs pre-treating plastic substrates were of the opinion that no alternative was generally available. 53 % of the DUs performing etching of metal substrates stated that no alternative was generally available. The main factors leading to the opinion that no alternatives are available were identified as "Surface property limitations" and "Customer acceptance" (see sections **4.2.1** and **4.3.1**).

Hypothetical substitution timelines were integrated into the survey and DUs were asked to agree or disagree with this suggested timeline and justify their response. The timeframes proposed were the 30<sup>th</sup> of June 2023 for the market sectors "Automotive", "Furniture", "Medical", "Sanitary" and "Other" and 31<sup>st</sup> of December 2020 for the market sector "Cosmetics". DU agreement to these suggested timelines for chrome plating was generally low (around 25 to 31 %), with the exception of the very small sub-group performing chrome plating in the largest market sector "Cosmetics" (n = 2, 50 % agreement) (see section **4.2.2**). Similar results were found for the etching sub-uses, with agreement rates ranging from 14 to 32 %. No data were available for the etching of metal substrates in the identified largest market sector "Cosmetics" (see section **4.3.2**).

The low agreement rates to the substitution timelines are supported by information relating to the status of substitution, considering four general phases of a substitution program. In general, the vast majority of DUs reported that they had

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not started the final substitution phases of "Commercialization / Industrialization of qualified alternative" or "Phase-out of CrVI / ramp-up of production to 100 % alternative". However, DUs reported they have made considerable progress in the earlier stages of R&D. The data illustrate that the DUs' substitution efforts were quite advanced in the steps of "Early Stage R&D" and "Qualification of preferred candidate alternative(s)". This statement can be made irrespective of the sub-use.

Substitution efforts were driven and managed differently by the participating DUs. DUs working with plastic substrates in the sub-uses of plating and etching indicated preference for "Regular meetings specific to R&D project" with the highest frequencies (69 % and 77 %, respectively) and "Allocation of a specific project manager to the R&D project" (60 % and 65 %, respectively). DUs working with metal substrates preferably chose "Other" management systems in the plating sub-use (46 %) and "Regular meetings specific to R&D project" in the etching sub-use (41 %). Generally, for both sub-uses with plastic substrates, higher implementation rates of most of the pre-determined monitoring systems were observed than by the DUs working with metal substrates. In general, the data suggest that the DUs working with plastic substrates have achieved a larger variety in regards of the monitoring options implemented but overall management systems to drive substitution are in place (see section 5).

No EU-wide date of substitution could be concluded from the provided raw data. The responses from the DUs indicated different approaches to implementing the four phases; the time to complete each phase was reported, however, the data suggested significant variance in the degree of overlap between phases, so expected time to fully substitute could not be determined with confidence in each case. To work around this, an estimate on the total time to complete substitution was derived by assuming overlap of subsequent phases by 50 %. Practically this means that the summed duration of all phases (*i.e.* assuming all phases starting subsequently) was multiplied with a factor of 0.5; the factor was derived based on an analysis of DU responses from several sectors and sub-uses. The methodology for the analysis is presented in section 4.1.

Only groups including more than 5 DU responses were analyzed in detail. In summary, the data suggest that the majority of the DUs that do not agree with the proposed timelines need at least 6 to 7 years to complete the substitution process. The individual sub-use and market sector specific timelines are presented in sections 4.2.3 and 4.3.3 as well as section 6.

To assess the reliability of these estimated timelines, an analysis of the requested review period as well as the review period recommended by the RAC and SEAC and/or decided by the EU Commission from separately submitted AfAs for the same use was performed. Only AfAs filed by DUs performing functional chrome plating with decorative character were regarded, *i.e.* no upstream supply chain AfAs were considered. The information was retrieved from the ECHA website. The results are summarized in **Table 26**. Of note, the analysis revealed:

- the timeline of 6-7 years derived from the DU data in this survey probably marks an underestimation. The DUs (see **Table 26**) in most cases requested a review period of 12 years for either sub-use (etching or plating). A reason for this might be the methodology used to calculate the timeline. Another cause might be found in the difference to an individually filed AfA. It can be assumed that an individual AfA contains a higher degree of specificity regarding the applicant's processes and needs. It can also be considered that in an individual AfA, challenges may be depicted in greater depth and are customized to the applicant's situation.
- the RAC and SEAC agreed with the requested review periods and recommended periods of the same length, in all seven cases where opinions were already adopted. The EU Commission already followed this recommendation in two cases and approved the authorisation (one AfA submitted prior to and one AfA submitted after the sunset date). Those authorisations for the use of CrO<sub>3</sub> will expire in 7 to 11 years, making an example of time granted for the substitution to other DUs.
- Critically, only 11 AfAs – covering 28 (mostly large) companies and 20 uses – were submitted by DUs performing functional chrome plating with decorative character. This is in clear contrast to the 851 DUs that contributed data to this SP. It shows that only a very low portion of DUs (around 3%) has the benefit of single or group downstream applications and around 97% of the DUs depend on this upstream application.

## SUBSTITUTION PLAN

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In conclusion, our analysis indicates DUs require 6-7 years and likely more to successfully substitute CrO<sub>3</sub>. However, given that the substitution process involves numerous uncertainties, prolonged substitution timelines cannot be excluded for some DUs, market sectors or sub-uses. The challenges described and analysed in chapter **3** can only be resolved by DUs and formulators working in close collaboration to further proceed with substitution across market sectors. This is reflected beyond the CTACSub AfA; considering standalone downstream AfAs submitted for similar uses, some critical issues of concern still remain unresolved as the requested, recommended and granted review periods range from 10 to 12 years for plating and etching, independent of the date of submission of the AfA. This is also supported by the small number of DUs employed with decorative chrome plating in the EU that have already substituted CrO<sub>3</sub> completely. Based on industry insights from the formulators forming CTACSub, less than 5 % of those DUs in the EU have completely substituted CrO<sub>3</sub> in decorative plating. For etching, numbers are even lower. These figures are consistent with the results from this survey showing that only a small number of DUs already finalized Phase 4 (Phase-out of CrVI / ramp-up of production to 100 % alternative) (see chapter **4.2.2** and chapter **4.3.2**).

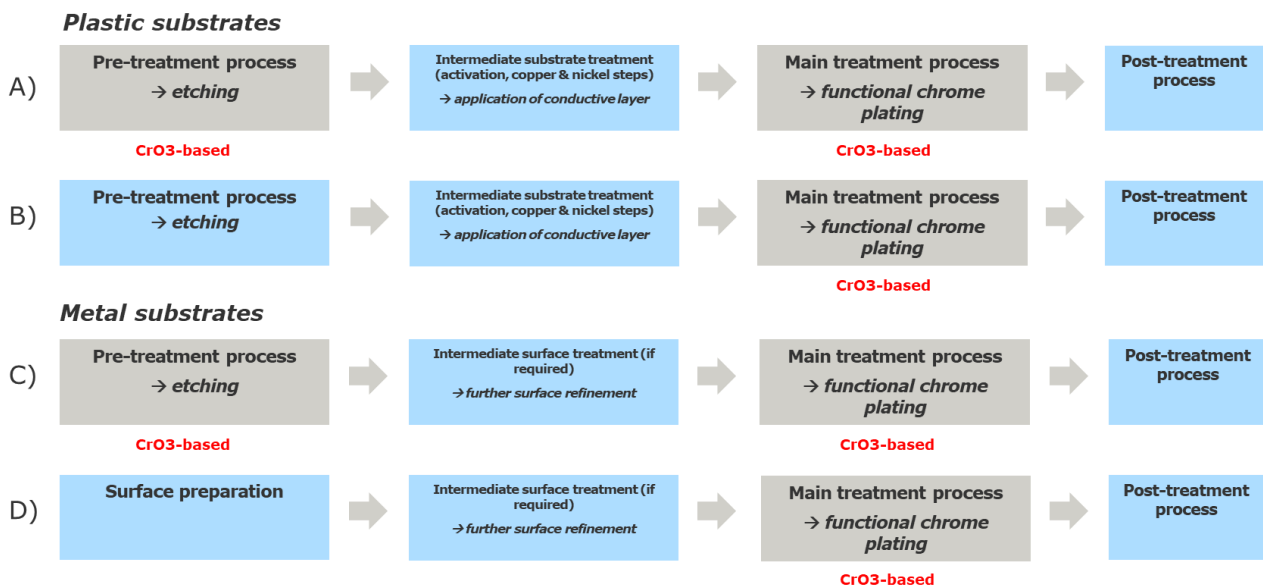
**1. INTRODUCTION**

**1.1 Functional chrome plating with decorative character**

Electroplating of chromium is used in several European industry sectors to impart specific functional performance, including a decorative aspect, to certain parts. These sectors include automotive, sanitary, furniture, medical, and various other sectors such as cosmetic packaging, consumer electronics, household appliances, building and construction, aerospace and military, fashion and jewellery etc.

The industry sector is diverse. There are companies that only plate for certain sectors (customers) or plate their own parts to be marketed, but there are also companies that plate for a variety of customers from different sectors with specifications determined by their customers (so-called job platers). A single chromium plating company may, therefore, serve dozens of customers and different industry sectors and may plate many different parts / components / articles. Many companies of both categories are small and medium-sized companies.

The chromium trioxide-based plating process is complex and involves numerous steps, which depend on the substrate of the part to be plated as well as the part (e.g., surface area, size, number) to be treated. In principle, the plating process can be divided into four sub-processes: *pre-treatment*, *intermediate processes*<sup>6</sup>, *main treatment* and *post-treatment*. Chromium trioxide is only used during *pre-treatment* and *main treatment* processes. Depending on the substrate (metal vs. plastic) of the part to be treated, the *pre-treatment* process does not always require chromium trioxide-based etching. However, the *main treatment* process always requires use of chromium trioxide. This combination of *pre-treatment* and *main treatment* results in four potential sub-use combinations, which are illustrated in **Figure 1** below.



**Figure 1: Potential combinations of chromium trioxide-related uses**

Regardless of the respective combination, the steps in the plating process/system are highly interdependent; changes in a single step cannot be made without impairing the overall process or performance of the final product. Compatibility and technical performance of the overall system are of fundamental importance during material specification and therefore dictate the search for alternatives.

The initial application for authorisation by *Chemservice et al.* was filed in 2015. As would be expected, there have been significant further efforts invested in research and development of potential alternatives to chromium trioxide in the intervening 5 years. The applicants are aware of available technologies, but do not generally have access to (often commercially sensitive) information within the supply chain regarding progress (and impediments) to successful substitution of electroplating based on chromium trioxide. For this reason and to achieve representativeness of the Substitution Plan, *Chemservice et al.* elected to survey the downstream users (DU) of Use Group 3 to seek to gather

<sup>6</sup> For Plating on Plastics, intermediate substrate treatment involves activation and application of copper and nickel layers as pre-requisite for chrome plating step (→ creation of conductive surface layer)

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current information about the status of substitution. The performance of this downstream user survey is described in detail in section 1.3.

## 1.2 Current status of alternative development and substitution

Replacing chromium trioxide in etching and electroplating applications has challenged scientists for decades. The finished part has a durable metallic chromium coating which offers reliable safety in a variety of uses. Furthermore, the unique chemical characteristics of chromium trioxide, its relatively low cost and efficacy of waste treatment have proven impossible to replicate in an alternative substance or technology.

The electroplating industry has evolved over many years to reflect the needs of multiple, complex sectors, customers and supply chains. Formulators and platers have distinct and co-dependent capabilities and must work in close partnership. Due to the highly specialised nature of the surface treatment processes, research and development of alternatives to chromium trioxide in electroplating requires highly specialised expertise and is led primarily by the formulators. The formulators have dedicated resources for this activity and benefit from the collective expertise involved in implementing technology across multiple operations. Downstream users on the other hand typically do not have the expertise or funds available to conduct such research. They are also not able to optimise new technology on their own. Formulators thus provide expert support to industry in terms of offering, implementing and operating potential alternatives.

The information regarding alternatives for *plating* and *etching* below is based on the expert knowledge provided by formulators. It shows that significant progress has been made in terms of alternative development since the *Chemservice et al.* application for authorisation was submitted in 2015. The CrIII-based technology for *decorative plating* is now considered technically mature, meaning it is commercially available on the market. However, this is not yet true for etching, especially for etching plastics. Moreover, the technical readiness of (potential) alternatives, the successful substitution of both *etching* and *plating* requires each DU to first resolve various other concerns. These concerns are specific to the respective DU's operation, and therefore must be approached by DU and formulator in close collaboration.

Due to differences in chemistry and functionality, *pre-treatment (etching)* and *plating* must, be considered separately when defining substitution plans.

### Main Treatment (plating)

In general, technical options for substitution of chromium trioxide for plating step are well developed, although alternatives have not been widely adopted due to increased complexity and cost. From a process technology perspective, hexavalent chromium (CrVI) may be replaced by trivalent chromium (CrIII) for plating applications. CrIII does not have the same concerns for toxicity to human health as CrVI, and CrIII-based processes are capable of depositing chrome metal coatings that closely match the characteristics of those produced from CrVI-based processes. However, CrIII-based processes have different operating requirements, that have implications for substitution:

- New equipment (tanks, anodes, pumps, filtration) is required for CrIII-based processes. This involves considerable financial outlay. Whilst it may be possible to retro fit existing lines subject to available space and the equipment configuration at any given site, this, involves a period of non-operation. Furthermore, retrofitting a line is not straightforward when it is necessary to phase out the use of CrVI gradually (*e.g.*, to respect existing contractual commitments).
- CrIII-based processes typically require longer processing times due to slower deposition rates, depending on their chemical formulation and desired coating quality. This can vary from 10-300 % longer processing times, which may require additional process tanks or tank volumes to ensure identical production output compared to CrVI-based manufacturing.
- Operating conditions and contamination levels for CrIII-based processes require specialist equipment and need to be maintained within relatively narrow ranges to ensure constant coating quality.
- Waste treatment of rinse waters requires a different approach as CrIII-based plating processes contain different acids, bases and complexing agents. Typically, rinse waters from CrIII-based processes need to be segregated from other waste streams and require four stages of chemical treatment (neutralisation, flocculation, settlement and filtration). Disposal of concentrated waste process solutions are typically treated by external specialist contractors.
- The costs of CrIII-based plating processes are, therefore, higher than CrVI-based processes due to:
  - lower deposition rates → longer processing times for comparable surface quality;
  - use of a more expensive trivalent chromium salt, formulations that contain complexing agents, chemical buffers, wetting agents and other proprietary compounds that increase their production costs;
  - higher wastewater treatment cost.

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## **Pre-treatment (etching)**

The substitution of chromium trioxide for etching (especially etching of plastics) is still challenging. Chromium trioxide has been used for etching for over 40 years. The chemistry used is widely known and is made from commodity substances readily available to all applicators. The latest substitution technologies have only been developed during the past 4-5 years and are currently at the industrial scale-up phase, i.e. experience regarding long-term commercial suitability on production lines remains limited. These new chemical etching processes require new specialist processing equipment, techniques and process control equipment. Such alternatives have the following implications / limitations:

- They are not able to treat all forms of existing *acrylonitrile butadiene styrene (ABS)* & *acrylonitrile butadiene styrene-polycarbonate (ABS-PC)* substrate material;
- Etching requires several extra processing steps to complete the process;
- Processing times are 10-25 % longer than conventional CrVI-based etching;
- New equipment is required for the etching process during chemical processing of the component (tanks, pumps, filtration & ancillary equipment). Depending on the local circumstances, it may be possible to retro fit existing lines, depending on the available space and equipment configuration. In any event, a complete line audit is required to establish conversion capability;
- The new etching processes require close chemical management to ensure efficient and effective operation. This may also involve new equipment for analysis and specially trained staff. Both can lead to additional costs.
- Waste treatment of rinse waters and waste solution is simpler compared to CrVI-based etching processes.

Many existing processing lines may be suitable for conversion, but this will not be the case for others that are not sufficiently sized. Furthermore, conversion may not be a straightforward option considering contractual commitments and requirements for business continuity.

## **Financial Investment**

The financial investment and impact of substitution is significant. In order to substitute chromium trioxide in both *etching* and *electroplating*, an existing process line will have to undergo major reconfiguration or rebuild. The equipment cost of converting a single large processing line is estimated between 2-7 million €<sup>7</sup>. This does not consider other costs such as lost revenue during the conversion process and process optimisation. The extra costs for additional plating and etching tanks (required due to lower overall production output) in a new line sum up to around 10-15 % of the total investment.

## **Substitution support for DUs and timeframe for conversion (exemplarily)**

Please note that the following example for a conversion project incl. description of content and time estimates is based on one individual formulator's experiences from actual conversion projects performed; its purpose is hence to serve as a single example to highlight certain experienced challenges but must not be understood as the general view of all formulators as well as of the industry and DUs. Please note further that it only describes the process of "Commercialization / Industrialization of qualified alternative" and is not valid for "Early stage R&D / testing of candidate alternatives" and "Qualification of preferred candidate alternative(s)". All these steps have to be completed before. In addition, it also does not take into account time for "Phase-out of CrVI / ramp-up of production to 100 % alternative". This view from the formulator's standpoint must be regarded as rather optimal. Specific circumstances at the DUs need to be considered when setting realistic timeframes for conversion of individual operations. This is discussed further in sections **4.2** and **4.3**.

The formulator estimated an average conversion time, including planning, site preparation, plant conversion, process evaluation, production line approvals from customers, training and production ramp-up between 18-36 months per production line. An overview of the process to implement the CrVI-free technology is provided in **Figure 2** below (Note: the process described in **Figure 2** is comparable to "Commercialization / Industrialization of qualified alternative").

DUs are supported by the formulator during the substitution and conversion process. This includes not only the supply of chemistry and equipment, but also intensive training and education. These customized services are part of the implementation programs. However, the formulator is also limited in its capacities to provide these substitution services. Thus, the switch to an entirely CrVI-free decorative plating process is not only dependent on the technical & economic capacities of DUs and the acceptance willingness of their customers, but also on the formulator's (production) capacities

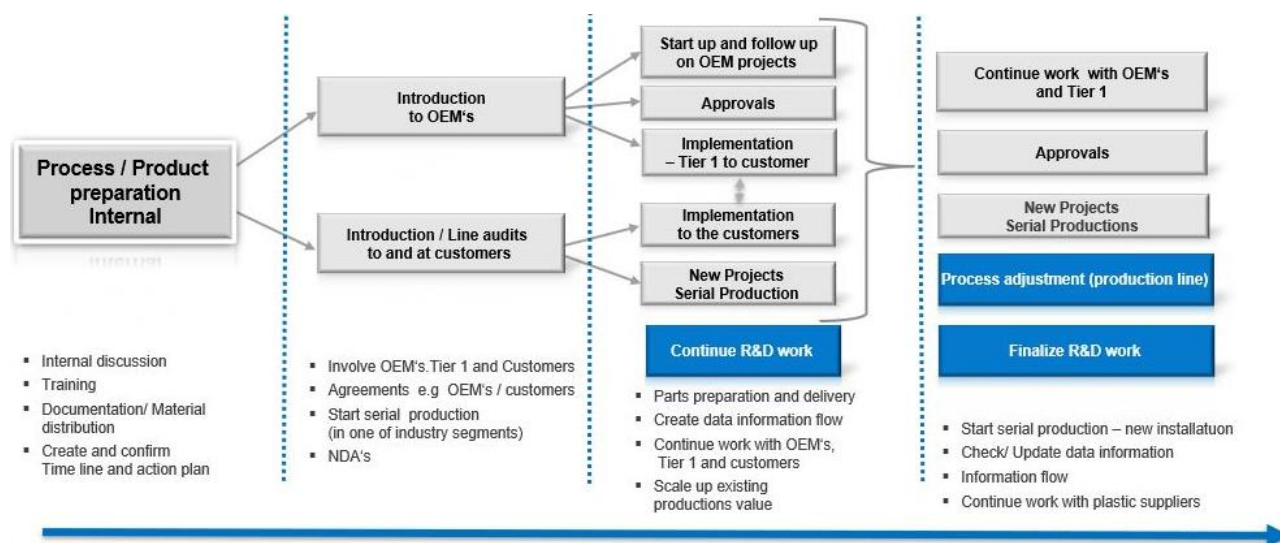
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<sup>7</sup> Implementation costs estimated by formulator based on industry experience;



## SUBSTITUTION PLAN

to provide equipment and service. In the formulator's opinion, this leads to a staggered conversion per market sector and DU and needs to be considered when setting dates for the substitution of chromium trioxide within the EU.



**Figure 2: Example of implementation road map of CrVI-free production process**

### 1.3 Survey to gather DU specific data for Use 3

The *Chemservice et al.* application for authorisation was submitted in 2015 and, as anticipated in that application, there has been significant progress since 2015 towards the development of alternatives and successful substitution of chromium trioxide in plating processes with decorative character.

In order to gather DU specific data on the current status of in-field substitution of chromium trioxide in *Chemservice et al.*'s Use group 3, the CTACSub consortium performed a DU survey via online questionnaire in five languages (English, French, German, Italian, Spanish) from April 06<sup>th</sup>, 2020 to May 15<sup>th</sup>, 2020. The questionnaire was distributed as widely as possible via industry associations and in the supply chains of the applicants. Following the contractual agreement, the survey was extended to include the supply chain of REACHLaw (*as OR for JSC "NPCC"*). The survey and this report, therefore, address DUs in the supply chains of *Chemservice et al.*, its joint applicants and JSC "NPCC".

To ensure full engagement in the survey and encourage DUs to supply accurate and comprehensive data in the questionnaire, participation in the survey was deemed mandatory for all DUs that would seek supply following August 24<sup>th</sup>, 2020<sup>8</sup>; those that did not participate in the survey were considered to have successfully substituted their use of chromium trioxide such that suppliers would not make deliveries of chromium trioxide from August 24<sup>th</sup>, 2020 onwards.

The CTACSub consortium communicated the necessity for survey participation and above-mentioned consequences for non-participation to the DUs by a letter of March 30<sup>th</sup>, 2020 (see **Annex II**). The same was done by REACHLaw. The letter was distributed via the CTACSub and JSC "NPCC" supply chains (*i.e.* via intermediate formulators/distributors of chromium trioxide) and industry associations.

To participate in the online survey, DUs had to first register with their contact and legal entity information to receive a company-specific survey link to the survey. To increase awareness regarding the need to participate and to explain how to complete the survey (and thus improve data quality/validity), DUs were invited to webinars in which instructions on how to fill the online questionnaire were presented and to give them further background information on the requested substitution plan. The webinars were held in five languages (English, French, German, Italian, Spanish) and DUs were given the opportunity to ask questions. The webinars were also recorded so that DUs could access them at any time throughout the survey. We note that the data gathering exercise was held while the COVID-19 virus lockdown was in force in numerous Member States, while many DUs were non-operational and staff furloughed. Therefore, upon request, several DUs were given additional time to respond. To further ensure a high survey response rate, formulators and distributors provided their sales force and account managers with background information and training regarding the survey to allow them to support their customers directly.

<sup>8</sup> DUs that participated in the survey received documentation of participation that could be provided to their suppliers to ensure future supplies.

## SUBSTITUTION PLAN

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It is noted that the application for authorisation for Use 3 does not separate chromium trioxide-based pre-treatment (etching) and chromium trioxide-based main treatment (chrome plating), or differentiate substrates (metals vs. plastics), products or applications (*i.e.* industry sectors in the scope of the application). This is entirely consistent with prevailing guidance for the application process in 2015 (the date of submission of the application) whereas it is now guidance and best practice to consider chromium trioxide based pre- and main treatment processes separately and consider substitution profiles (*i.e.* most-promising alternatives and substitution timelines) for each separately. Furthermore, in the 5 years since the application for authorisation was submitted (2015 to 2020), different preferred paths to substitution have emerged for pre-treatment (*etching*) and main-treatment (*plating*) processes. Research and development and increased attention to documenting progress since 2015 have resulted in a clearer distinction between the substitution profiles for *etching* and *plating* as well as the market sector in which the specific product is used. The DU survey was developed accordingly.

The survey consisted of five sections. Depending on circumstances some or all of these sections would apply for each DU.

The first section requested general information on the company's supplier, use of CrO<sub>3</sub>, major market sectors of Cr(VI)-related products and respective share of CrO<sub>3</sub> for each market sector. The participants could choose from the following six options (more than one choice possible):

1. Sanitary
2. Automotive
3. Medical
4. Cosmetics
5. Furniture
6. Other

According to their selection, the DUs were asked to provide additional information on the CrO<sub>3</sub>-surface treated articles/article group (*e.g.*, medical instruments) and the end-application (*e.g.*, surgical instruments for hospitals). At the end of the first part of the survey, the DUs were asked to identify the processes using CrO<sub>3</sub> as well as the annual tonnage used for the respective process. The DUs could choose from the following sub-uses of Use 3 (more than one choice was possible):

1. Functional chrome plating with decorative character of **plastic** substrates (Part 2)
2. Functional chrome plating with decorative character of **metal** substrates (Part 3)
3. Pre-treatment (etching) of **plastic** substrates (Part 4)
4. Pre-treatment (etching) of **metal** substrates (Part 5)

Based on the DU's selection of sub-uses of Use 3, parts 2 to 5 of the survey were automatically presented to the DUs (see also section 4.1). In these, the DUs were asked to provide information on their company-specific substitution scenario for the corresponding sub-uses selected. For each selected use, the DU was asked to provide information on their preferred alternative(s) and on the limitations/obstacles to implementation based on their largest market sector (measured in % annual chromium trioxide consumption).

### **Suitable alternatives generally available: SAGA**

The DU survey was initiated before ECHA officially announced during the Eurometaux/CETS seminar (May 28, 2020) that the concept 'suitable alternatives generally available (SAGA)' is valid for functional chrome plating with decorative character. Accordingly, the survey still allowed DUs to select 'no alternative generally available' for their use-specific substitution scenarios. However, the survey also required DUs to respond to suggested timelines for substitution (see below) and required them to indicate if and why they could not meet these timelines. By indicating such timelines from the outset in the questionnaire, the default assumption of the survey was, therefore, that suitable alternatives were generally available.

The DUs were asked to contemplate on a substitution timeline for their largest market sector. For doing so, the DUs were presented with and asked to provide the estimated time for completion of four, generally applicable, phases in the research and development of alternatives:

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1. Early stage R&D / testing of candidate alternatives
2. Qualification of preferred candidate alternative(s)
3. Commercialization / Industrialization of qualified alternative
4. Phase-out of CrVI / ramp-up of production to 100 % alternative

The proposed substitution timelines in the questionnaire were drawn from the draft decision on *Chemservice et al.'s* and *REACHLaw's (as OR for JSC "NPCC")* Use group 3 adopted by the REACH Committee in February 2019. This draft decision refers to 4 years from the date of decision (which would have meant approx. June 2023). This was adapted in the case of cosmetic applications because the applicants had obtained some information from individual companies that substitution could be possible by December 31<sup>st</sup>, 2020. However, in the survey, DUs from the cosmetics sector had the opportunity to disagree to that suggested timeline. Thus, for each selected sub-use (part 2 to part 5), DUs were asked whether or not they agree with the indicative timeline for substituting CrO<sub>3</sub> in their largest market sector until the following dates:

**Table 1: Suggested substitution dates for largest market sector**

Date	Largest market sector [% annual chromium trioxide]
December 31 <sup>st</sup> , 2020 <sup>9</sup>	Cosmetics
June 30 <sup>th</sup> , 2023 <sup>10</sup>	Sanitary, Automotive, Medical, Furniture, Others

Please refer to section **3.2** for detailed information on the evaluation and results concerning substitution timelines.

With respect to the company specific substitution scenario, the DUs were further requested to indicate detailed information on technical (*e.g.*, implementation) and economic risks, obstacles, uncertainties or factors that could impact the substitution timeline provided (see section **3**).

Finally, the DUs had to describe the system(s) in place to monitor and document the progress and implementation of their company specific substitution plan (see section **5**).

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<sup>9</sup> Indicative timeline based on industry knowledge.

<sup>10</sup> Indicative timeline based on EU COM draft decision for Use group 3 (*Chemservice et al. & REACHLaw (as OR for JSC "NPCC")*)

**2. GENERAL STATISTICS**

**2.1 Sample sizes**

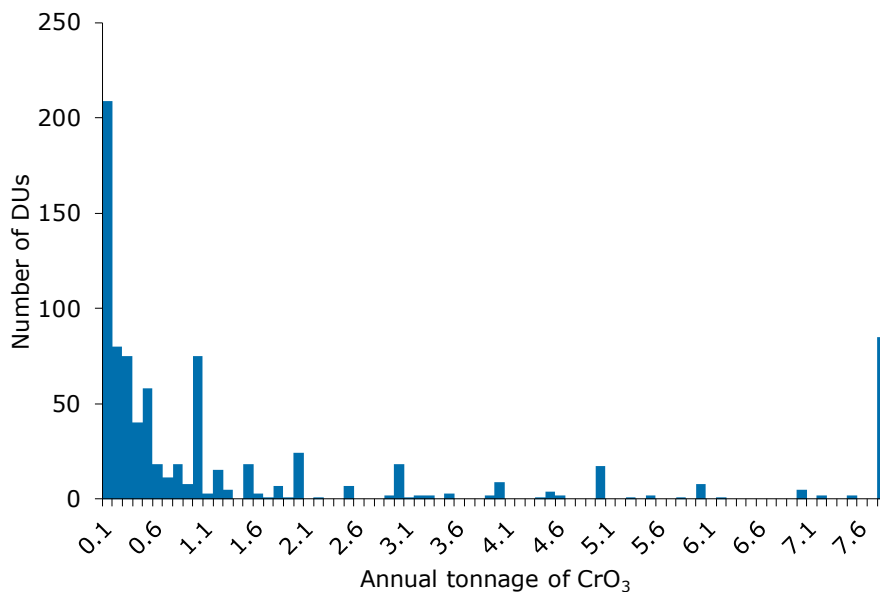
In total, >1400 surveys were submitted by DUs until the deadline of May 15, 2020. These included a considerable number of incomplete surveys caused by double registrations from representatives of the same legal entity, distributors, etc. Also, some surveys were received from companies that did not carry out functional plating with decorative character (e.g., covered under Use 2 of CTACSub).

Ramboll checked all correctly submitted questionnaires for completeness (i.e., all questions answered). 832 surveys were deemed suitable for subsequent analysis. From the first responses, several DUs were contacted and asked to provide additional information. Furthermore, as requests for participation were received after the deadline, a second survey was set up which remained open until June 08, 2020. 25 additional questionnaires were collected during that second survey of which 19 were considered complete and integrated into the existing dataset.

In summary, therefore, 851 questionnaires were evaluated for this substitution plan. Please note that DUs were allowed to give more than one answer for several questions. Also, depending on the answers given, not all sections of the survey were necessarily presented to the participants. Furthermore, in several cases individual data were excluded as they were regarded as invalid and not fit for evaluation. The number and justification for doing so is indicated at the respective section of this document. All analyses were performed with Microsoft Excel (2016).

**2.2 Tonnage and market sectors covered**

The participating DUs comprise a range of different company sizes in regard to the secondary measure of the annual consumption of CrO<sub>3</sub>. Four responses were excluded as they stated an invalid annual tonnage ( $\leq 0$ )<sup>11</sup>. Approximately one quarter (n= 209, 24.7 %) of the companies uses amounts of  $\leq 0.1$  tons CrO<sub>3</sub>/a. A median annual tonnage of 0.5 tons/a was calculated. The 90<sup>th</sup> percentile was 7.7 tons/a. The group consuming more than 7.7 tons/a comprised of 85 DUs. A histogram covering all assessed companies is given in **Figure 3**.



**Figure 3: Histogram of the number of participating DUs separated by their annual tonnage of CrO3**

Presented is the number of DUs within the 90<sup>th</sup> percentile (= 7.7 tons/a) of the annual CrO<sub>3</sub> consumption. The DUs are sorted using bins of 0.1 tons/a. All DUs outside the 90<sup>th</sup> percentile (> 7.7 tons/a) are summarized in an individual bin. Four DUs with invalid statements regarding their annual tonnage ( $\leq 0$  tons/a) were excluded.

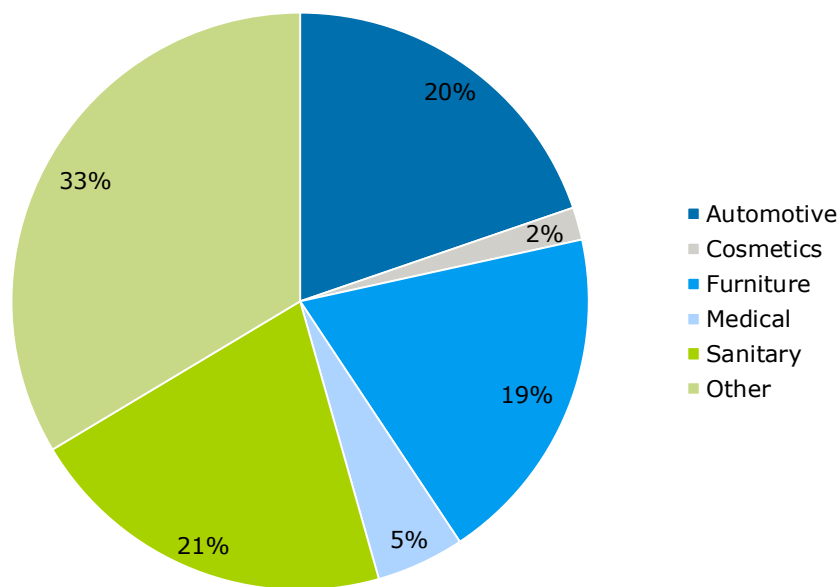
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<sup>11</sup> 1 DU reported a negative value

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As described in section 1.3, the DUs were asked to provide information about their associated market sectors (% of CrO<sub>3</sub>) from a list of six pre-determined sectors (Automotive, Cosmetics, Furniture, Medical, Sanitary and Other). The largest market sector was identified from the information provided on the tonnage/share of tonnage used. The answers of eight DUs were excluded as they did either not provide information on the largest market sector (n = 4) or the largest market sector was not identifiable as the market share was entered as "0" (n = 4). In case of same-sized market sectors, all those with the same and largest sizes were included in the assessment. From the identified largest market sectors (n = 932), the sector "Other" was the largest sector in 34 % of all cases. The sectors "Furniture", "Automotive" and "Sanitary" were chosen with a comparable frequency (19 to 21 %, respectively). The sectors "Medical" (5 %) and "Cosmetics" (2 %) were less abundantly identified as the largest market sectors. Please note that the distribution of market sectors shown here does not necessarily reflect the actual situation in terms of production volume or revenue created. This is because the largest market sectors in this survey were identified from the tonnage/share of tonnage of CrO<sub>3</sub> used by the DUs; the results here are thus only a representation of the primary field of work of the participating DUs. It should also be considered that the analysis is based on the available data provided by the survey participants and certain areas might be underrepresented due to individual applications for authorisation (e.g., by automotive platers and sanitary ware manufacturers which are generally larger organisations). The data are graphically presented in **Figure 4**. A non-exhaustive list of product groups and end-applications manufactured by the participating DUs is provided in **ANNEX III**.



**Figure 4: Primary field of work of the participating DUs based on the largest market sectors identified**

The figure shows the distribution of the largest market sectors of the participating DUs. For each DU, the largest market sector was identified from the information provided on the tonnage/share of tonnage used. The sectors "Automotive", "Furniture" and "Sanitary" make up 2/3 of the analyzed market. In approximately a third of all cases, the DUs could not identify their market sectors within the pre-determined options and therefore chose "Other". In fewer cases, the sectors "Medical" or "Cosmetics" were chosen. In the case of same-sized market sectors, all same-sized and largest sectors were counted. The total number of identified largest market sectors was 932. Please note that this distribution does not represent the actual size of the different sectors but rather highlights the primary field of work of the participants.

## SUBSTITUTION PLAN

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In addition to the largest market sectors, an analysis of the summed tonnage used by each market sector was performed. For this, all reported market sectors were counted, and the analysis was not restricted to the largest market sector identified. The analysis needs to be contemplated with care though because of the statistical restrictions that had to be applied to the dataset. The reasons are described in the following.

DUs were asked to provide information on the percentage share of the tonnage of CrO<sub>3</sub> for each market sector. However, as the format of the values was not inherently restricted by the survey, a range of DUs clearly reported values in the units of kg or tons. This subsequently caused that it could not be universally distinguished between DUs that intentionally reported a sum of shares below 100 % (e.g., companies which might have wanted to suggest that they did not exclusively use all of their total tonnage of CrO<sub>3</sub> in the market sectors asked for "Use 3") and those that reported their shares in the units kg or tons. To avoid misinterpretation of results, the dataset was restricted to DUs which reported a sum of shares per market sectors equal to 100 %. The individually reported shares (%) were then integrated with the reported total annual tonnage to calculate tonnage values for each market sector. In case the same market sector was reported several times by one DU, the tonnage for this market sector was summed.

Moreover, to avoid overestimation of individual sectors, the market sector tonnages were only calculated for all values within the 90<sup>th</sup> percentile of the total annual tonnage. Under these premises, still 660 DUs were analyzed (**Table 2**). The summed tonnage used was largest for the market sector "Sanitary" with a sum of 206 tons CrO<sub>3</sub>. Only slightly smaller is the consumption in the sector "Other" (198 tons), while a similar consumption was found for the sectors "Automotive" and "Furniture" (120 tons each). Considerably smaller values were deduced for the sectors "Medical" (19 tons) and "Cosmetics" (15 tons). While the order of results highlights the smaller extent of the sectors "Medical" and "Cosmetics", the results for the other sectors are surprising. In correspondence with the industry, it was expected that the "Automotive" sector would come out as the largest sector. However, by restriction of the dataset to DUs with an annual tonnage within the 90<sup>th</sup> percentile, the data may be biased.

To test if this might be the case, the data were also analyzed when restricted to all DUs within the 95<sup>th</sup> percentile of the annual tonnage (19.7 tons, 701 DUs). When doing so, a shift is observed, and the automotive sector can be identified as the market sector consuming the highest tonnage of CrO<sub>3</sub>. Also, the annual consumption within the sectors "Sanitary" and "Other" is increased by ~ 100 tons each.

Please note again that, because of the uncertainty of this specific data, these specific results should be treated with care.

**Table 2: Summed tonnage of each market sector**

	Annual consumption of CrO <sub>3</sub> per sector (tons)	
	90 <sup>th</sup> percentile <sup>1)</sup>	95 <sup>th</sup> percentile <sup>1)</sup>
Automotive	120	357
Cosmetics	15	50
Furniture	120	128
Medical	19	25
Other	198	282
Sanitary	206	316

<sup>1)</sup> Dataset restricted to DUs with an annual tonnage within the 90<sup>th</sup> and 95<sup>th</sup> percentile, respectively

### 2.3 Sub-uses performed by the DUs

The DUs were asked to provide information on the sub-uses they perform. As described earlier, the DUs could choose from four sub-uses which are referred to as sub-use 1 to 4 in the following:

1. Functional chrome plating with decorative character of plastic substrates (sub-use 1)
2. Functional chrome plating with decorative character of metal substrates (sub-use 2)
3. Pre-treatment (etching) of plastic substrates (sub-use 3)
4. Pre-treatment (etching) of metal substrates (sub-use 4)

The DUs were able to choose up to four of the sub-uses, and 848 DUs provided information regarded as valid. Three DUs were generally excluded from this analysis as no share (= 0) was allocated to either sub-use reported and therefore no conclusion on the validity of the answer could be made.

The largest proportion (84.4 %) of DUs performed "Functional chrome plating with decorative character of metal substrates" as their only field of work (**Table 3**). The second largest reported fraction was a combination of the sub-uses "Functional chrome plating with decorative character of plastic substrates" as well as "Pre-treatment (etching) of plastic substrates (8.1 %). 12 DUs reported to perform only "Pre-treatment (etching)" sub-uses (Use 3, Use 4). Those few cases may reflect both very specific situations at the sites of DUs or a misapprehension of the survey; as the total proportion of cases is only 1.4 % of the total sample they may be considered as less relevant to describe the sample. A

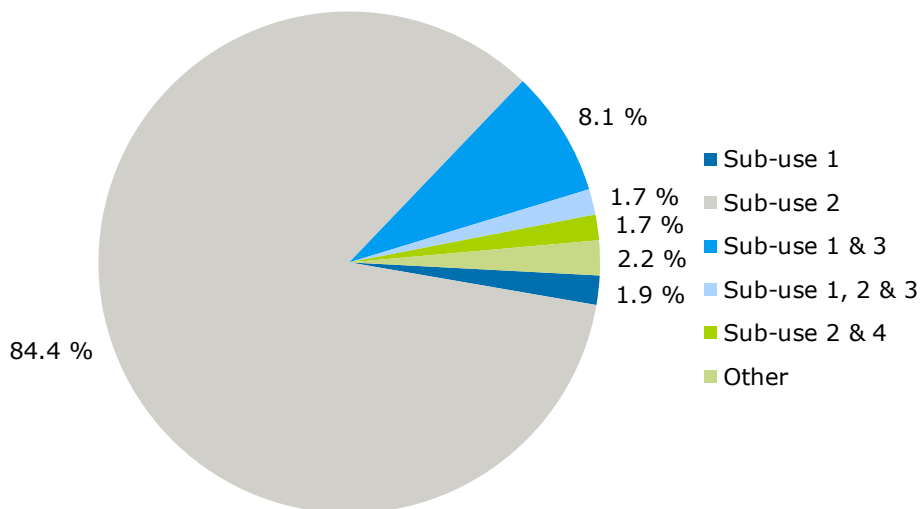
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graphical presentation is provided in **Figure 5**. In this, all sub-uses and sub-use combinations < 1 % are summarized as "Other" for visual clarity.

**Table 3: Sub-uses and combinations of sub-uses performed by the DUs**

Sub-uses performed <sup>1)</sup>	Responses	
	n	%
Sub-use 1	16	1.9
Sub-use 2	716	84.4
Sub-use 3	7	0.8
Sub-use 4	5	0.6
Sub-use 1 & 2	3	0.4
Sub-use 1 & 3	69	8.1
Sub-use 1 & 4	0	0.0
Sub-use 1, 2 & 3	14	1.7
Sub-use 1, 2 & 4	3	0.4
Sub-use 1, 3 & 4	0	0.0
Sub-use 1, 2, 3 & 4	1	0.1
Sub-use 2 & 3	0	0.0
Sub-use 2 & 4	14	1.7
Sub-use 2, 3 & 4	0	0.0
Sub-use 3 & 4	0	0.0
Sum	848	100.0

<sup>1)</sup> **Sub-use 1** refers to "Functional chrome plating with decorative character of plastic substrates", **Sub-use 2** to "Functional chrome plating with decorative character of metal substrates", **Sub-use 3** to "Pre-treatment (etching) of plastic substrates" and **Sub-use 4** to "Pre-treatment (etching) of metal substrates".



**Figure 5: Distribution of processes performed by the participating DUs**

The DUs could select more than one answer on the sub-uses performed and therefore a range of combinations of the sub-uses was possible. The combinations are listed in the graph above for 848 DUs. Three DUs did not report a corresponding share to any of the reported sub-uses and were thus excluded from this analysis. The large majority of DUs (84.4%) reported to perform solely "Functional chrome plating with decorative character of metal substrates" (Use 1). The second largest fraction of DUs (8.1 %) reported to perform "Functional chrome plating with decorative character of plastic substrates" (Use 1) in combination with "Pre-treatment (etching) of plastic substrates" (Use 3).

### 3. FACTORS AFFECTING SUBSTITUTION – SURVEY FEEDBACK FROM DUS

In this section, the most important factors affecting the substitution of chromium trioxide and the corresponding substitution timeline are described based on the data set obtained from the survey. The factors/limitations/obstacles are presented for the sub-uses "Functional chrome plating with decorative character" and "Pre-treatment (etching)" separately, but no further breakdown into substrates and/or market sectors was considered due to the high similarity of the DUs' responses. There are of course several substrate- product- and/or market sector-specific issues which currently limit the applicability of alternatives, but the most important factors impacting substitution and its timeline are more high-level and of a general nature (*i.e.* not related to a specific market sector or substrate).

Therefore, we have highlighted the most important factors on a high-level or general basis, but with sufficient detail to cover the entire data set of responses, *i.e.* the differences, difficulties and concerns of 851 DUs. To identify the most important factors, a sample of 164 responses was checked manually, and factors were reviewed, listed and grouped. This sample was created by screening the entire data set of 851 questionnaires for high-quality information regarding substitution efforts and challenges.

The factors/limitations/obstacles described below reflect the DUs' statements regarding applicability of alternatives. However, these accord well with the information independently provided by formulators (see section 1.2).

Section 3.1 and 3.2 do not show a quantitative linkage between factors/limitations/obstacles to substitution and substitution timelines/delays. Section 4 provides detailed information on use and market sector specific substitution timelines.

#### 3.1 Functional chrome plating with decorative character – DU perspectives on challenges to overcome on the way to substitution

The factors/limitations/obstacles mentioned below relate only to CrIII-based alternatives. This is in good accordance with Figure 6, which shows that most DUs consider CrIII-based technologies the most promising alternative for substitution of chromium trioxide.

##### No "drop-in" alternative

DUs stated that still the biggest and far-reaching limitation for substitution is that there is no drop-in alternative to chromium trioxide available which can be applied using identical process equipment, identical wastewater treatment systems and which allows manageable process control (*e.g.*, bath analytics) on a commercial scale.

Indeed, while the commercially available CrIII-based alternatives basically follow the same process principle (*i.e.* electroplating based on the principle of electrolysis), they need completely different process equipment and wastewater treatment systems. Furthermore, process control and process stability are more complex<sup>12</sup> than chromium trioxide technology and require additional equipment (*e.g.*, atom adsorption spectrometry) and/or support from external experts (*e.g.*, formulators). In addition, for DUs, the CrVI-based technology still has the advantage of being capable to treat a larger scope of substrates (*e.g.*, different metal or plastic compositions), components, component geometries, etc. while keeping process control low. This consideration is relevant as most DUs do manufacture many different products made from different substrates and geometries. For these DUs, the alternative process selected and implemented must be suitable to cover their product portfolio to allow to continue profitable business.

##### Technical challenges

###### *Surface property uncertainties*

The technical surface performance requirements (*e.g.*, wear, corrosion and chemical resistance, etc.) of products need to be tested under serial conditions to prove technical maturity. DUs stated that challenges to meet these serial approval requirements are the main driver for extended substitution timelines. This is further complicated as different OEMs from the same market sector (*e.g.*, automotive) have different approval processes and requirements. This affects alternative development timelines, as the complete switch to an alternative technology by a DU is only possible once all (indispensable) customers have accepted the change (*i.e.* products are in compliance with their individual technical test requirements) and maintain their business relationship. In other words, for most DUs, one alternative process must be suitable to fit all customers (also from other market sectors) in order to be considered an economically feasible change.

In the current highly competitive EU market, there is no trend or requirement for standardization among OEMs concerning decorative criteria (surface appearance/color, haptics, etc.). Indeed, CrIII-based technology (in combination

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<sup>12</sup> CrIII-based electrolytes have narrow operating window regarding chemical composition, concentration of chemicals, additives, pH level, etc. In addition, CrIII-based electrolyte are very sensitive to impurities carried over from previous processes.



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with a specific CrIII-based electrolyte) is capable to deliver a broad range of different surface appearances and colors (white to dark). While this represents a business opportunity for DUs (e.g., entering new market and customers) on the one hand, on the other hand it also presents challenges for existing contracts as the switch to a specific CrIII-based formulation results in a specific optical appearance that differs from the previously agreed specification. DUs need to decide very carefully and in close collaboration with their different customers if, and when they can perform the switch together.

### *Process-related challenges*

DUs stated that the process control for CrIII-based plating baths is complex as many variables (CrIII concentration, pH level, concentration of additives, etc.) need to be monitored exactly on commercial scale production to enable constant product quality. As CrIII-based bath chemistries are very sensitive to contaminants and, therefore, have a very narrow process window, flawless process monitoring is crucial to deliver constant product quality. Slight variations in the chemical bath composition (e.g., cross contamination from previous nickel treatment) already cause color differences between production batches. This causes an increased scrap rate and thus higher costs per part. Increased process monitoring is required, which can be solved with support from technical experts (e.g., formulators), but requires additional time, cost and expertise to master.

### *Process implementation challenges*

DUs stated that the transfer of technology from CrVI → CrIII involves substantial and costly reconstruction of their plants as the CrIII technology has significant higher space requirements (CrIII plating lines are 10 to 15 m longer). Therefore, additional space needs to be created at the sites (if possible), entailing plant modification (e.g., additional buildings) and additional regulatory approvals, often including an environmental impact assessment. These challenges are aggravated by the fact that the CrVI-based process needs to run in parallel during the transition period, i.e. phase out of CrVI-based serial production parts and ramp-up of serial production parts manufactured with the alternative.

Additionally, the DUs stated that the wastewater treatment systems need to be completely updated as the chemicals involved in the CrIII formulation require significantly more complex technologies (e.g., wastewater evaporation, UV / peroxide treatment systems, etc.) to be reduced to levels which comply with respective national waste water discharge limits.

### **Economic challenges**

DUs stated that their biggest concern regarding technology transfer from CrVI to CrIII is competitiveness against EU-based companies with granted authorisations for continued use of chromium trioxide, often for 12 years, and non-EU companies which are able use chromium trioxide today and in the future. The reason behind is that market prices for CrIII-based products are between 15-30 % higher due to higher production & running costs (wear parts (e.g., anodes), process chemicals, process control, process time (approx. 3x higher resulting in lower production output and higher energy consumption)<sup>13</sup>. However, the increased overall production costs cannot be passed on to the customers. Customers are not willing to accept additional costs caused by regulatory requirements affecting certain suppliers, as long as cheaper alternatives, i.e. parts from other EU suppliers with an authorisation or non-EU suppliers<sup>14</sup> exist.

The technology transfer from CrVI to CrIII requires significant investments to be made by the DUs. Per plating line (without etching) approximately 1-2 mio € need to be calculated for the equipment change only. This does not include DU-specific costs for plant modifications (e.g., new buildings, wastewater system, etc.) and costs related to compliance requirements according to national regulations.

### **Customer-related challenges**

As indicated above, the usage of a specific CrIII-based formulation results in specific surface properties, especially regarding optical appearance (e.g., color). Thus, it is very challenging for DUs to switch to a specific CrIII formulation when supplying different customers having different color specifications for their parts. Vice versa, customers purchasing parts from multiple suppliers potentially demand identical surface properties from their chrome-related supply chain.

Concluding, for DUs supplying multiple customers, the switch to a specific CrIII-formulation carries a significant risk to lose customers due to non-compliance with their part specifications. Customers can easily switch to non-EU suppliers in case EU suppliers are struggling to meet their requirements due to the substitution process.

The situation is further complicated as customers do not allow their supplier to change the plating system in active serial productions if this presents a risk to product approval (e.g., absence of tests proving lifetime requirement of

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<sup>13</sup> Note: Investments for plant reconstruction, equipment, regulatory compliance, etc. are not included;

<sup>14</sup> Note: No hazard arises from metallic chrome coating deposited from Cr(VI)-based electrolytes and therefore chrome plated articles from non-EU are allowed to be imported into the EU

product/surface). If DUs would perform a change for the serial production, *i.e.* change of the plating system, they would need to perform the product approval at their own cost, which is not economically feasible for any active serial production. In other words, DUs must phase out the CrVI-based serial productions for which contracts have been signed (before the plating system can be changed). For the phase out, sufficient time is required.

### Compliance and regulatory challenges

As indicated above, the switch to the CrIII-based technology requires massive plant reconstruction for which additional space is needed. According to national environmental legislation, additional space requirements could require a time-consuming environmental impact assessment before the actual plant modification is possible.

An additional regulatory aspect is that there is currently a high uncertainty concerning the effectiveness of the treatment of the wastewater resulting from the CrIII-based technologies. DUs stated that the issue of potential chemical cross reactions is not resolved. This is especially aggravated by the complexity of CrIII-based formulations, the availability of different formulations from different formulators and the resulting lack of experience from serial production.

### 3.2 Pre-treatment (etching) – challenges to overcome on the way forward to substitution

Please note that the factors/limitations/obstacles mentioned below are not related to a specific alternative but cover the general limitations for the alternatives shown in **Figure 22** and **Figure 23**. Furthermore, the limitations/factors/obstacles stated by DUs are very specific for the "Pre-treatment (etching) of plastic substrates". However, this is in good accordance as only a very small number of the 851 DUs performs etching of metal substrates.

#### No "drop in" alternative

DUs stated that for the "Pre-treatment (etching)", no drop-in alternative is available on the market that can be applied using the CrVI technology, *i.e.* process equipment, wastewater treatment system, etc. This is aggravated by the fact that a CrVI-free formulation is specific to the formulator producing the mixture, highly complex in its composition and therefore requires the alternative etch process to be specifically adjusted. For DUs this is highly restrictive regarding the choice of formulators (→ high dependency) and especially critical regarding the actual switch of technology as investments for equipment, wastewater treatment system, new buildings, etc.) are made for **one** specific formulation (→ not "simply" possible to switch to another formulator on a commercial scale as series production equipment is specifically built and adjusted for **one** formulation). In other words, the "chosen" alternative technology must not fail on a commercial scale as investments for repeated technology changes are simply not possible.

Concluding, the change to an alternative technology to CrVI-based etching is a challenging and long-lasting process for the DUs affected. DUs need to be absolutely sure about the success of the **one** technology they are going for as additional investments are in most cases not possible, especially for small and medium sized companies. In addition to that, DUs are not formulators themselves and therefore are highly dependent on the technologies appearing on the market.

#### Technical challenges

DUs stated that the commercially available alternatives still show deficiencies compared to the CrVI-based etching technology *e.g.*:

- adhesion of PoP<sup>15</sup> layer to base material is only sufficient for minority of parts (certain chemical compositions of plastic substrates, certain component geometries, etc.) manufactured by DUs → alternative etching process currently not yet applicable in series production where one process must fit all parts to be manufactured; it is not possible for DUs to implement multiple variants of alternative etching process to cover the entire product portfolio due to technical (*e.g.*, complexity of process alignment between CrVI-free "etching" and "plating", space requirements, etc.) and economic reasons (*e.g.*, plant reconstruction, running costs, etc.);
- application of selective chrome coating on two or more component plastics only partly possible on parts etched with alternative process → product portfolio of companies performing PoP includes various plastics substrates and thus etching alternative need to be developed further to be suitable for all parts to be manufactured;
- lifetime requirements for product/surface are currently lower compared to parts etched with CrVI-based process (*e.g.*, chrome coatings applied on parts etched with CrVI-free process are not resistant to temperature/climate changes);

Additionally, DUs stated that the additional space required for the implementation of an alternative "Pre-treatment (etching)" in parallel to an alternative plating processes is challenging as the "old" CrVI-based process variant needs to

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<sup>15</sup> Plating on Plastics (PoP) consists of the deposition of a metal multilayer system on a non-conductive surface.

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be run in parallel as long as the "last" series production of CrVI-based parts is finished (note: DUs have contractual supply obligations with their customers). DUs simply do not have enough free space at their production plants to perform parallel implementation of two alternative processes (*i.e.* etching and plating) and therefore envisage a staggered approach (→ first implementation of alternative plating process → transition to 100 % alternative plating → deconstruction of "old" CrVI-based plating process → start implementation of alternative etching process → time required for 100 % transition to alternative etching process (*i.e.* 100 % CrVI free overall plating process)).

### **Economic challenges**

As indicated in the paragraph above, the switch of technology (*i.e.* transition from "old" CrVI-based etching to "new" alternative etching) and the corresponding phase out of the CrVI-based technology would require both processes to be run in parallel for a certain amount of time (→ transition period). For DUs it is economically challenging to have two commercial etching processes (*i.e.* CrVI-based and CrVI-free) implemented in parallel. Therefore, the implementation must be performed with extraordinary care to reduce risk of technical failure on a commercial scale.

Besides these risks, there are additional economic risks which are caused by higher prices for the alternative formulations (estimation based on current prices for commercial alternatives) which lead to higher process costs (→ 50-100 % higher compared to CrVI-based etching process) for "Pre-treatment (etching)" only which in turn impacts the price of the end product. This has negative impacts on the DUs' competitiveness (as already indicated under section **3.1**). Higher production costs and thus higher prices for end products carry a risk for DUs to lose business if their customers are not willing to accept these. This is aggravated by the constant availability of CrVI-plated products from non-EU countries (or for a limited period of time from EU-based companies with granted authorisations to use chromium trioxide). In this respect, customers have an additional advantage when they continue to purchase CrVI-plated products, as absolutely no quality changes (*e.g.*, color, haptics, etc.) need to be accepted nor do any expensive approval processes need to be carried out.

Finally, bigger DUs stated that relocation to non-EU countries is definitely a valid option for them, as overall this would result in lower re-qualification cost (*i.e.* re-qualification of alternative process, re-qualification of wastewater treatment system, re-qualification of final product, etc.) compared to the change to the CrVI-free process. However, it can be assumed that many smaller DUs will not survive the change, as relocation is economically not possible and the availability of low priced CrVI-plated products (either from EU suppliers with granted authorisations or non-EU suppliers) endangers their competitiveness.

### **Customer-related challenges**

As indicated in section **3.1**, DUs have multiple contractual delivery obligations based on the agreed technology. Customers do not allow their supplier to change the overall plating system in active serial productions since this could have substantial implications for product quality and approval, with substantial repercussions. If DUs were to perform such a change in an active serial production, they would need to perform the required product approval (*e.g.*, tests for lifetime requirements: wear, corrosion and chemical resistance under serial conditions) by themselves, which is economically not possible. Customers are not incentivized to risk a "pre-mature" change to an alternative etching process. They will only change if there is proof for identical serial product quality and track record of reliable performance over time (→ customers will choose less risky and less expensive solution as long as the option remains (*i.e.* source parts from authorized EU suppliers or non-EU suppliers)).

Concluding, sufficient time is required to allow industry to continue to build a set of performance data that demonstrates reliability of alternative etching processes and enables reduction of costs to meet customer requirements. Under these premises DUs are able to phase out their "last" CrVI-based serial production (*i.e.* staggered approach for implementation of CrVI-free plating and CrVI-free etching process) while complying with contractual arrangements by being able to continue CrVI-based etching.

### **Compliance and regulatory challenges**

As already indicated in "technical challenges", the switch to an alternative etching technology requires massive plant reconstruction for which additional space is needed. According to national environmental legislation, additional space requirements could require a time-consuming environmental impact assessment before the actual plant modification is possible.

## 4. SUBSTITUTION OF CHROMIUM TRIOXIDE – ALTERNATIVES AND TIMELINES

### 4.1 Introduction and data analysis

The following section is separated into a section for the sub-uses "Functional chrome-plating with decorative character" (section 4.2) and "Pre-treatment (etching)" (section 4.2). Each sub-section is divided into three main parts.

In the first part (section 4.2.1 and 4.3.1, respectively), information on sub-use specific alternatives to CrO<sub>3</sub> as disclosed during the survey are described. As stated in section 1.3, the survey was initiated prior to the introduction of the SAGA concept, and DUs were able to state that no alternative was generally available. In this case, the DUs were asked to define the reasons/limitations to justify their answer. The data are presented separately for the sub-uses "Functional chrome plating with decorative character of plastic/metal substrates" and "Pre-treatment (etching) of plastic/metal substrates". As DUs were able to select more than one sub-use, selected sub-uses were only considered if an annual tonnage > 0 was entered. Moreover, based on their choices of alternatives available for the sub-uses "Functional chrome plating with decorative character of plastic/metal substrates", the DUs were asked if the sub-use "Pre-treatment (etching) of plastic/metal substrates" was still relevant (if one of it was selected in combination with the "plating"-sub-uses). Dependent on the answer, the section on "Pre-treatment (etching) of plastic/metal substrates" was either presented or excluded from the survey and not considered in the evaluation.

In the second part, information on the substitution process are presented (section 4.2.2 and 4.3.2, respectively). In these sections, the DUs were asked to provide information on their general agreement to the proposed timelines until substitution (30<sup>th</sup> of June 2023 / 31<sup>st</sup> of December 2020) as well as evaluate the status ("Not started", "In progress", "Completed") of their substitution efforts. These data were analysed on the level of sub-use, applying the same restrictions on data as described above, and also feature information of the DUs' largest market sector.

In the third part (sections 4.2.3 and 4.3.3, respectively), we discuss the estimated time to completion for each of the four prescribed phases ("Early stage R&D / testing of candidate alternatives"; "Qualification of preferred candidate alternative(s)"; "Commercialization / Industrialization of qualified alternative"; "Phase-out of CrVI / ramp-up of production to 100 % alternative"). In contrast to the analysis of alternatives, the data were not only evaluated per sub-use but also per market sector. DUs not providing information on a largest market sector were excluded. The relevance of the sub-uses "Pre-treatment (etching) of plastic/metal substrates" was identified as mentioned above. Importantly, the data were also evaluated separately for DUs that were or were not in agreement with the provided dates of substitution (30<sup>th</sup> of June 2023 / 31<sup>st</sup> of December 2020) to clearly distinguish the complexity of the different views on the time necessary. In cases where an insufficient number ( $n \leq 5$ ) of responses was identified for a sub-set, the data were not evaluated in further detail to avoid an artificial and incorrect indication of accuracy. The overall agreement rates are presented at the beginning of each market sector sub-section.

The DUs' responses on the estimated time to completion of the four phases were evaluated as the average of all values incorporated within the 90<sup>th</sup> percentile of the dataset. Values were disregarded when they were considered not fit for evaluation. This was the case when data were entered with a value of "0", or the value's format clearly deviated from the requested format in months (e.g., "2030"). For reasons of visualization, the values are presented graphically for each market sector and separated for DUs in agreement/not in agreement with the proposed timelines (30<sup>th</sup> of June 2023 / 31<sup>st</sup> of December 2020).

With a view to keeping the survey as simple and clearly structured as possible, the survey only asked DUs to indicate the timeline to complete each (remaining) phase to successful substitution; it did not request an overall timeline. The dataset shows that DUs have different schedules and/or approaches to the request, with some describing the duration of the phases following a staggered approach in which the estimated lengths until completion were entered sequentially and others starting the phases of substitution<sup>16</sup> in parallel.

For example, any DU might have entered for the first phase ("Early stage R&D / testing of candidate alternatives") a time of 6 months, for the second phase ("Qualification of preferred candidate alternative(s)") a time of 12 months, for the third phase ("Commercialization / Industrialization of qualified alternative") a time of 24 months and for the fourth phase ("Phase-out of CrVI / ramp-up of production to 100 % alternative" a time of 48 months until completion. Assuming the DU followed a parallel approach (i.e., that all phases started in parallel) the total time until completion would be 48 months. On the other hand, assuming that the DU described a staggered approach (i.e. a phase would only start after completion of the preceding phase), the time until substitution would be calculated as the sum of all phases (90 months).

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<sup>16</sup> Please note that the substitution process needs to be performed separately for plating and etching sub-uses.

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This means that a process of substitution, in which all phases were exclusively initiated in parallel, would take exactly as long as the estimated time needed to complete the "Phase-out of CrVI / ramp-up of production to 100 % alternative" (average of the data within the 90<sup>th</sup> percentile). The resulting value is the lower threshold of the estimated time needed until completion, and most probably marks an underestimation of the actual time needed as it would neglect the possibility that the DUs were entering the data following a staggered approach and hence result in implausibly short time frames until completion of the substitution process. When assuming a completely staggered approach on the other hand, the sum of the time needed to complete each phase (average of the data within the 90<sup>th</sup> percentile) would likely overestimate the actual time needed based on the data submitted as it would fall short of the DUs that followed a parallel substitution process in the survey.

Hence, differences in the approach to substitution or in the approach to responding to the question confounded this analysis. To nonetheless determine a more general and realistic estimate on the time needed until substitution, it was recognized that some degree of overlap between the different phases of sequential substitution might also be possible. To consider this, the data of the DUs that agreed with the timeline of 30<sup>th</sup> of June 2023 were analyzed, following the assumption that these DUs would completely substitute in ~3.5 years from the time of data collection (May 2020). When considering results of DUs that appeared to have entered the estimated time to completion based on a sequential or staggered approach (*i.e.* the sum of all phases), it was found that the sum of the periods entered exceeded the duration of 3.5 years by a factor of ~2. This might be suggestive of overlap between the phases by as much as ~ 50 % in at least some of these cases; however, further information from each DU would be required to confirm this.

The results of all approaches – parallel, sequential/staggered and, indeed, overlapping – are presented in unison in each sub-section, where possible according to the sample sizes.

## 4.2 Functional chrome plating with decorative character of plastic/metal substrates

### 4.2.1 Alternatives and limitations

The DUs were asked to define their preferred alternatives for the sub-uses "Functional chrome plating with decorative character of plastic substrates" and "Functional chrome plating with decorative character of metal substrates". For each sub-use, they could choose from five pre-determined options. Multiple choices were possible, unless DUs responded that there was no alternative generally available:

1. Chromium(III) sulphate-based electrolytes
2. Chromium(III) chloride-based electrolytes
3. Physical Vapor Deposition (PVD)
4. Other
5. No alternative generally available

Because of the structure of the survey, the opinion on the general availability of an alternative is presented at first. The DUs were asked for the availability or non-availability of an alternative. The rate for the option "availability of alternatives" has been calculated as the percental difference to a total of 100 %.

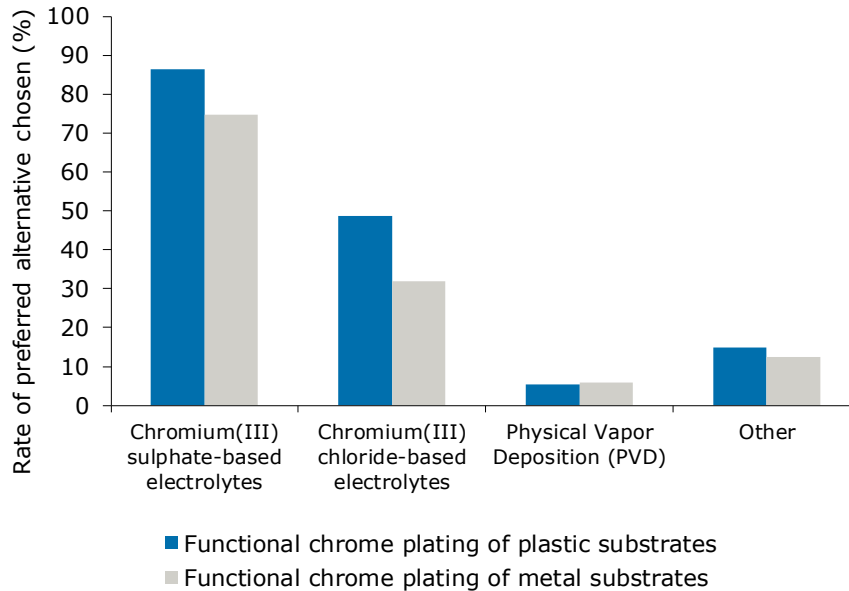
Based on the answers, there is a difference between the "Plating" sub-uses. While only 30 % of the DUs employed with "Functional chrome plating with decorative character of plastic substrates" were of the opinion that no alternative was generally available, a proportion of 50 % was in favour of this view in the group of DUs performing "Functional chrome plating with decorative character of metal substrates". The results are summarized in **Table 4**.

**Table 4: View of the DUs on the general availability of alternatives**

		Functional chrome plating with decorative character of	
		Plastic substrates	Metal substrates
Alternative available	n	74	375
	%	70	50
No alternative generally available	n	32	376
	%	30	50

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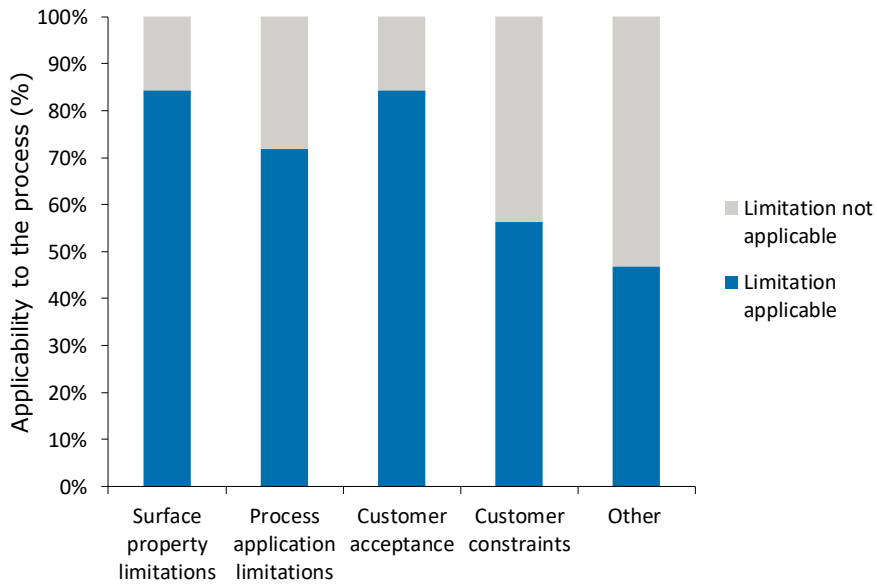
When examining the alternatives chosen by those DUs stating that an alternative was generally available (70 % and 50 % of the groups, respectively), it was revealed that the DUs preferentially chose Chromium(III) sulphate-based and Chromium(III) chloride-based electrolytes as an alternative for  $\text{CrO}_3$  in the sub-use of "Functional chrome plating with decorative character" (**Figure 6**). Those options were chosen with a frequency of 86 % for the "Plating" of plastic substrates and 75 % for the "Plating" of metal substrates. "Other" alternatives and Physical Vapor Deposition (PVD) were chosen less frequently for either sub-use (13 to 15 % and 5 to 6 %, respectively). The graphical presentation of the preferred alternatives was restricted to those DUs that supported the view an alternative was generally available.



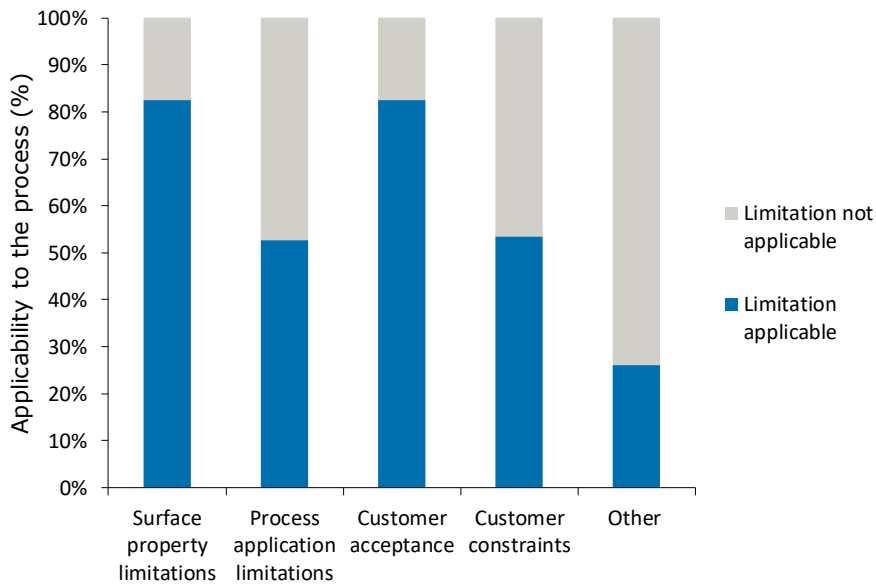
**Figure 6: Preferred alternatives of the DUs for the substitution of  $\text{CrO}_3$  in the sub-uses "Functional chrome plating with decorative character of plastic substrates" and "Functional chrome plating with decorative character of metal substrates"**

When asked for the limitations regarding the chosen option "No alternative generally available" in the sub-use "Functional chrome-plating with decorative character of plastic substrates", 84 % of the DUs found that surface property limitations and customer acceptance were restrictions applicable to their processes (**Figure 7**). 72 % of the DUs invoked that no suitable alternatives were generally available due to technical reasons ("process application limitations"). Consistently, 82 % of the DUs reported for the sub-use "Functional chrome-plating with decorative character of metal substrates" that surface property limitations and customer acceptance were restrictions applicable (**Figure 8**). However, the process application limitations were regarded as less applicable (53 %).

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**Figure 7: Limitations regarding "No alternative generally available" and their applicability to the DUs processes in the sub-use "Functional chrome plating with decorative character of plastic substrates"**



**Figure 8: Limitations regarding "No alternative generally available" and their applicability to the DUs processes in the sub-use "Functional chrome plating with decorative character of metal substrates"**

### 4.2.2 Level of agreement with suggested timelines and status of the substitution processes

The level of agreement with the proposed substitution timelines (30<sup>th</sup> of June 2023 for the market sectors "Automotive", "Furniture", "Medical", "Sanitary" and "Other" / 31<sup>st</sup> of December 2020 for the market sector "Cosmetics") was generally low.

Please note that the number of DUs performing a certain sub-use may differ from the number of the identified largest market sectors as multiple answers on the market sector were allowed and similar sized largest market sectors (e.g., two market sectors making up 50 % each of one DUs line of work) were included in the assessment. In the market sectors "Automotive", "Furniture", "Medical", "Sanitary" and "Other" of the sub-use "Functional chrome plating with decorative character of plastic substrates", an agreement of 25 % (n = 26 of n = 105 identified largest market sectors) to the 2023-timeline was reached. Similarly, in the market sector "Cosmetics" 29 % (n = 2 of n = 7 identified largest market sectors) agreed with the 2020-timeline.

DUs that were employed with "Functional chrome plating with decorative character of metal substrates" showed a slightly higher agreement within the market sectors "Automotive", "Furniture", "Medical", "Sanitary" and "Other" to the 2023-timeline (31 %; n = 255 of n = 813 identified largest market sectors) and an even agreement with the 2020-timeline (50 %; n = 1 of n = 2 identified largest market sectors). Please note the low sample size of the latter group though.

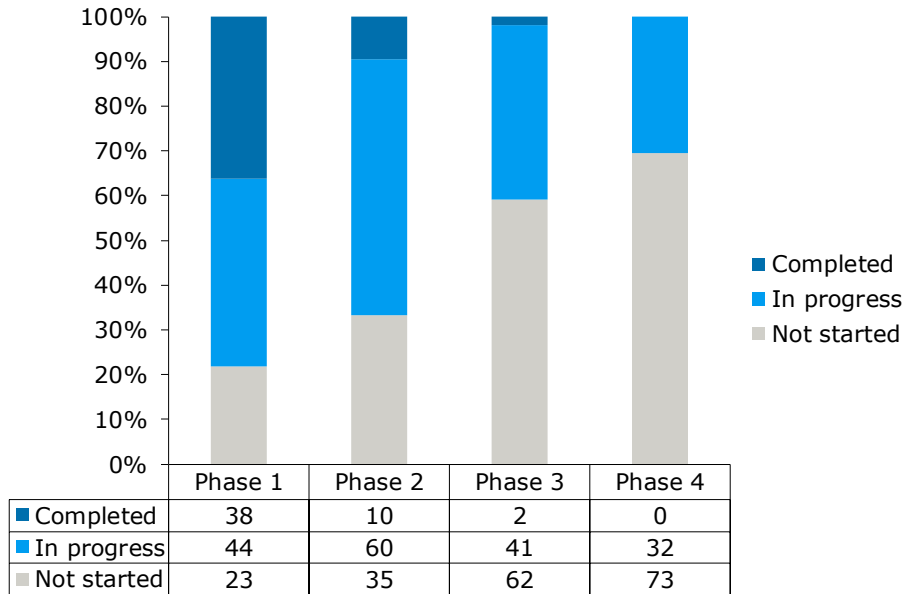
The DUs were also asked to assess the status of four predetermined substitution phases ("Early Stage R&D", "Qualification of preferred candidate alternative(s)", "Commercialization / Industrialization of qualified alternative", "Phase-out of CrVI / ramp-up of production to 100 % alternative") as "Not started", "In progress" or "Completed". The state of substitution is displayed separately for both timelines and sub-uses. The state of substitution for the sub-use "Functional chrome plating with decorative character of plastic substrates" is shown in **Figure 9** (market sectors with a proposed substitution until 30<sup>th</sup> of June 2023) and **Figure 10** (market sector with a proposed substitution until 31<sup>st</sup> of December 2020). The results for the other sub-use "Functional chrome plating with decorative character of metal substrates" are presented in **Figure 11** and **Figure 12**.

Similar trends can be observed for either sub-use or timeline: While more than 50 % of all DUs are in progress or have completed the "Early stage R&D", the proportion shifts when considering more elaborate stages of the substitution process. Consistently, only a small number of DUs reported to have completed the final phase 4 "Phase-out of CrVI / ramp-up of production to 100 % alternative" and this was restricted to the sub-use of "Functional chrome plating with decorative character of metal substrates". It has to be noted though that in this sub-use the sample size is considerably higher than in the other sub-uses.

In general, the data show that substitution efforts are incurred by the DUs and the substitution process is progressing. Especially regarding the "Early stage R&D", the majority of the DUs appears to have selected preferred processes and technologies for substitution.

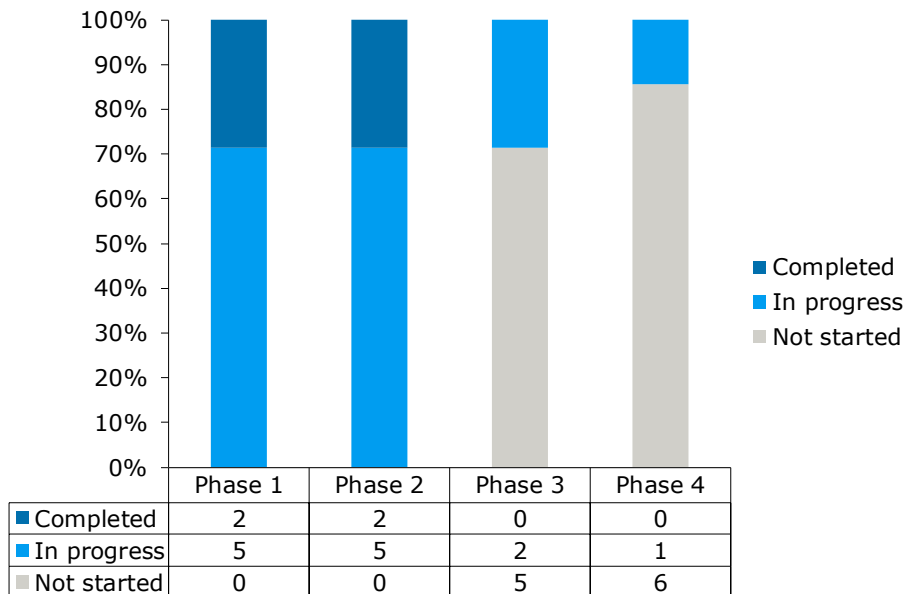


## SUBSTITUTION PLAN



**Figure 9: Status of the substitution phases (until 30th of June 2023) of DUs with the largest market sectors "Automotive", "Furniture", "Medical", "Sanitary" and "Other" performing "Functional chrome plating with decorative character of plastic substrates"**

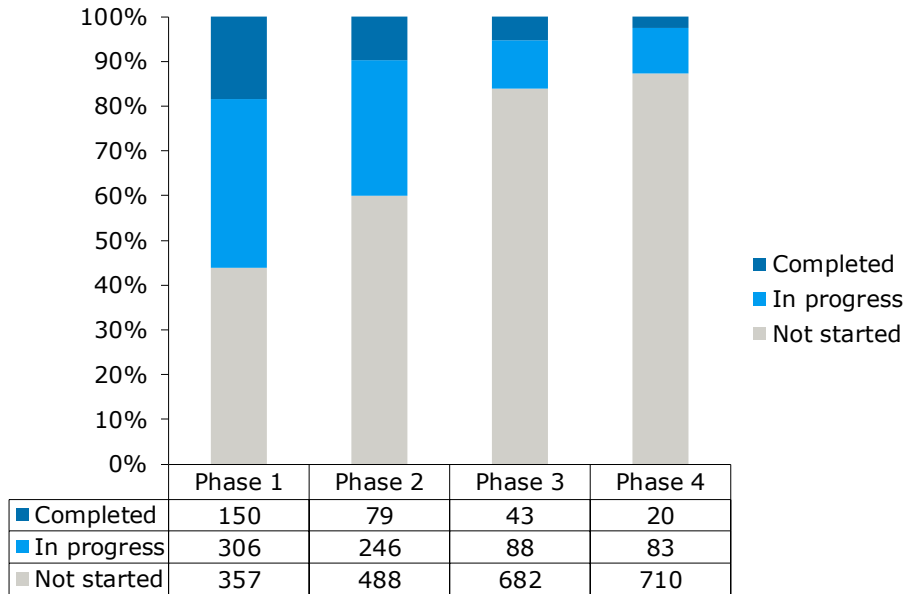
Phases 1 – 4 refer to the "Early Stage R&D", "Qualification of preferred candidate alternative(s)", "Commercialization / Industrialization of qualified alternative" & "Phase-out of CrVI / ramp-up of production to 100 % alternative"



**Figure 10: Status of the substitution phases (until 31st of December 2020) of DUs with the largest market sector "Cosmetics" performing "Functional chrome plating with decorative character of plastic substrates"**

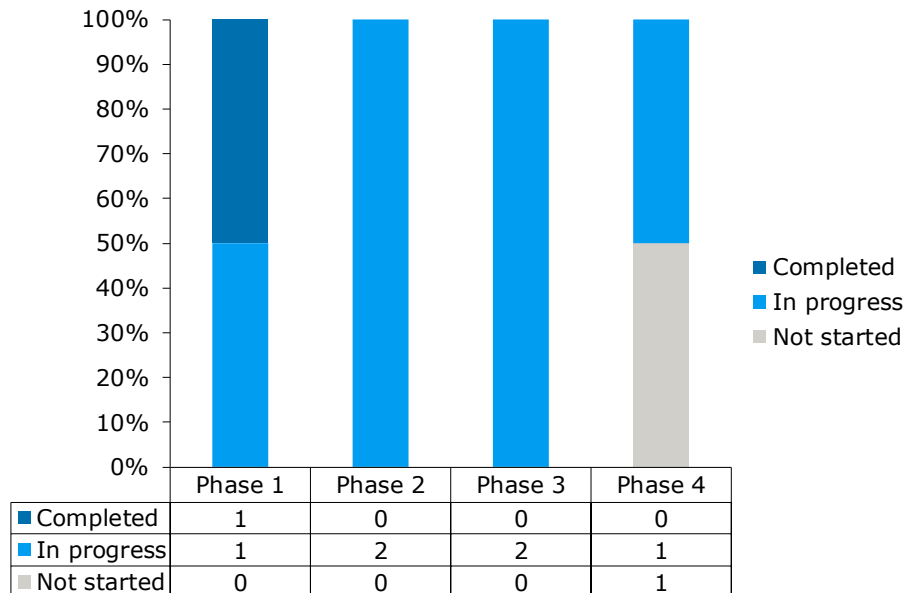
Phases 1 – 4 refer to the "Early Stage R&D", "Qualification of preferred candidate alternative(s)", "Commercialization / Industrialization of qualified alternative" & "Phase-out of CrVI / ramp-up of production to 100 % alternative".

## SUBSTITUTION PLAN



**Figure 11: Status of the substitution phases (until 30th of June 2023) of DUs with the largest market sectors "Automotive", "Furniture", "Medical", "Sanitary" and "Other" performing "Functional chrome plating with decorative character of metal substrates"**

Phases 1 – 4 refer to the "Early Stage R&D", "Qualification of preferred candidate alternative(s)", "Commercialization / Industrialization of qualified alternative" & "Phase-out of CrVI / ramp-up of production to 100 % alternative"



**Figure 12: Status of the substitution phases (until 31st of December 2020) of DUs with the largest market sector "Cosmetics" performing "Functional chrome plating with decorative character of metal substrates"**

Phases 1 – 4 refer to the "Early Stage R&D", "Qualification of preferred candidate alternative(s)", "Commercialization / Industrialization of qualified alternative" & "Phase-out of CrVI / ramp-up of production to 100 % alternative"

## SUBSTITUTION PLAN

### 4.2.3 Estimated Time Until Completion of Substitution

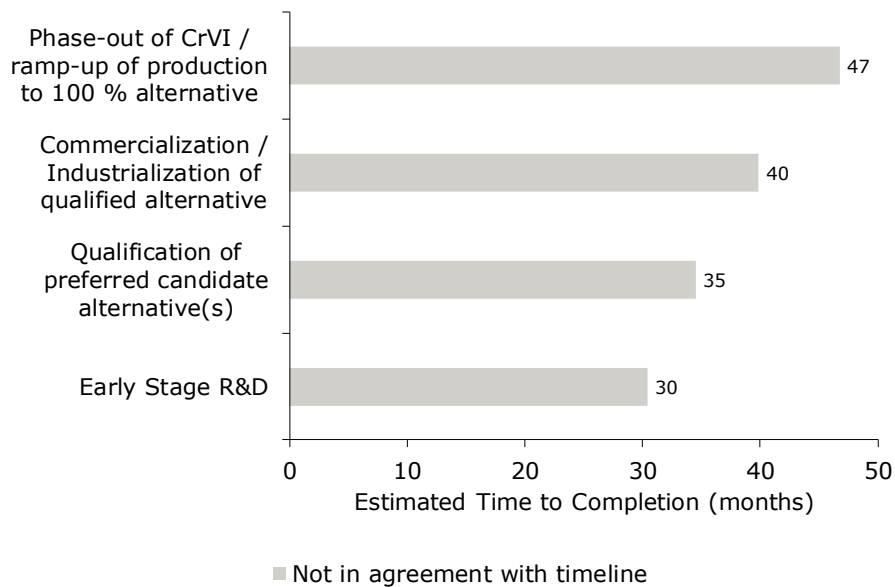
#### 4.2.3.1 Sanitary

Within the group of DUs, for which the sector "Sanitary" was identified as the largest market sector, the agreement rate to the timeline of substitution (30<sup>th</sup> of June 2023) was low and below 30 % for both sub-uses covered (**Table 5**).

**Table 5: Agreement with the timeline for substitution of CrO<sub>3</sub> in the sub-uses "Functional chrome plating with decorative character of plastic substrates" and "Functional chrome plating with decorative character of metal substrates" by DUs with the largest market sector "Sanitary"**

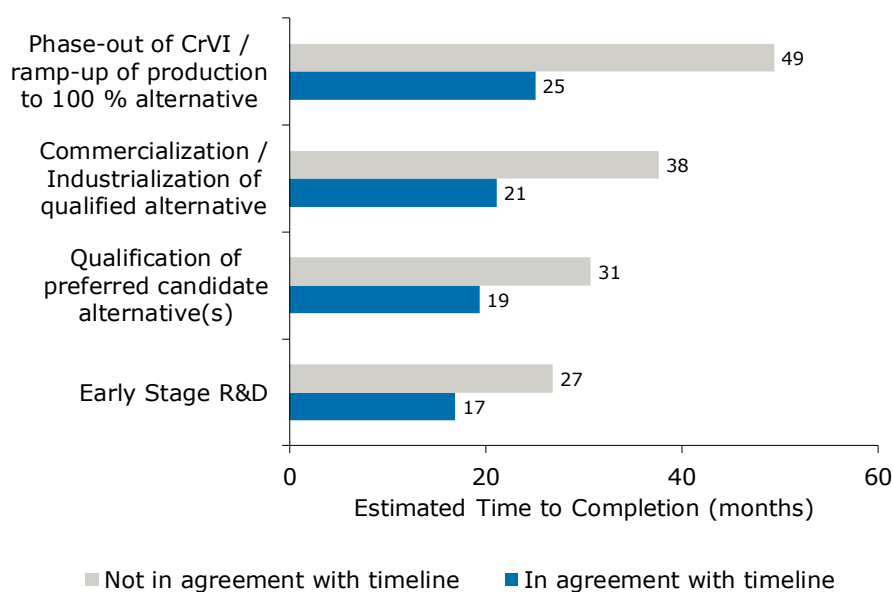
	Functional chrome plating with decorative character of	
	Plastic substrates	Metal substrates
Agree (n)	4	48
Disagree (n)	19	129
Agreement (%)	17	27

The estimated average time (of the 90<sup>th</sup> percentile) to completion of the phases is presented in **Figure 13** for the "Functional chrome plating with decorative character of plastic substrates". The estimates are only shown for DUs, which are not in agreement with the timeline due to the small sample size of the other group (*cf.* section 4.1). **Figure 14** displays the results for the "Functional chrome plating with decorative character of metal substrates".



**Figure 13: Estimated average (90th percentile) time to completion of the different substitution phases for the sub-use "Functional chrome plating with decorative character of plastic substrates" by DUs with the largest market sector "Sanitary"**

## SUBSTITUTION PLAN



**Figure 14: Estimated average (90th percentile) time to completion of the different substitution phases for the sub-use “Functional chrome plating with decorative character of metal substrates” by DUs with the largest market sector “Sanitary”**

As mentioned before, it could, however, not be determined from the data if the DUs were executing the phases in parallel or sequentially staggered (see section 4.1). The results for the three discussed approaches in the largest market sector “Sanitary” are presented in **Table 6** for the average value of data within the 90<sup>th</sup> percentile.

**Table 6: Upper and lower bounds (years) as well as an intermediate, adapted timeline (years) for substitution in “Functional chrome plating with decorative character of plastic/metal substrates” in the largest market sector “Sanitary”**

Substrate	Agreement to the timeline (30 <sup>th</sup> of June 2023)	Phases parallel [years]	Phases overlapping <sup>1)</sup> [years]	Phases staggered [years]
Plastic	Yes	n/a	n/a	n/a
	No	3.9	6.3	12.6
Metal	Yes	2.1	3.4	6.9
	No	4.1	6.0	12.1

<sup>1)</sup> Following the procedure described in section 4.1, a hypothetical overlap factor of 50 % was determined to provide a refined estimate on the time needed for substitution

## SUBSTITUTION PLAN

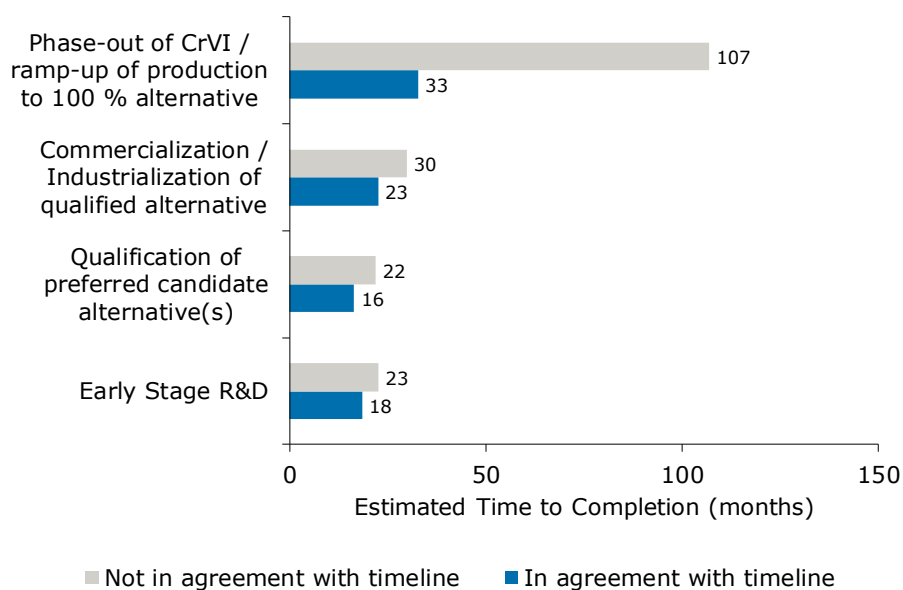
### 4.2.3.2 Automotive

In the automotive sector the agreement rates to the timeline of substitution (30<sup>th</sup> of June 2023) are slightly higher than for the sanitary sector. 22 % and 37 % of DUs are in agreement with the timeline for their respective uses of "Functional chrome plating with decorative character of plastic substrates" or "Functional chrome plating with decorative character of metal substrates" (**Table 7**).

**Table 7: Agreement with the timeline for substitution of CrO3 in the sub-uses "Functional chrome plating with decorative character of plastic substrates" and "Functional chrome plating with decorative character of metal substrates" by DUs with the largest market sector "Automotive"**

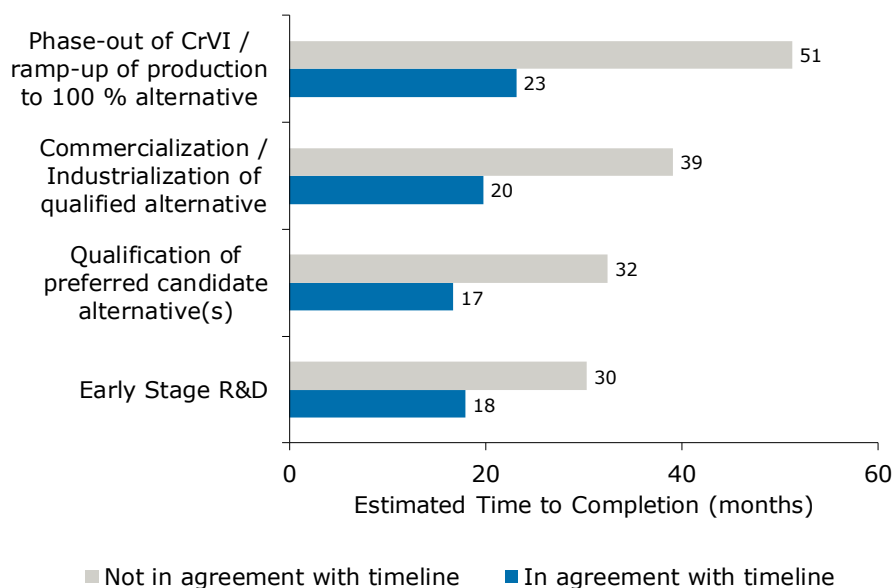
	Functional chrome plating with decorative character of	
	Plastic substrates	Metal substrates
Agree (n)	12	50
Disagree (n)	42	84
Agreement (%)	22	37

The low agreement rate to the timelines is also displayed by the estimated time to complete the different phases, especially in the sub-use "Functional chrome plating with Decorative Character of plastic substrates" (**Figure 15**). The DUs estimated on average (of the 90<sup>th</sup> percentile) a duration of 107 months for completion of the "Phase-out of CrVI / ramp-up of production to 100 % alternative". In the sub-use "Functional chrome plating with Decorative Character of metal substrates", DUs reported an average duration (of the 90<sup>th</sup> percentile) of 51 months for the same phase (**Figure 16**).



**Figure 15: Estimated average (90th percentile) time to completion of the different substitution phases for the sub-use "Functional chrome plating with decorative character of plastic substrates" by DUs with the largest market sector "Automotive"**

## SUBSTITUTION PLAN



**Figure 16: Estimated average (90th percentile) time to completion of the different substitution phases for the sub-use “Functional chrome plating with decorative character of metal substrates” by DUs with the largest market sector “Automotive”**

When analyzing the phases of the largest market sector automotive according to the procedure described in section 4.1, estimated adapted timelines until substitution of 7.6 years and 6.4 years were derived for the substrates plastic and metal in the “Plating”-sub-use for those DUs that did not agree to the timeline (Table 8). It is noteworthy that in the sub-use of “Plating” plastic substrates, the parallel estimate (8.9 years) is longer than that allowing for an overlap of 50 % of the phases. In this specific case, the average of the data within the 90<sup>th</sup> percentile for the last phase “Phase-out of CrVI / ramp-up of production to 100 % alternative” was determined as 107 months, corresponding to 8.9 years (cf. Figure 15). However, the overlap factor was estimated on the basis of all data and was not defined further. In addition, the factor was applied to the results of the staggered approach (i.e. the sum of the averages of values within the 90<sup>th</sup> percentile of each respective phase), which was 15.1 years.

Nonetheless, while the very high DU estimates for completion of the last phase of substitution in the sub-use “Functional chrome plating with decorative character of plastic substrates” leads to a parallel value by a factor of 2.1 higher than estimated for the sub-use of “Plating” metal substrates (8.9 to 4.3 years), the factorial diminishes when regarding the estimates for the overlapping (7.6 to 6.4 years; factor 1.2) and staggered (15.1 to 12.8 years, factor 1.2) approaches. It may, hence, be concluded that the actual difference in time needed until completion between the two sub-uses of “Plating” plastic or metal substrates is more similar than initially indicated by the estimates based on parallel progress of all phases.

**Table 8: Upper and lower bounds (years) as well as an intermediate, adapted timeline (years) for substitution in “Functional chrome plating with decorative character of plastic/metal substrates” in the largest market sector “Automotive”**

Substrate	Agreement to the timeline (30 <sup>th</sup> of June 2023)	Phases parallel	Phases overlapping <sup>1)</sup>	Phases staggered
Plastic	Yes	2.7	3.8	7.5
	No	8.9 <sup>2)</sup>	7.6	15.1
Metal	Yes	1.9	3.2	6.5
	No	4.3	6.4	12.8

<sup>1)</sup> Following the procedure described in section 4.1, a hypothetical overlap factor of 50 % was determined to provide a refined estimate on the time needed for substitution

<sup>2)</sup> Estimate higher than for the corresponding “overlapping phases” due to the high values entered for the final phase of substitution by the DUs (see text for details).

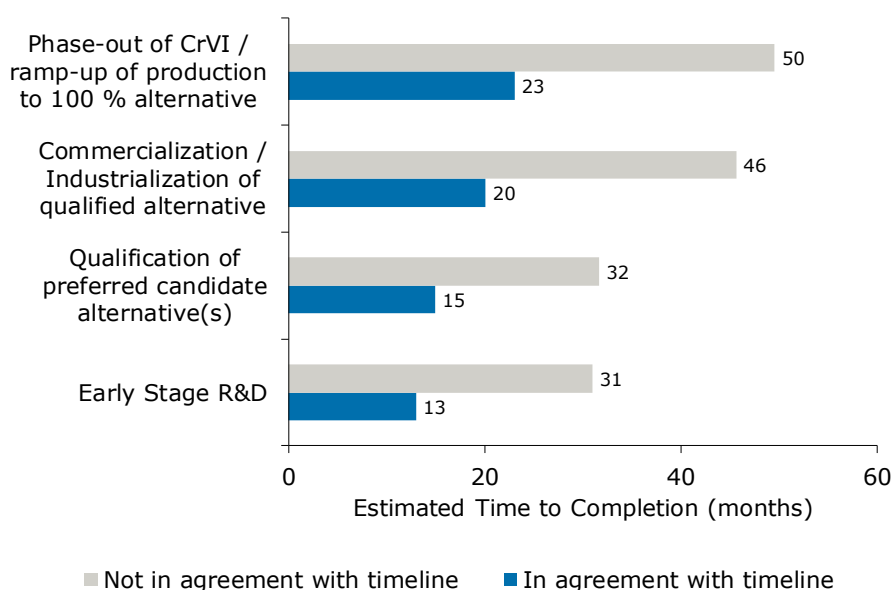
### 4.2.3.3 Furniture

While “Functional chrome plating with decorative character of plastic substrates” was reported by a lesser number of DUs in general (*cf.* **Figure 5**) there is a distinct difference in sample sizes between the sub-uses in the largest market sector “Furniture”. The agreement rates are nonetheless comparable. Less or equal to one third of the DUs agreed with the substitution timeline (30<sup>th</sup> of June 2023) (see **Table 9**).

**Table 9: Agreement with the timeline for substitution of CrO3 in the sub-uses “Functional chrome plating with decorative character of plastic substrates” and “Functional chrome plating with decorative character of metal substrates” by DUs with the largest market sector “Furniture”**

	Functional chrome plating with decorative character of	
	Plastic substrates	Metal substrates
Agree (n)	1	57
Disagree (n)	4	116
Agreement (%)	20	33

Due to the small sample size for the sub-use “Functional chrome plating with decorative character of plastic substrates”, the data for the DUs performing this sub-use were not evaluated in further detail (*cf.* section **4.1**). Hence, the data are presented graphically only for the sub-use “Functional chrome plating with decorative character of metal substrates” (**Figure 17**). The difference in time needed between those in agreement and those not in agreement was similar for the first two phases “Early Stage R&D” and “Qualification of preferred candidate alternative(s)” (18 months and 17 months, respectively). However, when regarding the later phases, the difference increases to 26 and 27 months, respectively. While the DUs estimated for the phases “Early Stage R&D” and “Qualification of preferred candidate alternative(s)” a similar duration until completion (13 months and 15 months when in agreement with the timeline, 31 months and 32 months when not in agreement with timeline). This is in line with the general observation of the status of the different phases described in section **4.2.2**, where it could be demonstrated that the initial phases were further progressed in comparison to the third and fourth phase. At maximum, the DUs estimate to need 23 months to “Phase-out of CrVI / ramp-up of production to 100 % alternative” when in agreement with the timeline and 50 months when not.



**Figure 17: Estimated average (90th percentile) time to completion of the different substitution phases for the sub-use “Functional chrome plating with decorative character of metal substrates” by DUs with the largest market sector “Furniture”**

Following the approach described in section **4.1**, a refined timeline of 3.0 years and 6.6 years was derived for DUs in agreement or not in agreement with the timeline and performing “Functional chrome plating with decorative character of metal substrates” (**Table 10**). As mentioned earlier, no analysis could be performed for DUs performing “Functional chrome plating with decorative character of plastic substrates”.

## SUBSTITUTION PLAN

**Table 10: Upper and lower bounds (years) as well as an intermediate, adapted timeline (years) for substitution in “Functional chrome plating with decorative character of plastic/metal substrates” in the largest market sector “Furniture”**

Substrate	Agreement to the timeline (30 <sup>th</sup> of June 2023)	Phases parallel	Phases overlapping <sup>1)</sup>	Phases staggered
Plastic	Yes	n/a	n/a	n/a
	No	n/a	n/a	n/a
Metal	Yes	1.9	3.0	5.9
	No	4.1	6.6	13.2

<sup>1)</sup> Following the procedure described in section 4.1, a hypothetical overlap factor of 50 % was determined to provide a refined estimate on the time needed for substitution.

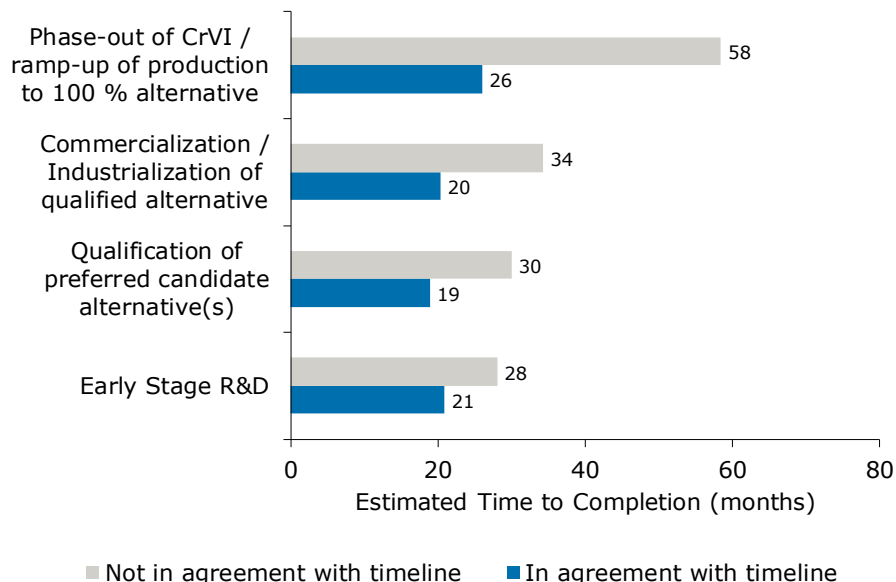
### 4.2.3.4 Medical

None of the DUs performing “Functional chrome plating with decorative character of plastic substrates” stated “Medical” as their largest market sector. The agreement rate to the timeline of substitution (30<sup>th</sup> of June 2023) for the other sub-use (“Functional chrome plating with decorative character of metal substrates”) is, however, comparable to that of the other assessed market sectors (30 %, **Table 11**).

**Table 11: Agreement with the timeline for substitution of CrO3 in the sub-uses “Functional chrome plating with decorative character of plastic substrates” and “Functional chrome plating with decorative character of metal substrates” by DUs with the largest market sector “Medical”**

	Functional chrome plating with decorative character of	
	Plastic substrates	Metal substrates
Agree (n)	0	13
Disagree (n)	0	31
Agreement (%)	—	30

The difference of time until completion between the DUs agreeing or not agreeing ranges from 7 to 14 months for the first three phases (**Figure 18**). Again, a larger difference is found when regarding the last phase of substitution (“Phase-out of CrVI / ramp-up of production to 100 % alternative”). Here, a difference of 32 months was observed. No analysis could be performed for the sub-use “Functional chrome plating with decorative character of plastic substrates” due to the absence of data.



**Figure 18: Estimated average (90th percentile) time to completion of the different substitution phases for the sub-use “Functional chrome plating with decorative character of metal substrates” by DUs with the largest market sector “Medical”**



## SUBSTITUTION PLAN

According to the results shown above, the duration of the parallel, overlapping and staggered approaches was only evaluated for "Functional chrome plating with decorative character of metal substrates" in the largest market sector "Medical" (**Table 12**). An intermediate time until completion of 3.6 years and 6.3 years for the DUs in agreement or not in agreement were identified following the procedure described in section **4.1**.

**Table 12: Upper and lower bounds (years) as well as an intermediate, adapted timeline (years) for substitution in "Functional chrome plating with decorative character of plastic/metal substrates" in the largest market sector "Medical"**

Substrate	Agreement to the timeline (30 <sup>th</sup> of June 2023)	Phases parallel	Phases overlapping <sup>1)</sup>	Phases staggered
Plastic	Yes	n/a	n/a	n/a
	No	n/a	n/a	n/a
Metal	Yes	2.2	3.6	7.2
	No	4.9	6.3	12.6

<sup>1)</sup> Following the procedure described in section **4.1**, a hypothetical overlap factor of 50 % was determined to provide a refined estimate on the time needed for substitution.

### 4.2.3.5 Cosmetics

The timeline for substitution of CrO<sub>3</sub> in the market sector "Cosmetics" differed from that for the other market sectors, and the DUs were asked if they agreed with the substitution date 31<sup>st</sup> of December 2020. The sample size of DUs stating "Cosmetics" as the largest market sector was small. In total, the "Cosmetics" sector was identified as the largest market sector for 8 DUs in the sub-use "Functional chrome plating with decorative character of plastic substrates" and for 7 DUs in the sub-use "Functional chrome plating with decorative character of metal substrates". However, during the survey, only DUs stating a percentual tonnage > 49 % in the sector "Cosmetics" were asked to express their agreement to the shorter timeline, leading to a reduced number of responses. Of those respondents, 29 % and 50 %, respectively, agreed with the timeline (**Table 13**). No further evaluation was conducted as the sample size was too small to draw any robust conclusions (see section **4.1**).

**Table 13: Agreement with the timeline for substitution of CrO<sub>3</sub> in the sub-uses "Functional chrome plating with decorative character of plastic substrates" and "Functional chrome plating of metal substrates" by DUs with the largest market sector "Cosmetics"**

	Functional chrome plating with decorative character of	
	Plastic substrates <sup>1)</sup>	Metal substrates <sup>1)</sup>
Agree (n)	2	1
Disagree (n)	5	1
Agreement (%)	29	50

<sup>1)</sup> One (electroplating of plastic substrates) and five (electroplating of metal substrates) questionnaires were not included as the question was not presented to the DUs; DUs stating that their tonnage in the market sector "Cosmetics" was < 49 % of the total tonnage were not asked to provide information on their agreement with the timeline.

**4.2.3.6 Others**

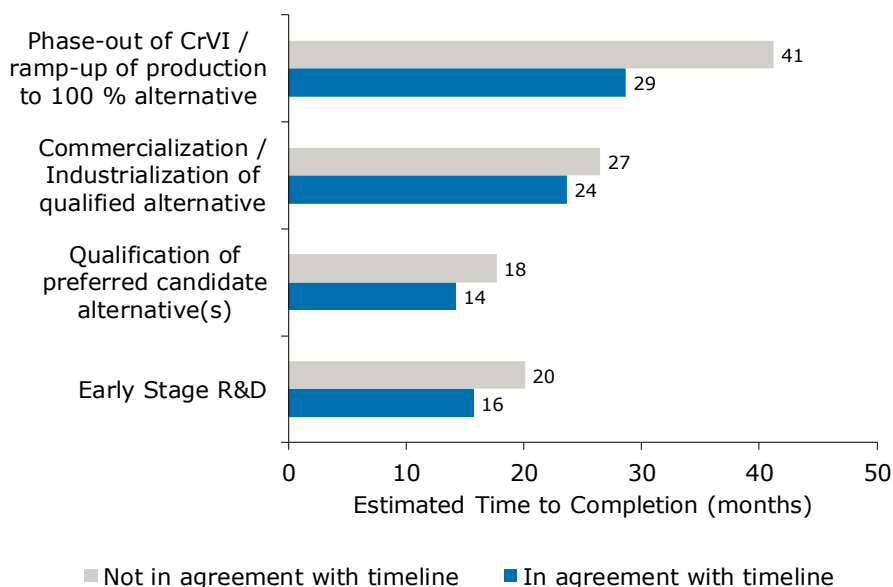
The last option that could be selected as a relevant market sector was termed "Other". A list of products/article groups as well as end applications covered can be found in **ANNEX III**. A higher number of DUs agreed with the timeline until substitution (30<sup>th</sup> of June 2023) in the sub-use "Functional chrome plating with decorative character of plastic substrates" (39 %) than in the sub-use "Functional chrome plating with decorative character of metal substrates" (31 %) (**Table 14**).

**Table 14: Agreement with the timeline for substitution of CrO<sub>3</sub> in the sub-uses "Functional chrome plating of plastic substrates" and "Functional chrome plating of metal substrates" by DUs with the largest market sector "Other"**

	<b>Functional chrome plating with decorative character of</b>	
	Plastic substrates <sup>1)</sup>	Metal substrates <sup>1)</sup>
Agree (n)	9	87
Disagree (n)	14	198
Agreement (%)	39	31

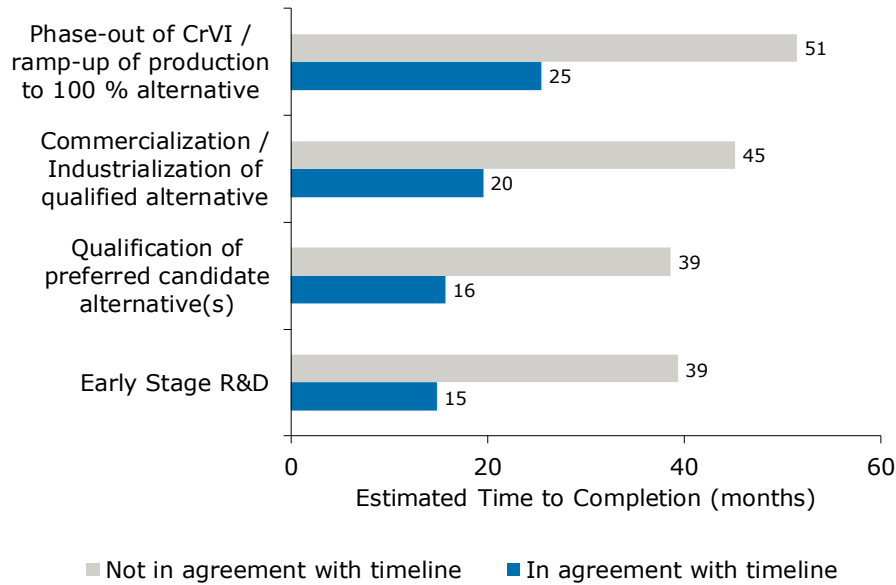
Regarding the time to complete the phases, the DUs estimated similar periods until completion for the "Early stage R&D" and the "Qualification of preferred candidate alternative(s)" for either sub-use and when in agreement with the timeline (14 to 16 months) (**Figure 19** and **Figure 20**). An interesting observation is the large difference between the estimated time to completion of any phase by the DUs agreeing or not agreeing with the timeline performing "Functional chrome plating with Decorative Character of metal substrates", which appears to be more consistent for the sub-use "Functional chrome plating with decorative character of plastic substrates". This difference becomes smaller when considering the later phases of substitution.

The duration until completion of "Phase-out of Cr(VI) / ramp-up of production to 100 % alternative", for the DUs not agreeing with the timeline was estimated to an average period (90<sup>th</sup> percentile) of 41 to 51 months ("Functional chrome plating with Decorative Character of plastics substrates" and "Functional chrome plating with Decorative Character of metal substrates", respectively). This is also reflected by the state of the substitution process presented in **4.2.2**, where the data indicated that DUs performing "Functional chrome plating with decorative character of plastic substrates" were more advanced in the process of substituting CrO<sub>3</sub>.



**Figure 19: Estimated average (90th percentile) time to completion of the different substitution phases for the sub-use "Functional chrome plating with Decorative Character of plastic substrates" by DUs with the largest market sector "Other"**

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**Figure 20: Estimated average (90th percentile) time to completion of the different substitution phases for the sub-use “Functional chrome plating with Decorative Character of metal substrates” by DUs with the largest market sector “Other”**

In the largest market sector “Others”, estimates for the lower, upper and intermediate bound for substitution in “Functional chrome plating with decorative character” were computable for either substrate as well as both DUs in agreement or not in agreement with the predetermined timeline. The procedure is described in section 4.1 and the results are shown in **Table 15**.

The timelines allowing for overlapping phases were short for DUs performing “plating” with plastic substrates and not in agreement with the timeline in comparison to the other sub-uses and market sectors. A value of 4.4 years was derived, being close to the lower bound and possibly underestimating the actual time necessary. For the “plating” of metal substrates larger sample size was available, and the refined estimate of time needed until completion of the substitution process was calculated as 7.3 years.

**Table 15: Upper and lower bounds (years) as well as an intermediate, adapted timeline (years) for substitution in “Functional chrome plating with decorative character of plastic/metal substrates” in the largest market sector “Others”**

Substrate	Agreement to the timeline (30 <sup>th</sup> of June 2023)	Phases parallel	Phases overlapping <sup>1)</sup>	Phases staggered
Plastic	Yes	2.4	3.4	6.9
	No	3.4	4.4	8.8
Metal	Yes	2.1	3.1	6.3
	No	4.3	7.3	14.6

<sup>1)</sup> Following the procedure described in section 4.1, a hypothetical overlap factor of 50 % was determined to provide a refined estimate on the time needed for substitution.

### 4.3 Pre-treatment (etching) of plastic/metal substrates

#### 4.3.1 Alternatives and limitations

The sub-uses "Pre-treatment (etching) of plastic substrates" and "Pre-treatment (etching) of metal substrates" were in general selected with lesser frequency than the electroplating uses. The distribution into largest market sectors accordingly lead to small sample sizes. As described in section 4.1, after providing data on the most promising alternatives for substitution for the "Electroplating"-sub-uses, the DUs were asked if the "Etching"-sub-uses were still relevant for them. In case they were not, the subsequent questions on "etching" were not presented to them. This may lead to a difference in the number of DUs indicating that they perform the "Pre-treatment (etching)" sub-uses (cf. section 2.3) and the number of DUs presented in the following sub-sections. Anyway, the DUs who were presented with the question could select from five choices:

1. Permanganates and manganese salts
2. Sulfuric acid (H<sub>2</sub>SO<sub>4</sub>) and/or phosphoric acid (H<sub>3</sub>PO<sub>4</sub>)
3. Other mineral acids
4. Other
5. No alternative generally available

As described in section 4.2.1, the opinion on the general availability of an alternative is presented at first before specifying the preference of the listed alternatives and the reasons for the DUs to choose the option that no alternative was generally available. In total, the data of 91 DUs performing "Pre-treatment (etching) of plastic substrates" were evaluated. A lesser number of answers could be considered for the "Pre-treatment (etching) of metal substrates" (n =17). Interestingly, there was a distinct difference within these sub-samples regarding the general availability of an alternative. While only 22 % of the DUs performing "Pre-treatment (etching) of plastic substrates" were of the opinion that no alternative was generally available, 53 % of the DUs performing "Pre-treatment (etching) of metal substrates" stated that no alternative was generally available (see **Table 16**). Interestingly, despite the small sample size of the latter group, the results are in good accordance with the views on the availability of an alternative for the "Plating" sub-use (cf. section 4.2.1).

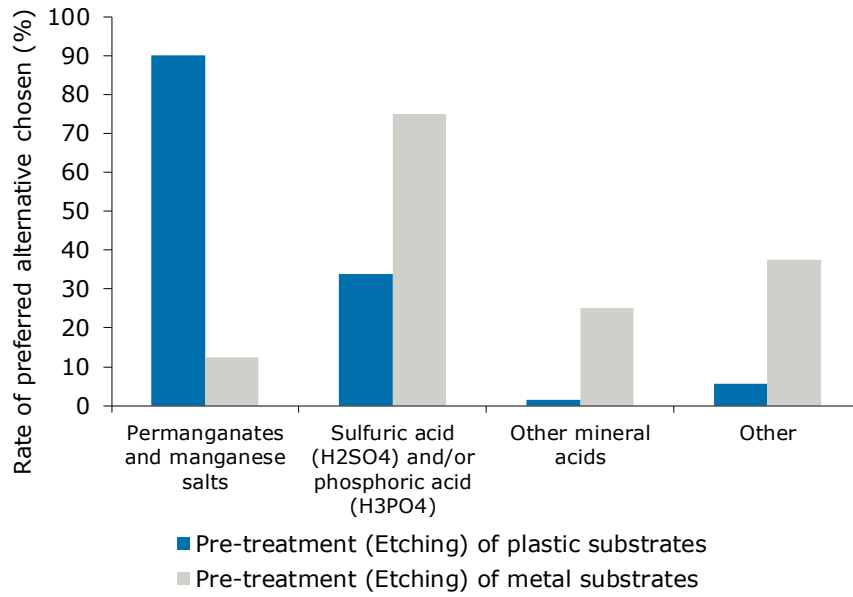
**Table 16: View of the DUs on the general availability of alternatives**

		Pre-treatment (etching) of	
		Plastic substrates	Metal substrates
Alternative available	n	71	8
	%	78	47
No alternative generally available	n	20	9
	%	22	53

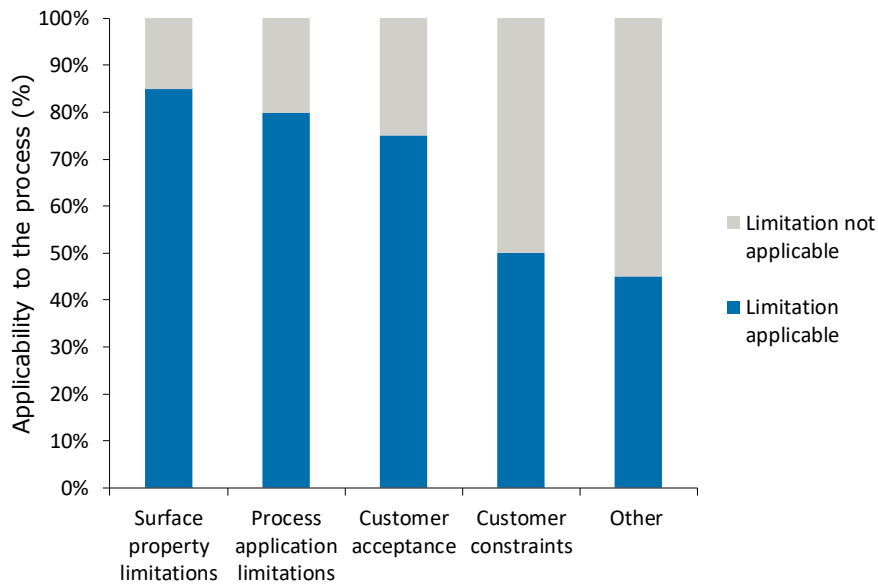
In the sub-use "Pre-treatment (etching) of plastic substrates", permanganates and manganese salts were considered as the most promising alternative (90 % of all answers) for substitution CrO<sub>3</sub> (**Figure 21**). Sulfuric acid and phosphoric acid were chosen to a lesser extent (34 %). The preferences shifted in the sub-use "Pre-treatment (etching) of metal substrates", where (75 %) considered sulfuric acid to be the option of choice. The options "Other mineral acids" and "Other" were chosen rarely for the first sub-use (1 % and 6 %, respectively), but more often for the second sub-use (25 % and 38 %, respectively). In general, the data suggest that one preferred alternative was identified in either sub-use. However, the DUs performing "Pre-treatment (etching) of metal substrates" appear to be more flexible on the choice of the other options. However, it needs to be stressed again that the sample size of the latter group is small, and the conclusions need to be tended with care.

Overall, the data for the "Pre-treatment (etching) of plastic/metal substrates" strongly resembled the limitations reported for the respective "Plating" sub-uses. When examining the limitations causing the DUs to respond that no alternative was generally available, it became clear that more than one limitation was considered of importance (**Figure 22**). 75 to 85 % of the DUs performing the "Pre-treatment (etching) of plastic substrates" stated that not only technical limitations – "Surface property limitations" and "Process application limitations" – were an issue, but also "Customer acceptance". For "Pre-treatment (etching) of metal substrates", the "Process application limitations" were regarded of lesser importance, while "Surface property limitations" were still the factor chosen with the highest preference (**Figure 23**).

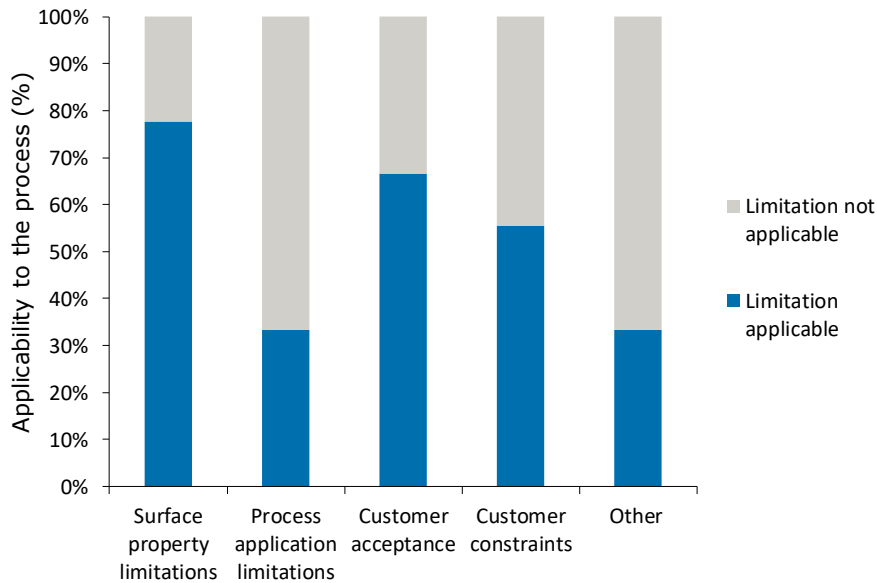
## SUBSTITUTION PLAN



**Figure 21: Preferred alternatives of the DUs for the substitution of CrO<sub>3</sub> in the sub-uses "Pre-treatment (etching) of plastic substrates" and "Pre-treatment (etching) of metal substrates"**



**Figure 22: Limitations regarding "No alternative generally available" and their applicability to the DUs processes in the sub-use "Pre-treatment (etching) of plastic substrates"**



**Figure 23: Limitations regarding “No alternative generally available” and their applicability to the DUs processes in the sub-use “Pre-treatment (etching) of metal substrates”**

**4.3.2 Level of agreement with suggested timelines and status of the substitution process**

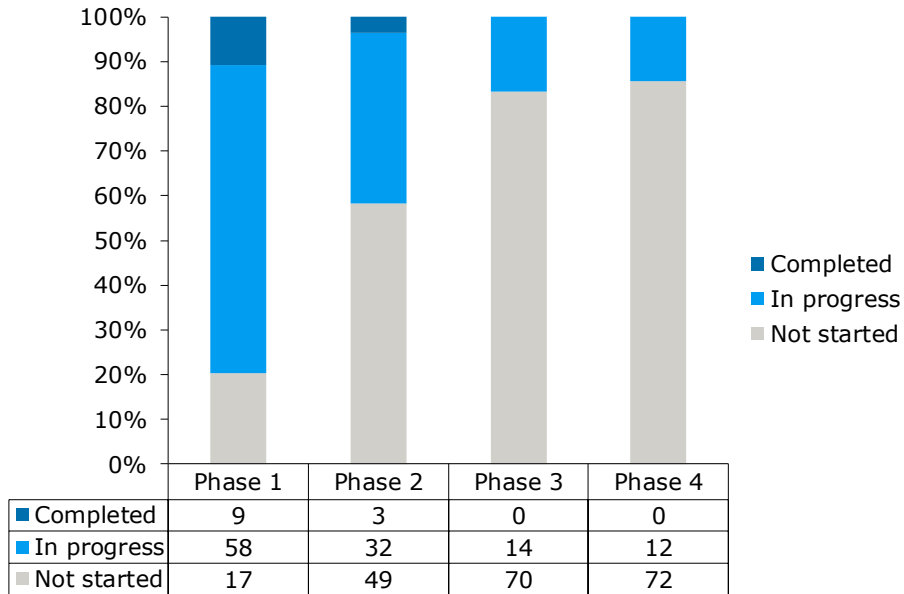
The overall agreement to the proposed substitution timelines for the sectors “Automotive”, “Furniture”, “Medical”, “Sanitary” and “Other” (30<sup>th</sup> of June 2023) as well as “Cosmetics”(31<sup>st</sup> of December 2020) for the “Pre-treatment (etching) of plastic substrates” was even lower than for the “Plating”-sub-use. Please note that, complementary to the statement made in section 4.3.1 and congruent to the remark in section 4.2.2, for several DUs that were presented with the sections on “Etching” in the survey, more one than largest market sector with the same size was identified. This might lead to a discrepancy between the number of responding DUs and the number of largest market sectors identified.

The results for the sub-use “Pre-treatment (etching) of plastic substrates” are described firstly. When considering the identified largest market sectors “Automotive”, “Furniture”, “Medical”, “Sanitary” and “Other” (substitution until 30<sup>th</sup> of June 2023), an agreement rate of 17 % (n = 14 of n = 84 identified largest market sectors) was found. In the largest market sector “Cosmetics”, 14 % (n = 1 of n = 7 identified largest market sectors) agreed with a date of substitution until the 31<sup>st</sup> of December 2020. When considering “Pre-treatment (etching) of metal substrates”, the agreement to the 2023-timeline was comparable to the associated “Plating”-sub-use, and 32 % (n = 5 of n = 22 identified largest market sectors) agreed with the timeline. No data were available for the “Pre-treatment (etching) of metal substrates” in the market sector “Cosmetics”.

The results of the status of the different substitution phases (“Early Stage R&D”, “Qualification of preferred candidate alternative(s)”, “Commercialization / Industrialization of qualified alternative”, “Phase-out of CrVI / ramp-up of production to 100 % alternative”) are presented in **Figure 24** to **Figure 26**. When examining the status of the four phases of substitution, the partly small sample sizes must be considered. In general, the trend is similar to the results observed for the “Plating” sub-uses. However, a higher proportion of DUs stated not having started the phases “Commercialization / Industrialization of qualified alternative” and “Phase-out of CrVI / ramp-up of production to 100 % alternative” in the sub-use “Etching” of plastic substrates compared to the sub-use “Plating” of plastic sub-use (**Figure 24** and **Figure 25**, cf. section 4.2.2). This observation is reversed for the DUs working with metal substrates (**Figure 26**), where a higher proportion indicated that the advanced substitution phases 3 and 4 were in progress or completed in comparison to the “Plating” sub-use (cf. section 4.2.2). It has again to be stressed that some of the analysed groups are small.

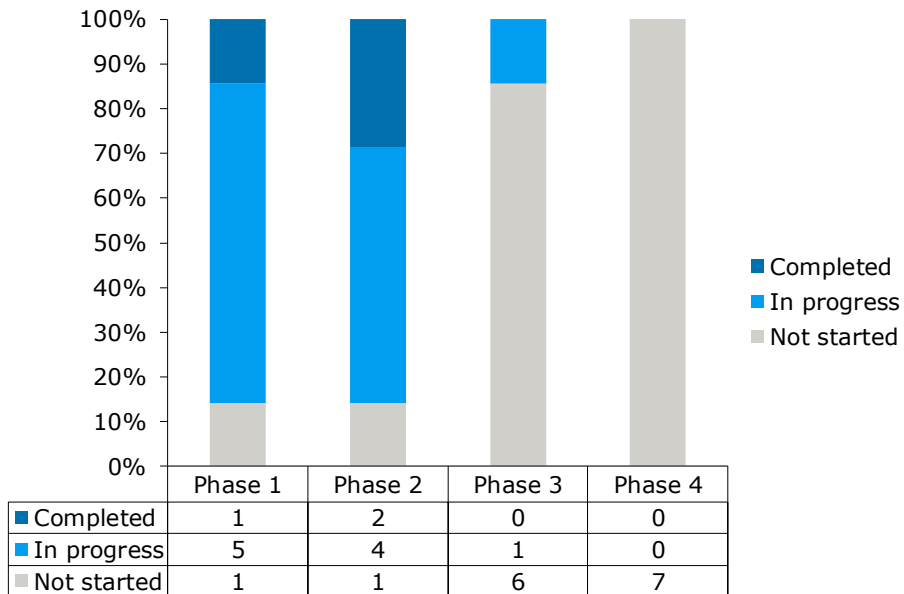
No data were available for the 2020-timeline (“Cosmetics” in the sub-use “Pre-treatment (etching) of metal substrates”. Accordingly, no graphs are presented.

## SUBSTITUTION PLAN



**Figure 24: Status of the substitution phases (until 30th of June 2023) of DUUs with the largest market sectors "Automotive", "Furniture", "Medical", "Sanitary" and "Other" performing "Pre-treatment (etching) of plastic substrates"**

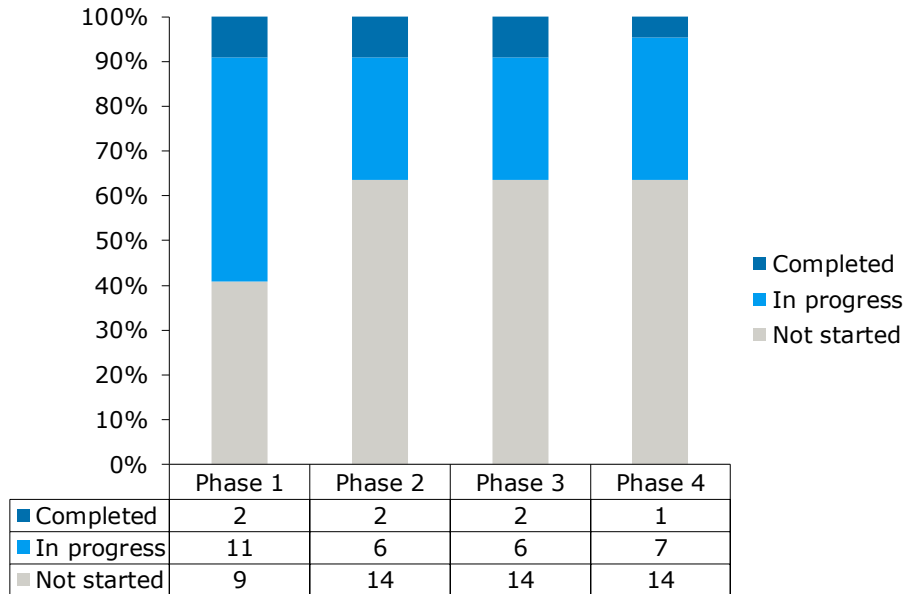
Phases 1 – 4 refer to the "Early Stage R&D", "Qualification of preferred candidate alternative(s)", "Commercialization / Industrialization of qualified alternative" & "Phase-out of CrVI / ramp-up of production to 100 % alternative".



**Figure 25: Status of the substitution phases (until 31st of December 2020) of DUUs with the largest market sectors "Cosmetics" performing "Pre-treatment (etching) of plastic substrates"**

Phases 1 – 4 refer to the "Early Stage R&D", "Qualification of preferred candidate alternative(s)", "Commercialization / Industrialization of qualified alternative" & "Phase-out of CrVI / ramp-up of production to 100 % alternative".

## SUBSTITUTION PLAN



**Figure 26: Status of the substitution phases (until 30th of June 2023) of DUs with the largest market sectors "Automotive", "Furniture", "Medical", "Sanitary" and "Other" performing "Pre-treatment (etching) of metal substrates"**

Phases 1 – 4 refer to the "Early Stage R&D", "Qualification of preferred candidate alternative(s)", "Commercialization / Industrialization of qualified alternative" & "Phase-out of CrVI / ramp-up of production to 100 % alternative"



## SUBSTITUTION PLAN

### 4.3.3 Estimated Time Until Completion of the Substitution

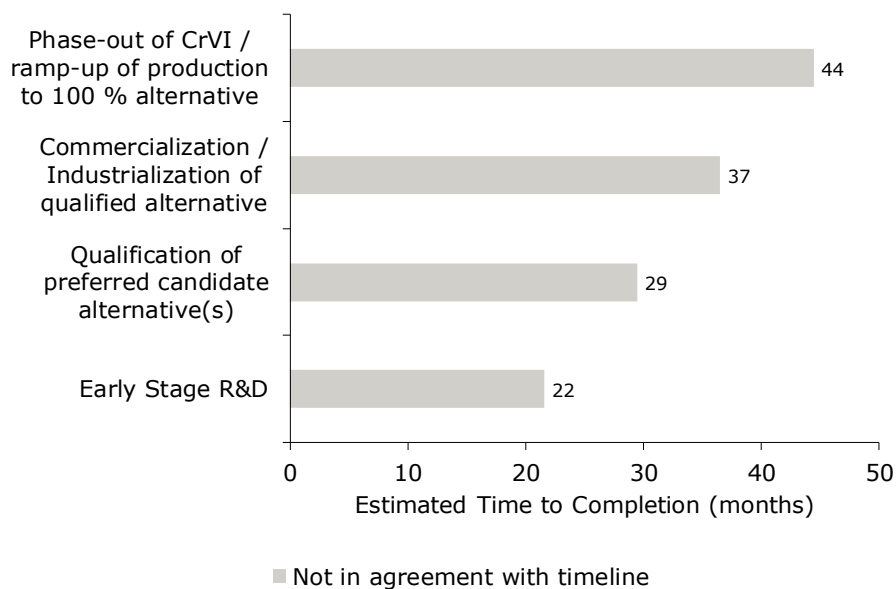
#### 4.3.3.1 Sanitary

Only two answers were received from DUs performing "Pre-treatment (etching) of metal substrates" in the largest market sector "Sanitary". For the sub-use "Pre-treatment (etching) of plastic substrates", "Sanitary" was chosen as the largest market sector by 17 DUs. DUs, which considered the sub-use "Pre-treatment (etching) of plastic substrates" still relevant after their previous answers on the alternatives of the plating process, did generally not agree with the presented timeline of substitution until 30<sup>th</sup> of June 2023 (18 %) (**Table 17**).

**Table 17: Agreement with the timeline for substitution of CrO3 in the sub-uses "Pre-treatment (etching) of plastic substrates" and "Pre-treatment (etching) of metal substrates" by DUs with the largest market sector "Sanitary"**

	Pre-treatment (etching) of	
	Plastic substrates	Metal substrates
Agree (n)	3	1
Disagree (n)	14	1
Agreement (%)	18	50

When analyzing the estimated time to completion, the picture was consistent with the previously described data for the "plating" sub-uses. DUs which were not in agreement with the timeline generally estimated to need 44 months to complete the "Phase-out of CrVI / ramp-up of production to 100 % alternative". As described in section 4.1, the results for the three DUs in agreement with the timeline have not been analyzed in further detail. (**Figure 27**). Also, no analysis was performed for the two DUs identified in the sub-use "Pre-treatment (etching) of metal substrates".



**Figure 27: Estimated average (90th percentile) time to completion of the different substitution phases for the sub-use "Pre-treatment (etching) of plastic substrates" by DUs with the largest market sector "Sanitary"**

In accordance with the results shown above, detailed timelines were deduced only for DUs who did not agree to the pre-determined timeline and performing "Pre-treatment (etching) of plastic substrates" (**Table 18**). From an upper bound of 11 years, an intermediate period allowing for a 50 % overlap of the substitution phases of 5.5 years until substitution was calculated (see also section 4.1).

## SUBSTITUTION PLAN

**Table 18: Upper and lower bounds (years) as well as an intermediate, adapted timeline (years) for substitution in "Pre-treatment (etching) of plastic/metal substrates" in the largest market sector "Sanitary"**

Substrate	Agreement to the timeline (30 <sup>th</sup> of June 2023)	Phases parallel	Phases overlapping <sup>1)</sup>	Phases staggered
Plastic	Yes	n/a	n/a	n/a
	No	3.7	5.5	11.0
Metal	Yes	n/a	n/a	n/a
	No	n/a	n/a	n/a

<sup>1)</sup> Following the procedure described in section 4.1, a hypothetical overlap factor of 50 % was determined to provide a refined estimate on the time needed for substitution.

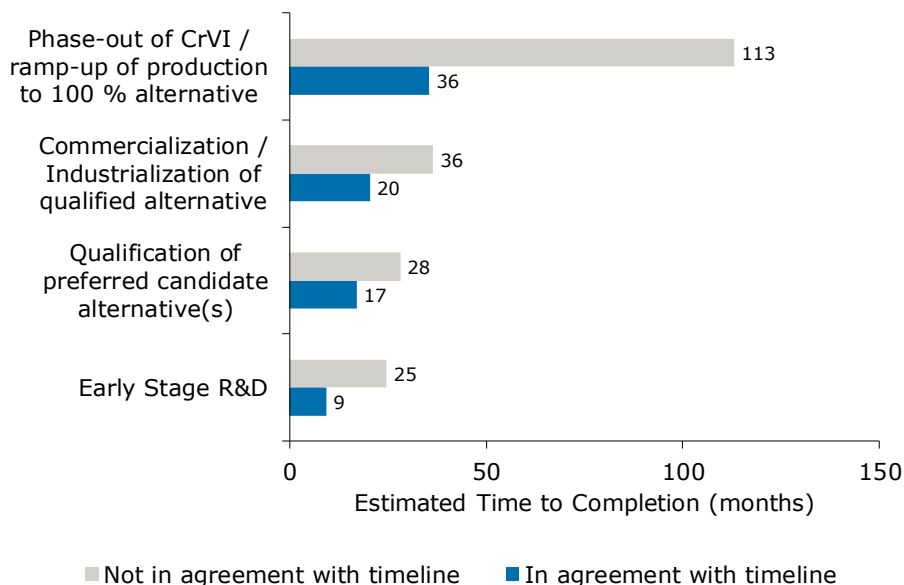
### 4.3.3.2 Automotive

An acceptable amount of data was also available for "Pre-treatment (etching) of plastics" in the largest market sector "Automotive", but not for "Pre-treatment (etching) of metals". Compared to the market sector "Sanitary", less DUs accepted the timeline of substitution until the 30<sup>th</sup> of June 2023 (12 % and 33 %, respectively) (**Table 19**).

**Table 19: Agreement with the timeline for substitution of CrO3 in the sub-uses "Pre-treatment (etching) of plastic substrates" and "Pre-treatment (etching) of metal substrates" by DUs with the largest market sector "Automotive"**

	Pre-treatment (etching) of	
	Plastic substrates	Metal substrates
Agree (n)	6	1
Disagree (n)	43	2
Agreement (%)	12	33

The high disagreement is reflected by the average period estimated (of the 90<sup>th</sup> percentile) to complete the "Phase-out of CrVI / ramp-up of production to 100 % alternative" (113 months) by DUs that do not agree with the timeline (**Figure 28**). Interestingly, the estimated duration to complete "Phase-out of CrVI / ramp-up of production to 100 % alternative" is also long for DUs who are in agreement with the timeline in comparison to other sub-uses and market sectors (36 months).



**Figure 28: Estimated average (90th percentile) time to completion of the different substitution phases for the sub-use "Pre-treatment (etching) of plastic substrates" by DUs with the largest market sector "Automotive"**

## SUBSTITUTION PLAN

When analyzing the data for the DUs performing “Pre-treatment (etching) of plastic substrates” in the automotive sector, it became obvious that especially distinct differences exist between DUs who reported to be in agreement with the timeline until substitution and those who are not (**Table 20**). The difference amounted to 5 years when allowing the phases to overlap and 10 years when assuming all phases are initiated sequentially. This disparity is also driven by the stretched, estimated duration until completion of the “Phase-out of CrVI / ramp-up of production to 100 % alternative” by the DUs who are not in agreement with the timeline. As already described in more detail in section **4.2.3.2**, the potential overestimate of the time needed causes that the refined estimate including a potential overlap of substitution phases (8.4 years) is shorter than the total period of substitution when assuming parallelism of the phases (9.4 years) (cf. section **4.1**).

**Table 20: Upper and lower bounds (years) as well as an intermediate, adapted timeline (years) for substitution in “Pre-treatment (etching) of plastic/metal substrates” in the largest market sector “Automotive”**

Substrate	Agreement to the timeline (30 <sup>th</sup> of June 2023)	Phases parallel	Phases overlapping <sup>1)</sup>	Phases staggered
Plastic	Yes	3.0	3.4	6.9
	No	9.4 <sup>2)</sup>	8.4	16.9
Metal	Yes	n/a	n/a	n/a
	No	n/a	n/a	n/a

<sup>1)</sup> Following the procedure described in section **4.1**, a hypothetical overlap factor of 50 % was determined to provide a refined estimate on the time needed for substitution.

<sup>2)</sup> Estimate higher than for the corresponding “overlapping phases” due to the high values entered for the final phase of substitution by the DUs (see also section **4.2.3.2** for details).

### 4.3.3.3 Furniture, Medical, Cosmetics

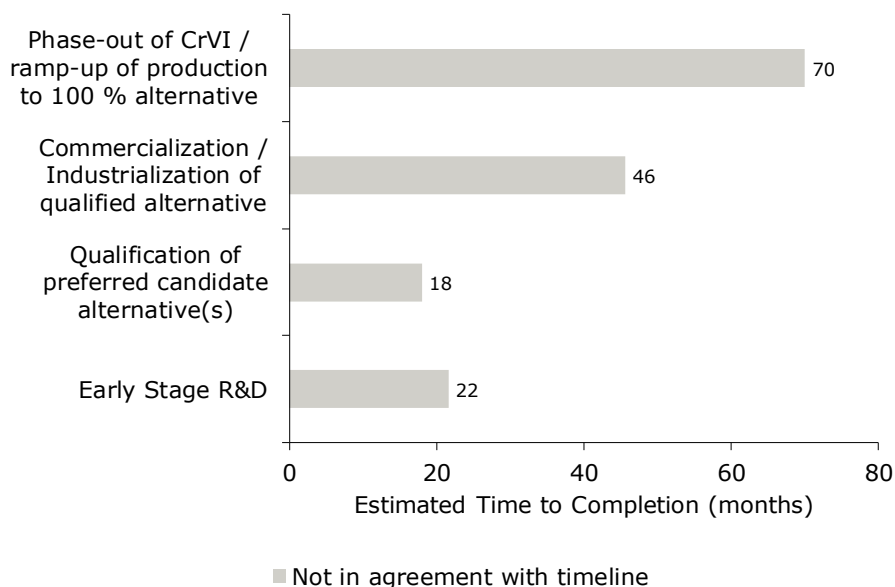
Due to the small number of relevant responses for “Pre-treatment (etching) of plastic/metal substrates”, the three market sectors “Furniture”, “Medical” and “Cosmetics” were summarized. Neglecting the low sample sizes, the agreement to the timelines of substitution (“Furniture” and “Medical”: 30<sup>th</sup> of June 2023; “Cosmetics”: 31<sup>st</sup> of December 2020) was generally low (0 to 25 %)

**Table 21: Agreement with the timeline for substitution of CrO3 in the sub-uses “Pre-treatment (etching) of plastic substrates” and “Pre-treatment (etching) of metal substrates” by DUs with the largest market sectors “Furniture”, “Medical” and “Cosmetics”**

		Pre-treatment (etching) of	
		Plastic substrates	Metal substrates
Furniture	Agree (n)	0	0
	Disagree (n)	2	2
	Agreement (%)	0	0
Medical	Agree (n)	0	1
	Disagree (n)	0	3
	Agreement (%)	—	25
Cosmetics	Agree (n)	1	0
	Disagree (n)	6	0
	Agreement (%)	14	—

## SUBSTITUTION PLAN

In the market sector "Cosmetics" and the "Pre-treatment (etching) of plastic substrates", the highest number of answers was identified (n = 6) for DUs not agreeing with the timeline (31<sup>st</sup> of December 2020). Accordingly, only those were evaluated in further detail (cf. section 4.1). Even though the information were retrieved from a small sample size, the distribution of the estimated average (of the 90<sup>th</sup> percentile) time to completion of the substitution phases was comparable to the previously presented timelines for other sectors and sub-uses (Figure 29). In total, the estimated time to complete "Phase-out of CrVI / ramp-up of production to 100 % alternative" was however high (70 months).



**Figure 29: Estimated average (90th percentile) time to completion of the different substitution phases for the sub-use "Pre-treatment (etching) of plastic substrates" by DUs with the largest market sector "Cosmetics"**

**Table 22** summarizes the results of the refinement approach to provide a more realistic estimate on the time to substitution necessary for the market sector "Cosmetics" and the sub-use "Pre-treatment (etching) of plastic substrates. Data were only evaluable for the group of DUs not in agreement with the timeline (31<sup>st</sup> of December 2020). Irrespective of the approach taken (see section 4.1), the proposed timeline is exceeded to a large extent, illustrating that DUs would need more time to substitute the use of CrO3 in the "etching"-sub-use.

**Table 22: Upper and lower bounds (years) as well as an intermediate, adapted timeline (years) for substitution in "Pre-treatment (etching) of plastic/metal substrates" in the largest market sector "Cosmetics"**

Substrate	Agreement to the timeline (31 <sup>st</sup> of December 2020)	Phases parallel	Phases overlapping <sup>1)</sup>	Phases staggered
Plastic	Yes	n/a	n/a	n/a
	No	5.8	6.5	12.9
Metal	Yes	n/a	n/a	n/a
	No	n/a	n/a	n/a

<sup>1)</sup> Following the procedure described in section 4.1, a hypothetical overlap factor of 50 % was determined to provide a refined estimate on the time needed for substitution.

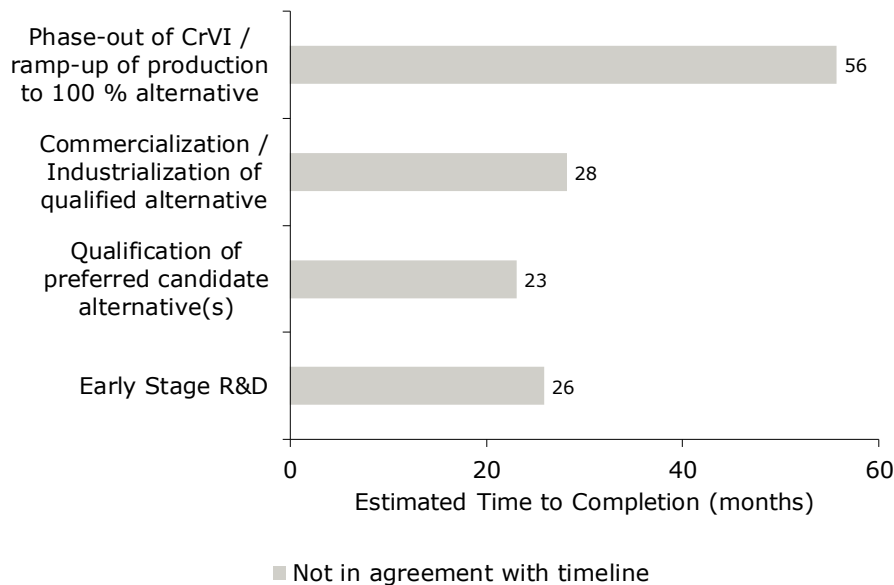
**4.3.3.4 Other**

In total, 16 DUs reported the market sector “Other” as the largest market sector for the “Pre-treatment (etching) of plastic substrates” (**Table 23**). An additional 11 DUs stated “Other” as the largest market sector for the sub-use “Pre-treatment (etching) of metal substrates” taking into account their opinion on the relevance of the “etching” process based on their answers on the substitution in the “plating” sub-uses (cf. section 4.1 and statements in sections 4.3.1 and 4.3.2). Around 1/3 (31 % and 36 %, respectively) of the DUs agreed with the timeline of substitution (30<sup>th</sup> of June 2023).

**Table 23: Agreement with the timeline for substitution of CrO3 in the sub-uses “Pre-treatment (etching) of plastic substrates” and “Pre-treatment (etching) of metal substrates” by DUs with the largest market sector “Other”**

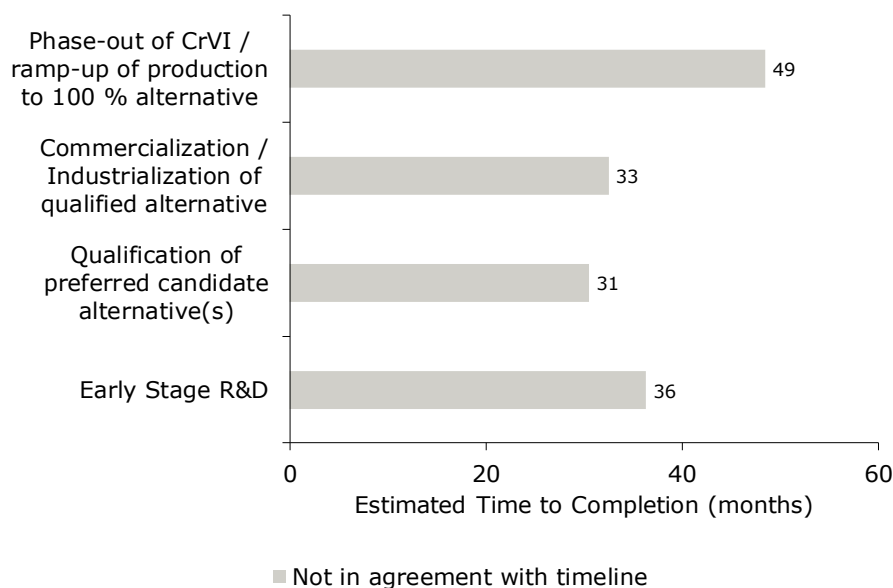
	Pre-treatment (etching) of	
	Plastic substrates	Metal substrates
Agree (n)	5	4
Disagree (n)	11	7
Agreement (%)	31	36

The estimated time to completion of the phases for the different sub-uses are presented in **Figure 30** and **Figure 31**. In the sub-use “Pre-treatment (etching) of plastic substrates”, DUs that were not in agreement with the timelines estimated to need 56 months until “Phase-out of CrVI / ramp-up of production to 100 % alternative”, which is approximately twice as long as for any other phase reported. The differences were smaller in the sub-use “Pre-treatment (etching) of metal substrates”, although the time needed until completion of “Phase-out of CrVI / ramp-up of production to 100 % alternative” was comparable (49 months).



**Figure 30: Estimated average (90th percentile) time to completion of the different substitution phases for the sub-use “Pre-treatment (etching) of plastic substrates” by DUs with the largest market sector “Other”**

## SUBSTITUTION PLAN



**Figure 31: Estimated average (90th percentile) time to completion of the different substitution phases for the sub-use “Pre-treatment (etching) of metal substrates” by DUs with the largest market sector “Other”**

A detailed analysis of the time to substitution was only conducted for the DUs that are not in agreement with the timeline (30<sup>th</sup> of June 2023) for both substrates (plastic and metal) pre-treated (section 4.1). All estimates are highly comparable. Allowing for an overlap of the substitution phases, a substitution period of 5.5 to 6.2 years was calculated (Table 24).

**Table 24: Upper and lower bounds (years) as well as an intermediate, adapted timeline (years) for substitution in “Pre-treatment (etching) of plastic/metal substrates” in the largest market sector “Others”**

Substrate	Agreement to the timeline (31 <sup>st</sup> of December 2020)	Phases parallel	Phases overlapping <sup>1)</sup>	Phases staggered
Plastic	Yes	n/a	n/a	n/a
	No	4.6	5.5	11.1
Metal	Yes	n/a	n/a	n/a
	No	4.0	6.2	12.3

<sup>1)</sup> Following the procedure described in section 4.1, a hypothetical overlap factor of 50 % was determined to provide a refined estimate on the time needed for substitution.

## SUBSTITUTION PLAN

### 5. MONITORING OF THE IMPLEMENTATION OF THE SUBSTITUTION PLAN

At the end of each sub-use section, the DUs were asked about the system in place to monitor the progress and implementation of the company-specific substitution plan. The DUs could choose from up to four pre-determined options. Also, more than one option could be selected:

1. Allocation of specific project manager to R&D project
2. Regular meetings (quarterly, half-yearly) specific to R&D project
3. Regular reporting of substitution plan progress to R&D steering committee resulting in necessary action plan for further steps
4. Other

As described before, the section on "etching" was only presented to the DUs if they regarded the "etching" process still relevant based on their answers regarding substitution of the "plating" sub-uses. Hence, 106 DUs provided answers for the sub-use "Functional chrome plating with decorative character of plastic substrates", 751 for the sub-use "Functional chrome plating with decorative character of metal substrates", 91 for the sub-use "Pre-treatment (etching) of plastic substrates" and 17 for the sub-use "Pre-treatment (etching) of metal substrates".

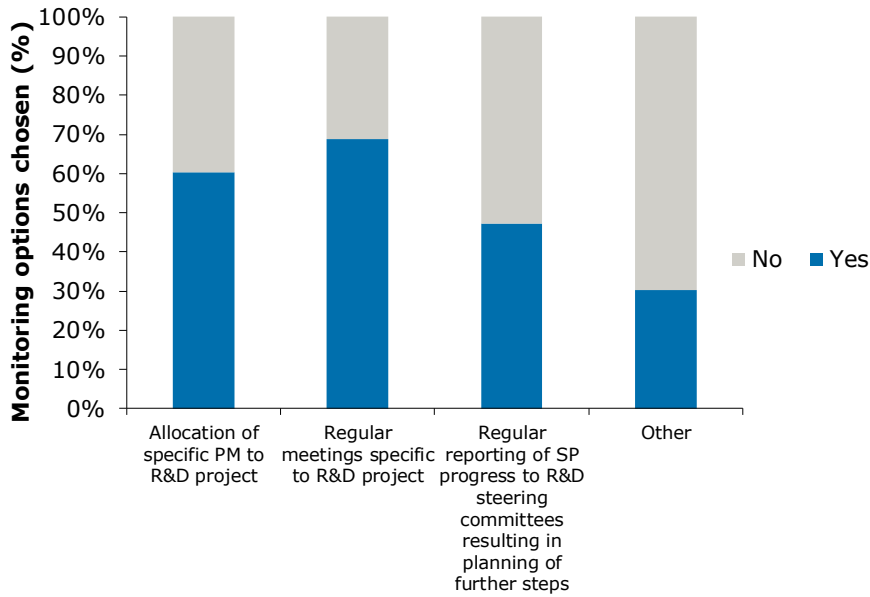
DUs working with plastic substrates during "plating" and "etching" chose "Regular meetings specific to R&D project" with the highest frequencies (69 % and 77 %, respectively). Moreover, it was also quite favored to allocate a specific project manager to the R&D project (60 % and 65 %, respectively). For both sub-uses featuring plastic substrates, generally higher implementation rates of any of the pre-determined monitoring systems were observed than by the DUs working with metal substrates. An exception is the choice of "Other", which gained a higher agreement rate in the "plating" sub-use of metal substrates (46 %). In general, the data suggest that the DUs working with plastic substrates have achieved a larger variety in regards of the monitoring options implemented. The reasons for this remain, however, unresolved. The total number of responses is presented below in **Table 25**. A graphical presentation of the results is given in **Figure 32** to **Figure 35**.

**Table 25: System in place to monitor and document the progress and implementation of the company-specific substitution plan**

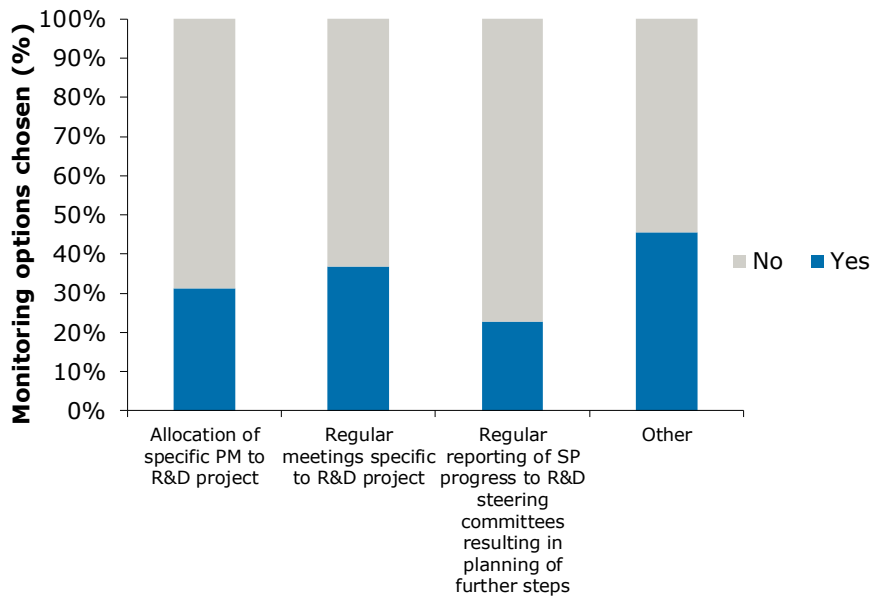
Sub-use	Response	Allocation of specific project manager to R&D project	Regular meetings (quarterly, half-yearly) specific to R&D project	Regular reporting of substitution plan progress to R&D steering committee resulting in necessary action plan for further steps	Other
1	Yes	64	73	50	32
	No	42	33	56	74
2	Yes	235	277	171	342
	No	516	474	580	409
3	Yes	59	70	44	26
	No	32	21	47	65
4	Yes	4	7	5	5
	No	13	10	12	12

Remark: Sub-use 1 refers to "Functional chrome plating with decorative character of plastic substrates", sub-use 2 to "Functional chrome plating with decorative character of metal substrates", sub-use 3 to "Pre-treatment (etching) of plastic substrates" and sub-use 4 to "Pre-treatment (etching) of metal substrates".

## SUBSTITUTION PLAN



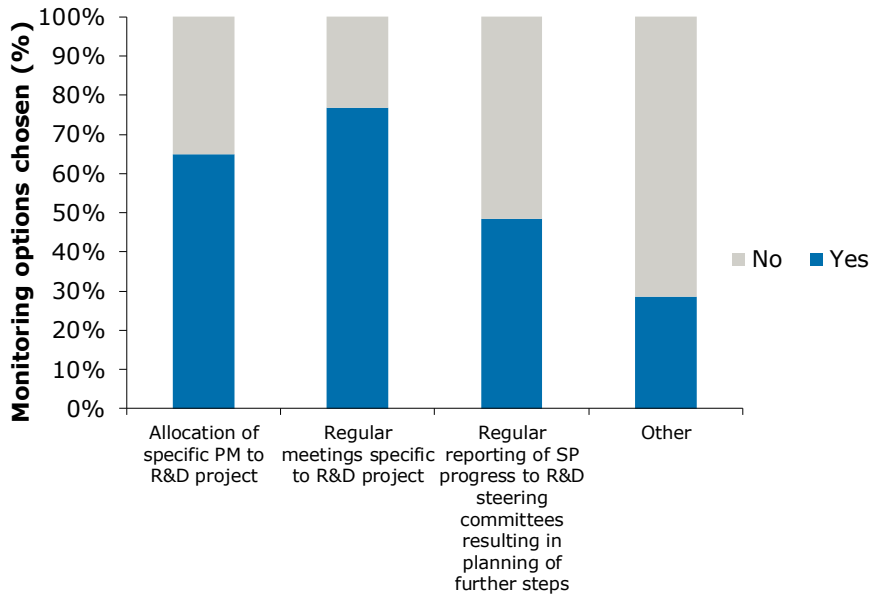
**Figure 32: System in place to monitor and document the progress and implementation of the company-specific substitution plan of DUs performing "Functional chrome plating with decorative character of plastic substrates"**



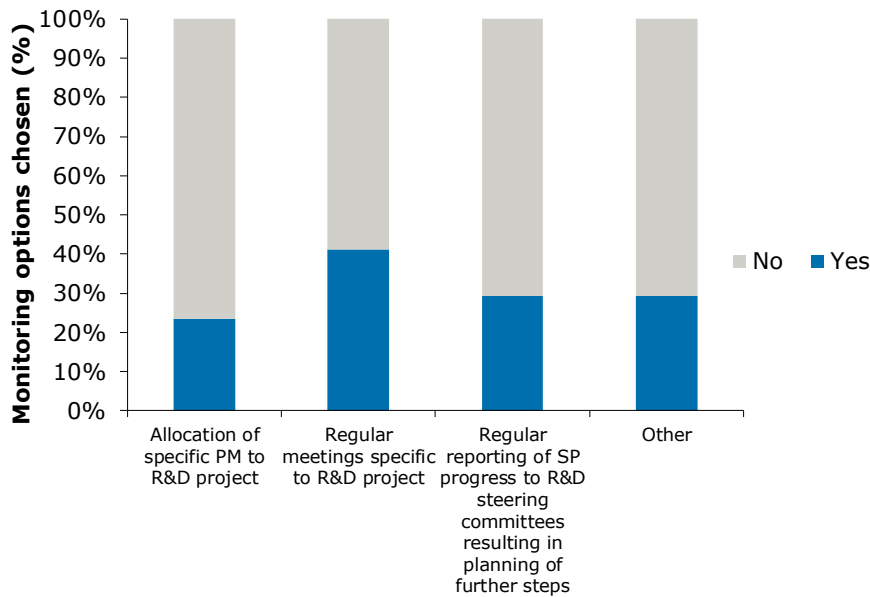
**Figure 33: System in place to monitor and document the progress and implementation of the company-specific substitution plan of DUs performing "Functional chrome plating with decorative character of metal substrates"**



## SUBSTITUTION PLAN



**Figure 34: System in place to monitor and document the progress and implementation of the company-specific substitution plan of DUs performing "Pre-treatment (etching) of plastic substrates"**



**Figure 35: System in place to monitor and document the progress and implementation of the company-specific substitution plan of DUs performing "Pre-treatment (etching) of metal substrates"**

### 6. CONCLUSION

The survey was initiated to gather up to the minute information from DUs to support the substitution plan on the use of chromium trioxide (CrO<sub>3</sub>) for "Functional chrome plating with decorative character", also referred to as CTACSub's Use Group 3. The aim of the survey was to characterize the affected DUs, to explain the individual concerns and challenges posed by substitution, and to describe efforts made towards the substitution process. Moreover, it aimed to better understand the differences between four sub-uses and all relevant market sectors to allow for a specific consideration of the diverse lines of action.

The DUs were also asked to provide information on the state of their substitution and the estimated time needed to complete the four pre-determined phases of substitution (*i.e.* "Early Stage R&D", "Qualification of preferred candidate alternative(s)", "Commercialization / Industrialization of qualified alternative" and "Phase-out of CrVI / ramp-up of production to 100 % alternative").

In general, the survey was a success as a very high response rate was achieved (see section **2.1**). However, there were certain challenges to a) the consistency in approach to substitution between the DUs and/or b) the quality/consistency of the responses received. This shows – even when considered carefully – the difficulty to collect data from a multi-regional and complex supply chain, including organisations who, despite operating similar processes, have multiple facilities, customers, insights, data and cultures. These challenges reflect differences observed during data collection for original CTAC work.

The analyses of the annual tonnage revealed that the survey covered a wide range of company sizes. As described in section **2.2**, a large proportion of the DUs may be referred to as small- or medium-sized companies based on their annual consumption of CrO<sub>3</sub>. Also, the responses on the market sectors indicated that the survey covered a broad range of different market interests. The largest proportion of DUs was classified in the largest market sector "Other" (33 %), compared to one of the pre-determined sectors "Automotive", "Furniture", "Medical", "Sanitary" and "Cosmetics". This indicates that the fields of work covered by "Use 3" are highly diverse and cannot simply be separated into pre-determined sectors. This issue is also confirmed by the list of products and end-uses, comprising a wide variety of goods (see **ANNEX III**). Approximately 20 % of the DUs were allocated to the largest market sectors "Automotive", "Furniture" and "Sanitary", respectively. Fewer DUs are engaged with the sector "Medical" (5 %), but the product list suggests that the availability and quality of those products is of high value for society. Only a small fraction of DUs (2 %) indicated "Cosmetics" as their largest market sector, hinting at its secondary role regarding the proportion of CrO<sub>3</sub> used within Use 3.

When split by sub-use (section **2.3**), the largest proportion of DUs could be associated with "Functional chrome plating with decorative character of metal substrates" (84 %). According to the percentage of answers, this sub-use appears to be of highest importance within Use group 3. As metals substrates can, in most cases, be readily plated without pre-treatment, the combination of etching and plating for metal substrates was only reported with a frequency of 2 %. Regarding plastic substrates, general accordance by DUs with galvanic sequences and the necessity to treat plastic substrates prior to the actual plating process to make the substrates' surfaces conductive was found. 10% of DUs were associated with the combined sub-uses plating and etching. Smaller fractions of DUs reported to perform solely plating (2 %) or etching of plastic substrates (1 %). This may either reflect differences in site-specific sequences or could be the result of a misapprehension of the survey.

From sections **3.1** and **3.2** it can be concluded that the switch to an entirely CrVI-free production process is a challenging and complex task for most DUs. They need to consider many different levels (technical, economic, etc.) when assessing alternatives for implementation at their production sites. At the end, the overall result of the respective DU' assessment must ensure that the implementation of alternatives (either for plating or etching) entails the lowest risk possible for failure on commercial stage and/or losing business.

In general, the points regarding the challenges of substituting CrO<sub>3</sub> raised by DUs are in good accordance with the view of the formulators of CrVI-free technologies (see section **1.2**). Sections **1.2**, **3.1** and **3.2** can be considered as a good estimation for the status of alternative development and implementation in respect to the market reality. Further, it can be concluded that industry is well informed about alternatives and eager to pursue a reasonable way towards substitution (see sections **4.2.2** and **4.3.2**).

When considering a substance or substance group to substitute CrO<sub>3</sub>, many DUs were confident that a technical alternative existed (sections **4.2.1** and **4.3.1**). 22 % of all DUs stated that no technical alternative was generally available for etching of plastic substrates and 30% provided the same statement for plating. The DUs performing etching and plating of metal substrates were even more pessimistic. 50 % (etching) and 53 % (plating), respectively reported that there was no alternative generally available.

When asked for possible alternatives, the DUs referred to few "main" alternatives. For the chrome plating sub-uses of metal and plastic substrates these were Chrome(III)-sulphate- and Chrome(III)-chloride-based electrolytes. The results indicate that these electrolytes are suitable for either substrate (metal or plastic). This is in line with the information

## SUBSTITUTION PLAN

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received from formulators (see section **1.2**) and the extent of the challenges of the substitution process, as described herein (see section **3**). PVD and *Other* alternatives comprised only a small fraction of the responses given.

For the etching sub-uses, the DU indicated that different alternatives (Permanganates and Manganese-salts for plastic substrates; Sulfuric acid and or Phosphoric acid for metal substrates) were the preferred alternatives, which might complicate the substitution process if a combination of both etching sub-uses is performed by a DU. In case the DUs stated that no alternative was generally available, similar applicable limitations were identified. For all sub-uses, these mainly encompassed not only concerns about the "customer acceptance" of the alternatively etched or plated product, but also limitations of the "surface property" of the final product.

All of the identified obstacles are reflected in the DU responses on the target substitution timelines (30<sup>th</sup> of June 2023 / 31<sup>st</sup> of December 2020) suggested for the purpose of achieving clear statements in the survey as well as the estimated time to complete either of the four predetermined phases of substitution (sections **4.2.2** and **4.2.3** as well as sections **4.3.2** and **4.3.3**).

The agreement with the timelines was low. When only considering those sub-uses and market sector combinations with more than five responses, the lowest agreement rate was observed for etching of plastic substrates in the largest market sector "Automotive" (12 %). The highest agreement rate was 38 % for plating of plastic substrates in the market sector "Others" and plating of metal substrates in the largest market sector "Automotive". This suggests that many DUs will not be able to substitute before the end of the authorisation period set out in the current draft authorisation decision. However, substitution in the cosmetic sector appears to be more advanced and could be achieved within this timeframe.

Regarding the market sector specific time necessary for substitution, it has to be noted that the fragmented analyses of sub-uses and market sectors resulted in high granularity. Inferentially, the granularity was also accompanied with the creation of partly small sample sizes, rendering it difficult to draw robust conclusions for several sub-use and market sector combinations.

The low agreement rates to the substitution timelines are also partly displayed by the state of the substitution phases. In general, the vast majority of DUs reported that they had not started the final substitution phases of "Commercialization / Industrialization of qualified alternative" or "Phase-out of CrVI / ramp-up of production to 100 % alternative". However, it was also found in the data that the DUs have made considerable progress in the earlier stages of R&D. The data illustrate that the DUs' substitution efforts were quite advanced in the steps of "Early Stage R&D" and "Qualification of preferred candidate alternative(s)". This statement can be made irrespective of the sub-use. Interestingly, the substitution processes for plating of metal substrates appears to be generally less developed. The rate of DUs stating that they had not started especially phases 2 to 4 is higher. As expected, DUs in agreement with the suggested timeline generally reported shorter periods until completion of either phase while those not agreeing with the timeline reported to need longer.

In any case, no final date could be concluded from the provided raw data as it could not be clarified in many cases if the data were entered as parallel or consecutive periods. To overcome this, a more realistic estimate on the total time until completion was derived, allowing an overlap of the phases by 50 %. Due to the partly small sample sizes, only groups including more than 5 DUs were analyzed in detail. In summary, the data suggest that the majority of the DUs – those not agreeing with the proposed timelines – need at least 6 to 7 years for the substitution process. As mentioned before, this timeline assumes overlapping phases.

The estimated periods needed until completion based on the data reported by the DUs for the different sub-uses are presented on the following two pages.

## SUBSTITUTION PLAN

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Estimated time until completion of substitution of **"Functional chrome plating with decorative character"** based on DU data, including an estimated overlap of 50 % of the individual substitution phases (see section 4.1):

- Substrate: **Plastic**
    - Proposed timeline (see section 1.3): **30<sup>th</sup> of June 2023**
      - Agreeing with the timeline [n = 26]
        - Sanitary: n/a [n = 4 / 17 %]
        - Automotive: 3.8 years [n = 12 / 22 %]
        - Furniture: n/a [n = 1 / 20 %]
        - Medical: n/a [n = 0 / n/a ]
        - Other: 3.4 years [n = 9 / 39 %]

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      - On average: **3.6 years**
    - Not agreeing with the timeline [n = 79]
      - Sanitary: 6.3 years [n = 19 / 83 %]
      - Automotive: 7.6 years [n = 42 / 78 %]
      - Furniture: n/a [n = 4 / 80 %]
      - Medical: n/a [n = 0 / n/a ]
      - Other: 4.4 years [n = 14 / 61 %]

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    - On average: **6.1 years**
  - Proposed timeline (see section 1.3): **31<sup>st</sup> of December 2020**
    - Agreeing with the timeline
      - Cosmetics: **n/a** [n = 2 / 29 %]
    - Not agreeing with the timeline:
      - Cosmetics: **n/a** [n = 5 / 71 %]
- Substrate: **Metal**
  - Proposed timeline (see section 1.3): **30<sup>th</sup> of June 2023**
    - Agreeing with the timeline [n = 255]
      - Sanitary: 3.4 years [n = 48 / 27 %]
      - Automotive: 3.2 years [n = 50 / 37 %]
      - Furniture: 3.0 years [n = 57 / 33 %]
      - Medical: 3.6 years [n = 13 / 30 %]
      - Other: 3.1 years [n = 87 / 31 %]

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    - On average: **3.3 years**
  - Not agreeing with the timeline [n = 558]
    - Sanitary: 6.0 years [n = 129 / 73 %]
    - Automotive: 6.4 years [n = 84 / 63 %]
    - Furniture: 6.6 years [n = 116 / 67 %]
    - Medical: 6.3 years [n = 31 / 70 %]
    - Other: 7.3 years [n = 198 / 69 %]

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  - On average: **6.5 years**
- Proposed timeline (see section 1.3): **31<sup>st</sup> of December 2020**
  - Agreeing with the timeline
    - Cosmetics: **n/a** [n = 1 / 50 %]
  - Not agreeing with the timeline:
    - Cosmetics: **n/a** [n = 1 / 50 %]

## SUBSTITUTION PLAN

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Estimated time until completion of substitution of "**Pre-treatment (etching)**" based on DU data, including an estimated overlap of 50 % of the individual substitution phases (see section 4.1):

- Substrate: **Plastic**
    - Proposed timeline (see section 1.3): **30<sup>th</sup> of June 2023**
      - Agreeing with the timeline [n = 14]
        - Sanitary: n/a [n = 3 / 18 %]
        - Automotive: 3.4 years [n = 6 / 12 %]
        - Furniture: n/a [n = 0 / 0 %]
        - Medical: n/a [n = 0 / n/a ]
        - Other: n/a [n = 5 / 31 %]

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      - On average: **3.4 years**
    - Not agreeing with the timeline [n = 70]
      - Sanitary: 5.5 years [n = 14 / 82 %]
      - Automotive: 8.4 years [n = 43 / 88 %]
      - Furniture: n/a [n = 2 / 100 %]
      - Medical: n/a [n = 0 / n/a ]
      - Other: 5.5 years [n = 11 / 69 %]

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    - On average: **6.5 years**
  - Proposed timeline (see section 1.3): **31<sup>st</sup> of December 2020**
    - Agreeing with the timeline
      - Cosmetics: **n/a** [n = 1 / 14 %]
    - Not agreeing with the timeline
      - Cosmetics: **6.5 years** [n = 6 / 86 %]
- Substrate: **Metal**
  - Proposed timeline (see section 1.3): **30<sup>th</sup> of June 2023**
    - Agreeing with the timeline [n = 7]
      - Sanitary: n/a [n = 1 / 50 %]
      - Automotive: n/a [n = 1 / 33 %]
      - Furniture: n/a [n = 0 / 0 %]
      - Medical: n/a [n = 1 / 25 %]
      - Other: n/a [n = 4 / 36 %]

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    - On average: **n/a**
  - Not agreeing with the timeline [n = 15]
    - Sanitary: n/a [n = 1 / 50 %]
    - Automotive: n/a [n = 2 / 67 %]
    - Furniture: n/a [n = 2 / 100 %]
    - Medical: n/a [n = 3 / 75 %]
    - Other: 6.2 years [n = 7 / 64 %]

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  - On average: **6.2 years**
- Proposed timeline (see section 1.3): **31<sup>st</sup> of December 2020**
  - Agreeing with the timeline
    - Cosmetics: **n/a** [n = 0 / n/a ]
  - Not agreeing with the timeline
    - Cosmetics: **n/a** [n = 0 / n/a ]

## SUBSTITUTION PLAN

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To assess the reliability of these estimated timelines, an analysis of the requested review period as well as the review period recommended by the RAC and SEAC and/or decided by the EU Commission from separately submitted AfAs for the same use was performed. Only AfAs filed by DUs performing functional chrome plating with decorative character were regarded, *i.e.* no upstream supply chain AfAs were considered. The information was retrieved from the ECHA website. The results are summarized in **Table 26**. Of note, the analysis revealed:

- the timeline of 6-7 years derived from the DU data in this survey probably marks an underestimation. The DUs (see **Table 26**) in most cases requested a review period of 12 years for either sub-use (etching or plating). A reason for this might be the methodology used to calculate the timeline. Another cause might be found in the difference to an individually filed AfA. It can be assumed that an individual AfA contains a higher degree of specificity regarding the applicant's processes and needs. It can also be considered that in an individual AfA, challenges may be depicted in greater depth and are customized to the applicant's situation.
- the RAC and SEAC agreed with the requested review periods and recommended periods of the same length, in all seven cases where opinions were already adopted. The EU Commission already followed this recommendation in two cases and approved the authorisation (one AfA submitted prior to and one AfA submitted after the sunset date). Those authorisations for the use of CrO<sub>3</sub> will expire in 7 to 11 years, making an example of time granted for the substitution to other DUs.
- Critically, only 11 AfAs – covering 28 (mostly large) companies and 20 uses – were submitted by DUs performing functional chrome plating with decorative character. This is in clear contrast to the 851 DUs that contributed data to this SP. It shows that only a very low portion of DUs (around 3%) has the benefit of single or group downstream applications and around 97% of the DUs depend on this upstream application.

In conclusion, our analysis indicates DUs require 6-7 years and likely more to successfully substitute CrO<sub>3</sub>. However, given that the substitution process involves numerous uncertainties, prolonged substitution timelines cannot be excluded for some DUs, market sectors or sub-uses. The challenges described and analysed in chapter **3** can only be resolved by DUs and formulators working in close collaboration to further proceed with substitution across market sectors. This is reflected beyond the CTACSub AfA; considering standalone downstream AfAs submitted for similar uses, some critical issues of concern still remain unresolved as the requested, recommended and granted review periods range from 10 to 12 years for plating and etching, independent of the date of submission of the AfA. This is also supported by the small number of DUs employed with decorative chrome plating in the EU that have already substituted CrO<sub>3</sub> completely. Based on industry insights from the formulators forming CTACSub, less than 5 % of those DUs in the EU have completely substituted CrO<sub>3</sub> in decorative plating. For etching, numbers are even lower. These figures are consistent with the results from this survey showing that only a small number of DUs already finalized Phase 4 (Phase-out of CrVI / ramp-up of production to 100 % alternative) (see chapter **4.2.2** and chapter **4.3.2**).

## SUBSTITUTION PLAN

**Table 26: List of submitted Applications for Authorisation by Downstream Users performing functional chrome plating with decorative character**

Application listing, type and submission date	Applicant(s)	Sector(s)	Use	Requested review period	Review period recommended or decided by ECHA	Status	Remaining period (from May 2020)
1 – Single (07.10.2015)	Grohe AG	Sanitary	Plating	12	12 – 21.09.2029	Commission decided (08.02.2017)	9.4
			Etching	10	10 – 21.09.2027		7.4
2 – Consortium (22.02.2016)	Gerhardi Kunststofftechnik GmbH C. Hübner GmbH SAXONIA Galvanik GmbH Simon Systems GmbH & Co. KG <sup>1)</sup> Galvanoplast Fischer Bohemia, s.r.o. <sup>2)</sup> Fischer Oberflächentechnologie GmbH <sup>3)</sup> WAFA Germany GmbH Boryszew Oberflächentechnik Deutschland GmbH Bolta Werke GmbH Heinze Gruppe GmbH C+C Krug GmbH BIA Kunststoff- und Galvanotechnik GmbH & Co KG Aludec Galvanic s.a.	Automotive	Plating	12	12	Opinion adopted	n/a
			Etching	12	12		
3 – Single (15.11.2016)	Hansgrohe SE	Sanitary	Plating	12	12 – 14.02.2031	Commission decided (14.02.2019)	10.8
			Etching	12	12 – 14.02.2031		10.8
4 – Single (19.11.2018)	Aloys F. Dornbracht GmbH & Co.KG	Sanitary	Plating	12	12	Opinion adopted	n/a
5 – Single (20.11.2018)	Schell GmbH & Co. KG Armaturentechnologie	Sanitary	Plating	12	12	Opinion adopted	n/a
6 – Single (20.11.2018)	KEUCO GmbH & Co KG	Sanitary	Plating	12	12	Opinion adopted	n/a
			Etching	12	12		n/a
7 – Single (20.11.2018)	Ideal Standard - Vidima AD Ideal Standard Produktions-GmbH Jado Iberia-Produtos Metalurgicos Sociedade Unipessoal LDA (withdrawn) Ideal Standard - Vidima AD	Sanitary	Plating	12	12	Opinion adopted	n/a
			Etching	12	12		n/a
8 – Single (n/a)	C. Hübner GmbH	Automotive/ Sanitary/ Consumer	Etching	31.12.2028	[ / ]	Opinion development	n/a
			Etching	31.12.2028	[ / ]		n/a
			Plating	31.12.2028	[ / ]		n/a

Use number: 3

Chemservice GmbH

## SUBSTITUTION PLAN

**Table 26 (continued): List of submitted Applications for Authorisation by Downstream Users performing functional chrome plating with decorative character**

Application listing, type and submission date	Applicant(s)	Sector(s)	Use	Requested review period	Review period recommended or decided by ECHA	Status	Remaining period (from May 2020)
9 – Consortium (n/a)	LARS Chemie, spol. s r.o. CASTELCROM SRL MATRIDOS S.L.U. PLATING BRAP S.A.U.	Automotive/ Sanitary	Etching	12	[ / ]	Public consultation	n/a
	LARS Chemie, spol. s r.o. CASTELCROM SRL MATRIDOS S.L.U. PLATING BRAP S.A.U.		Plating	12	[ / ]		n/a
10 – Single (n/a)	Oras Oy Oras Olesno Sp.z.o.o.	Sanitary	Plating	12	[ / ]	Public consultation	n/a
			Etching	12	[ / ]	Public consultation	n/a
11 – Single (n/a)	Viega Supply Chain GmbH & Co KG	Sanitary	Plating	12	[ / ]	Public consultation	n/a
			Etching	12	[ / ]		

<sup>1)</sup> Name of co-applicant in the original application: Karl Simon GmbH & Co. KG updated due to a notified legal entity name change

<sup>2)</sup> Correction of the name of the original applicant: Fischer GmbH & Co. surface technologies KG and of the successor applicant: Fischer Surface Technologies GmbH

<sup>3)</sup> Correction of the name of the original applicant: Fischer GmbH & Co. surface technologies KG and of the successor applicant: Fischer Surface Technologies GmbH



## SUBSTITUTION PLAN

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### **ANNEX I – EU COMMISSION LETTER SENT TO CHEMSERVICE GMBH (FEBRUARY 24<sup>TH</sup>, 2020)**



EUROPEAN COMMISSION

DIRECTORATE-GENERAL FOR INTERNAL MARKET, INDUSTRY, ENTREPRENEURSHIP  
AND SMES

Consumer, Environmental and Health Technologies

DIRECTORATE-GENERAL FOR ENVIRONMENT

Circular Economy and Green Growth

Brussels, 24/02/2020

GROW/D1/RZ

Ares(2020)1143935

Mr Dieter Drohmann  
Chemservice GmbH  
Herrnsheimer Hauptstr. 1b  
67550 Worms  
Germany  
[d.drohmann@chemservice-group.com](mailto:d.drohmann@chemservice-group.com)

**Subject: Your application for authorisation under Regulation (EC) No 1907/2006 (REACH) for the use of chromium trioxide in ‘functional chrome plating with decorative character’<sup>1</sup>**

Dear Mr Drohmann,

We are contacting you in relation to the joint application for authorisation you represent as a lead applicant for uses of chromium trioxide. This letter concerns in particular the use of chromium trioxide in ‘functional chrome plating with decorative character’, as regards the analysis of alternatives and the possible requirement of a substitution plan.

In the EU General Court judgment of 7 March 2019 in Case T-837/16, *Sweden v. Commission*<sup>2</sup>, the Court has given its interpretation of the condition set out in Article 60(4) and (5) and Article 62(4)(f) REACH as regards suitability of alternatives and the requirement of a substitution plan. The Court has in particular established that ‘*where (...) there remain uncertainties as regards the condition relating to the lack of availability of alternatives, it must be concluded that the applicant for authorisation has not discharged the burden of proof and, therefore, that he cannot be granted authorisation*’ (par. 79). However the Court also ruled that where the information gathered and analysis made ‘*(...) suggest that suitable alternatives are available in general, but that those alternatives are not technically or economically feasible for the applicant for authorisation, this does not necessarily mean that authorisation under Article 60(4) of the regulation must be refused*’ (par. 75). If that is the case, ‘*(...) and if it is shown that socio-economic benefits outweigh the risk to human health*

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<sup>1</sup> Reference numbers: 11-2120088250-61-0014, 11-2120088250-61-0015, 11-2120088250-61-0016, 11-2120088250-61-0017, 11-2120088250-61-0018, 11-2120088250-61-0019, 11-2120088250-61-0020. This letter does not concern the other uses of your application.

<sup>2</sup><http://curia.europa.eu/juris/document/document.jsf?text=&docid=211428&pageIndex=0&doclang=EN&mode=lst&dir=&occ=first&part=1&cid=1351718>

*or the environment arising from the use of the substance, (...) authorisation may be granted if the applicant for authorisation submits, in accordance with Article 62(4)(f) of that regulation, a substitution plan within the meaning of Article 60(4)(c) of that regulation' (par. 76).*

This interpretation provided by the Court judgment differs from the interpretation resulting from the currently applicable ECHA's guidance. In particular, the Court links the requirement to provide a substitution plan not to the availability of a suitable alternative specifically *for the applicant* (as this was reflected in ECHA's guidance) but to the availability of a suitable alternative *in general* (i.e. not only for the applicant but for any economic operator in the EU, as explained under section 1 of the Annex to this letter).

As you are aware, the Committee on Socio-economic Analysis (SEAC) of the European Chemicals Agency (ECHA) concluded, in its Opinion of 16 September 2016, that concerning the use at stake '*overall, technically feasible alternatives for chromium trioxide-based functional chrome plating with decorative character do not seem to exist before the sunset date*'. However, SEAC also noted that, '*due to the extremely broad scope of this application for authorisation and especially of the precise applications covered by this use applied for, SEAC cannot exclude that there are indeed applications where substitution is already feasible or will become so in the short term*'<sup>3</sup> (emphasis added). In fact, the relevant information available to the Commission (including information from other applications and public consultations) suggests that there may be suitable alternatives available in general, for specific utilisations falling within the scope of the use at stake.

In the light of the above and as it is not necessarily demonstrated that there are no suitable alternatives in general for the entire scope of the use at stake, an authorisation may only be granted if you submit a substitution plan for the utilisations or groups of utilisations for which it is concluded that there are suitable alternatives in general<sup>4</sup>. As this interpretation had been provided by the Court only after the submission of your application, you are hereby given the opportunity to provide the relevant additional information, including an explanation on the availability of suitable alternatives in general for the utilisations or groups of utilisations covered by the use at stake and a substitution plan for those utilisations or group of utilisations for which suitable alternatives in general are available, before the Commission takes a decision on your application.

To that end, ECHA's guidance on the preparation of an application for authorisation<sup>5</sup> (Section 4) provides advice on how to prepare a substitution plan. More details on the criteria identified by the Court regarding the concept of 'suitable alternatives in general' and further information as regards the content of the substitution plans are given in the Annex to this letter.

You will need to send the above-mentioned additional information to ECHA so that it undergoes the scrutiny of the ECHA's scientific committees. We foresee that a draft of this

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<sup>3</sup>Section 7.2, p. 40.

<sup>4</sup> It has to be recalled that even if a substitution plan is submitted, an authorization may only be granted if all conditions of Article 60(4) are fulfilled, including that there are no suitable alternative substances or technologies available for the applicant and/or his downstream users

<sup>5</sup>[https://echa.europa.eu/documents/10162/23036412/authorisation\\_application\\_en.pdf](https://echa.europa.eu/documents/10162/23036412/authorisation_application_en.pdf). This guidance will be updated to reflect the above-mentioned change of interpretation.

assessment<sup>6</sup> will be made available to you for possible comments before being transmitted to the Commission for a final decision on this use. A public consultation would not be necessary in this case.

**Please note that if you do not submit the additional information and, where applicable, a substitution plan for the utilisations or groups of utilisations for which it is concluded that there are suitable alternatives in general, the authorisation will have to be refused. Please also note that no other parts of your application should be updated or modified at this stage.**

We invite you to submit the above information to ECHA (Unit Risk Management II) by 24 August 2020. The contact address at the Commission is [GROW-D1@ec.europa.eu](mailto:GROW-D1@ec.europa.eu).

Yours sincerely,

(e-sign)  
Carlo Pettinelli

DG Internal Market, Industry  
Entrepreneurship and SMEs

(e-sign)  
Kestutis Sadauskas

DG Environment

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<sup>6</sup>ECHA will be requested to prepare a draft addendum to the original opinion addressing the additional information and the substitution plan.

## Annex

### 1) Criteria to identify 'suitable alternatives in general'

In paragraphs 72 and 73 of the above-mentioned judgment, the General Court has provided key criteria to identify what is a 'suitable alternative in general'. According to the Court, a suitable alternative should be **safer** (entailing a lower risk for human health and/or the environment) and **suitable in the EU** (this 'suitability' is not limited to the existence of an alternative *in abstracto* or in laboratory or exceptional conditions, but relates to the availability of alternatives *technically* and *economically feasible* in the EU). The analysis concerning the suitable alternative in general should be carried out from the perspective of the production capacities (for someone in the market) for those alternative substances and feasibility of those alternative technologies in the light of the legal and factual requirements for placing them on the market.

### 2) Further information on a substitution plan in your specific case

The availability of a suitable alternative in general, as defined above, is the trigger for the requirement to submit a substitution plan as a part of the application for authorisation, i.e. a substitution plan is not required where there are no suitable alternatives in general.

In line with the objective of progressive substitution included in the REACH Regulation, the substitution plan allows companies to set out a specified timetable for a possible replacement of a substance of very high concern with a safer substitute, available and feasible in general in the EU that, nevertheless, for technical or economic reasons, they cannot implement by the time of applying for authorisation.

As mentioned above in the letter, you should submit a substitution plan as regards the utilisations or groups of utilisations covered by the use at stake for which there are suitable alternatives available in general. For the utilisations or groups of utilisations for which there are no suitable alternatives available in general, a substitution plan is not required. However, in your particular case and in view of the broad use applied for, as well as the broad scope of the analysis of alternatives submitted for that use, you should also provide an explanation for reaching the conclusion that there are no suitable alternatives in general for those utilisations or groups of utilisations. This additional information should be provided in a separate document, as an addendum to the analysis of alternatives.

In addition, we would like to clarify the following points:

- Part of the elements for a substitution plan may already be contained in the analysis of alternatives submitted as part of your application. In so far as relevant, those elements may be taken up in the substitution plan, complemented and updated to provide the appropriate timeline for actions in the substitution plan.
- Where it is clear that a suitable alternative in general will become feasible for you or your downstream users within a certain timeline, the substitution plan should contain a clear and credible timeline to substitute the use of the substance. If appropriate, the substitution plan may be updated later in time as part of a review report, and justification provided regarding the reason for which it is updated.
- Where substitution towards a suitable alternative in general depends on the results of ongoing research, development or testing, the substitution plan should contain a commitment to undertake the necessary actions to undertake research on, develop or

test alternatives to make them technically and economically feasible for you, with a clear timetable, following the indications provided in the Guidance on Authorisation. In particular for the initial actions, that timetable should be the subject of a firm and credible commitment. For actions later in that timetable, it is accepted that those may depend on the outcome of earlier actions.

- Where it is clear that a suitable alternative in general cannot become economically and technically feasible for you in a short or medium term, you should still submit a substitution plan, explaining that substitution can only take place in a long term (e.g. when building a new plant or after the end of lifetime of the product). Obviously, such a long-term substitution plan also needs to have clear timelines.
- The addendum to the analysis of alternatives should allow to clearly identify for which utilisations or groups of utilisations alternatives in general exist and the substitution plan should link the actions for substitution to those utilisations or groups of utilisations. Conversely, too general and imprecise information provided may undermine the justification for the need of a certain time, or even the appropriateness itself of an authorisation.

## SUBSTITUTION PLAN

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### **ANNEX II – CTACSUB LETTER SENT TO DUS**

**CTACSub Consortium**  
Information Notice  
March 30, 2020

To the Downstream Users  
of the Members of the CTACSub Consortium  
who use Chromium trioxide for Use 3  
'Functional Plating with Decorative Character'

Dear Downstream Users,

If you are using Chromium trioxide as a substance or in a mixture for functional plating with decorative character including pretreatments (such as etching) ('Use 3') supplied directly or indirectly (via distributors or formulators) from any of the companies listed below, please read this Information Notice carefully.

- Atotech Deutschland GmbH
- JSC (Aktyubinsk Chromium Chemicals Plant)
- Elementis
- Brother CISA (formerly LANXESS)
- MacDermid Enthone
- Sisecam (Soda Sanayii A.S.)

The application for REACH authorization of the Members of the CTACSub Consortium is still pending with the European Commission.<sup>1</sup> For Use 3, the European Commission has decided to suspend<sup>2</sup> the authorization procedure for legal<sup>3</sup> reasons and has requested the applicants<sup>4,5</sup>, with letter of February 24, 2020, to draw up and submit a so-called Substitution Plan by August 24, 2020.<sup>6</sup>

The Substitution Plan has to be submitted by the upstream applicants and must be based on Downstream User information! You must not submit your own Substitution Plan to the European Commission.

A Substitution Plan is a document whereby the applicant(s) must provide information on Chromium trioxide replacement efforts (timetable, drop-in replacements and R&D and investments into alternatives, reasons why substitution is not feasible for a specific use etc.) for the specific end use applications.

If you want to continue your use beyond August 24, 2020 under the pending (upstream) application for authorization, you need to contribute to the Substitution Plan data gathering. The CTACSub Members cannot draw up this Substitution Plan without comprehensive and quality input from the Use 3 Downstream Users. The information to be provided must be detailed and up-to-date. If you do not contribute as requested, we will not receive authorization for Use 3. Consequently, all deliveries to all Use 3 Downstream Users relying on CTACSub will have to stop in 2021 latest. Please provide the certificate, received from Ramboll for filling in the questionnaire, to your immediate supplier.

The information you provide will be treated as 'confidential business information'. CTACSub's technical consultant Ramboll will act as a third party trustee and aggregate and neutralize it before submission to the European Commission.

The CTACSub Members will therefore take the following steps and ask for the input of ALL their Downstream Users:

- CTACSub is working on an on-line questionnaire to be filled in thoroughly by ALL Downstream Users who wish to continue to rely on this application for authorization for Use 3. The online questionnaire will be available in English, French, German, Italian and Spanish.



- You must register at <https://surveys.ramboll.com/LinkCollector?key=6RAA1MNNSN1P> in order to receive your own invitation to the survey. Once you have registered, Ramboll will send you a link to the survey in the language of your choice.
- CTACSub’s technical consultant Ramboll will hold a series of webinars to explain how to fill in the on-line questionnaire. The schedule of webinars is provided in the box below.
- Downstream Users are requested to familiarize themselves with the on-line questionnaire, to attend one webinar of their choice, and to ask at that webinar any clarifications they may require. Links to the webinar will be issued when you complete the initial registration step.
- Downstream Users then must fill in the on-line questionnaires by May 15, 2020. Downstream Users that do not send back the fully completed questionnaire by that date will be considered as no longer relying on that pending application for authorization and/or no longer working with Chromium trioxide for Use 3.

Industry associations and OEMs may voluntarily also fill in and submit the questionnaire or provide additional detailed information. However, their input will be used only to complement the information from individual Downstream Users. It will not substitute for it.

Schedule of Webinars	
<ul style="list-style-type: none"> <li>• Monday 6 April – 11am CET German</li> <li>• Monday 6 April – 3pm CET Italian</li> <li>• Monday 6 April – 4pm CET English</li> </ul>	<ul style="list-style-type: none"> <li>• Tuesday 7 April – 3pm CET French</li> <li>• Tuesday 7 April – 4pm CET Spanish</li> </ul>

Thank you for your attention and input for this very important data gathering exercise!

The Members of the CTACSub Consortium

<sup>1</sup> For more information, please see the Q&As and press releases available at [www.jonesdayreach.com](http://www.jonesdayreach.com).

<sup>2</sup> After submission by August 24, 2020, ECHA’s SEAC Committee will scrutinize the Substitution Plan. A recommendation will then be submitted to the European Commission likely early in 2021 for decision on the authorization of Use 3.

<sup>3</sup> EU General Court T-837/16; Sweden had applied for annulment of a Commission REACH authorization Decision for another substance. The European Commission has appealed this General Court decision on several grounds.

<sup>4</sup> Chemservice GmbH in its legal capacity as Only Representative of **Brother CISA** (formerly LANXESS Deutschland GmbH in its legal capacity as Only Representative of LANXESS CISA (Pty) Ltd.); **Atotech Deutschland GmbH**; **Boeing Distribution, Inc.** [name of applicant in the original application: Aviall Services Inc updated due to a notified change of corporate name]; Prospere Chemical Logistic OÜ as Only Representative of **Aktyubinsk Chromium Chemicals Plant, Kazakhstan** [application transferred from: “Prospere Logistic Baltic OÜ as Only Representative of Aktyubinsk Chromium Chemicals Plant, Kazakhstan” due to a notified change of Only Representative] [application transferred from original Applicant: "BONDEX TRADING LTD in its legal capacity as Only Representative of Aktyubinsk Chromium Chemicals Plant, Kazakhstan" due to a notified change of Only Representative]; CROMITAL S.P.A. in its legal capacity as Only Representative of **Soda Sanayii A.S.**; **Elementis Chromium LLP** in its legal capacity as Only Representative of Elementis Chromium Inc; **MacDermid Enthone GmbH** [name of co-applicant in the original application: Enthone GmbH updated due to a notified legal entity name change].

<sup>5</sup> Several other applicants for functional plating with decorative character have also been asked to submit a Substitution Plan.

<sup>6</sup> The European Commission has not yet decided whether to prolong such deadline due to the Coronavirus/ Covid- 19 pandemic.

## CTACSub Consortium

Informationsbrief

30. März 2020

An die nachgeschalteten Anwender  
der Mitglieder des CTACSub-Konsortiums  
Verwendung von Chromtrioxid  
für „funktionelle Verchromung mit dekorativem Charakter“ (sog. „Verwendung 3“)

Sehr geehrte nachgeschaltete Anwender,

Wenn Sie Chromtrioxid als Stoff oder in einer Mischung zur funktionellen Verchromung mit dekorativem Charakter verwenden, einschließlich Vorbehandlungen (wie Ätzen) („Verwendung 3“), die direkt oder indirekt (über Händler oder Formulierer) von einem der unten aufgeführten Unternehmen geliefert werden, lesen Sie bitte diesen Informationsbrief sorgfältig durch.

- Atotech Deutschland GmbH
- JSC (Aktyubinsk Chromium Chemicals Plant)
- Elementis
- Brother CISA (formerly LANXESS)
- MacDermid Enthone
- Sisecam (Soda Sanayii A.S.)

Der von den Mitgliedern des CTACSub-Konsortiums eingereichte Antrag auf REACH-Zulassung ist noch bei der Europäischen Kommission anhängig.<sup>1</sup> Für Verwendung 3 hat die Europäische Kommission beschlossen, das Genehmigungsverfahren aus rechtlichen<sup>2</sup> Gründen auszusetzen,<sup>3</sup> und die Antragsteller<sup>4,5</sup> mit Schreiben vom 24. Februar 2020 aufgefordert, bis zum 24. August 2020 einen sogenannten Substitutionsplan zu erstellen und vorzulegen.<sup>6</sup>

Der Substitutionsplan muss von den vorgelagerten Antragstellern eingereicht werden und auf nachgelagerten Anwenderinformationen basieren! Sie dürfen der Europäischen Kommission keinen eigenen Substitutionsplan vorlegen.

Ein Substitutionsplan ist ein Dokument, in dem der / die Antragsteller Informationen über die Bemühungen zum Austausch von Chromtrioxid (Zeitplan, Drop-in Ersatz und F & E sowie Investitionen in Alternativen; Gründe, warum eine Substitution für eine bestimmte Verwendung nicht möglich ist, usw.) für die jeweiligen Endanwendungen zur Verfügung stellen müssen.

Wenn Sie Ihre Nutzung daher über den 24. August 2020 hinaus im Rahmen des anhängigen (vorgelagerten) Genehmigungsantrags fortsetzen möchten, müssen Sie einen Beitrag zur Datenerfassung des Substitutionsplans leisten. Die CTACSub-Mitglieder können diesen Substitutionsplan nicht ohne umfassende und qualitativ hochwertige Eingaben der nachgeschalteten Anwender von Verwendung 3 erstellen. Die zur Verfügung zu stellenden Informationen müssen detailliert und aktuell sein. Wenn Sie Ihren Beitrag nicht leisten, erhalten wir keine Genehmigung für die Verwendung 3. Folglich müssen alle Lieferungen an alle nachgeschalteten Anwender der Verwendung 3, die sich auf CTACSub verlassen, spätestens 2021 eingestellt werden. Bitte senden Sie Ihrem unmittelbaren Lieferanten das von Ramboll erhaltene Zertifikat nach Ausfüllen des Fragebogens.

Die von Ihnen angegebenen Informationen werden als „vertrauliche Geschäftsinformationen“ behandelt. Der technische Berater von CTACSub, Ramboll, wird als Treuhänder für Dritte fungieren und diese Informationen aggregieren und neutralisieren, bevor sie der Europäischen Kommission vorgelegt werden.

Die CTACSub-Mitglieder werden daher die folgenden Schritte unternehmen und um die Eingaben ALLER ihrer nachgeschalteten Anwender bitten:

- CTACSub arbeitet an einem Online-Fragebogen, der von ALLEN nachgeschalteten Anwendern, die sich weiterhin auf diesen Antrag auf Genehmigung zur Verwendung 3 verlassen möchten, gründlich ausgefüllt werden muss. Der Online-Fragebogen wird in Englisch, Französisch, Deutsch, Italienisch und Spanisch bereitgestellt.
- Sie müssen sich unter <https://surveys.ramboll.com/LinkCollector?key=6RAA1MNNSN1P> registrieren, um Ihre eigene Einladung zur Umfrage zu erhalten. Sobald Sie sich registriert haben, sendet Ihnen Ramboll einen Link zur Umfrage in der Sprache Ihrer Wahl.
- Der technische Berater von CTACSub, Ramboll, wird eine Reihe von Webinaren abhalten, in denen erläutert wird, wie der Online-Fragebogen ausgefüllt werden soll. Der Zeitplan für Webinare ist im Fenster unten enthalten.
- Die nachgeschalteten Anwender werden gebeten, sich mit dem Online-Fragebogen vertraut zu machen, an einem Webinar ihrer Wahl teilzunehmen und bei diesem Webinar alle erforderlichen Erläuterungen zu erfragen. Links zum Webinar werden ausgegeben, wenn Sie den ersten Registrierungsschritt abgeschlossen haben.
- Die nachgeschalteten Anwender müssen dann die Online-Fragebögen bis zum 15. Mai 2020 ausfüllen. Nachgeschaltete Anwender, die den vollständig ausgefüllten Fragebogen bis zu diesem Datum nicht zurücksenden, gelten als nicht mehr auf diesen anhängigen Antrag auf Zulassung angewiesen bzw. wir können davon ausgehen, dass Sie kein Chromtrioxid zur Verwendung 3 mehr benötigen.

Branchenverbände und OEMs können freiwillig auch den Fragebogen ausfüllen und einreichen oder zusätzliche detaillierte Informationen bereitstellen. Ihre Eingabe wird jedoch nur verwendet, um die Informationen einzelner nachgeschalteter Anwender zu ergänzen. Diese Eingaben werden die Eingaben der einzelnen nachgeschalteten Anwender nicht ersetzen.

Zeitplan der Webinare	
<ul style="list-style-type: none"> <li>• Montag 6. April – 11.00h CET Deutsch</li> <li>• Montag 6. April – 15.00h CET Italienisch</li> <li>• Montag 6. April – 16.00h CET English</li> </ul>	<ul style="list-style-type: none"> <li>• Dienstag 7. April – 15.00h CET Französisch</li> <li>• Dienstag 7. April – 16.00h CET Spanisch</li> </ul>

Vielen Dank für Ihre Aufmerksamkeit und Ihre Rückmeldungen für diese sehr wichtige Datenerfassung!

#### Die Mitglieder des CTACSub-Konsortiums

<sup>1</sup> Weitere Informationen finden Sie in den Fragen und Antworten sowie in den Pressemitteilungen unter [www.jonesdayreach.com](http://www.jonesdayreach.com).

<sup>2</sup> EU-Gericht T-837/16; Schweden hatte die Aufhebung einer REACH-Zulassungsentscheidung der Kommission für einen anderen Stoff beantragt. Die Europäische Kommission hat gegen diese Entscheidung des Gerichts aus mehreren Gründen Berufung eingelegt.

<sup>3</sup> Nach der Einreichung bis zum 24. August 2020 wird das SEAC-Komitee der ECHA den Substitutionsplan prüfen. Eine Empfehlung wird dann der Europäischen Kommission voraussichtlich Anfang 2021 zur Entscheidung über die Zulassung der Verwendung 3 vorgelegt.

<sup>4</sup> Chemservice GmbH in its legal capacity as Only Representative of **Brother CISA** (formerly LANXESS Deutschland GmbH in its legal capacity as Only Representative of LANXESS CISA (Pty) Ltd.); **Atotech Deutschland GmbH**; **Boeing Distribution, Inc.** [name of applicant in the original application: Aviall Services Inc updated due to a notified change of corporate name]; Prosper Chemical Logistic OÜ as Only Representative of **Aktyubinsk Chromium Chemicals Plant, Kazakhstan** [application transferred from: "Prosper Chemical Logistic Baltic OÜ as Only Representative of Aktyubinsk Chromium Chemicals Plant, Kazakhstan" due to a notified change of Only Representative] [application transferred from original Applicant: "BONDEX TRADING LTD in its legal capacity as Only Representative of Aktyubinsk Chromium Chemicals Plant, Kazakhstan" due to a notified change of Only Representative]; CROMITAL S.P.A. in its legal capacity as Only Representative of **Soda Sanayii A.S.**; **Elementis Chromium LLP** in its legal capacity as Only Representative of Elementis Chromium Inc; **MacDermid Enthone GmbH** [name of co-applicant in the original application: Enthone GmbH updated due to a notified legal entity name change].

<sup>5</sup> Mehrere andere Antragsteller für funktionale Beschichtungen mit dekorativem Charakter wurden ebenfalls gebeten, einen Substitutionsplan vorzulegen.

<sup>6</sup> Die Europäische Kommission hat noch nicht entschieden, ob solche Fristen aufgrund der Coronavirus / Covid-19-Pandemie verlängert werden sollen.

## CTACSub Consortium

Note d'Information

Le 30 Mars 2020

### A destination des Utilisateur en aval

Des Membres du Consortium CTACSub

Utilisant du Trioxyde de Chrome dans le cadre de son « Utilisation 3 »

### Chromage fonctionnel à but décoratif

Chers Utilisateurs en aval,

Merci de lire attentivement cette Note d'Information si vous utilisez du Trioxyde de Chrome comme substance ou dans un mélange pour un chromage fonctionnel à but décoratif (« Utilisation 3 ») qui vous a été fourni directement ou indirectement (par des distributeurs ou des mélangeurs) par l'une des entreprises suivantes :

- Atotech Deutschland GmbH
- JSC (Aktyubinsk Chromium Chemicals Plant)
- Elementis
- Brother CISA (formerly LANXESS)
- MacDermid Enthone
- Sisecam (Soda Sanayii A.S.)

La demande d'autorisation des Membres du Consortium CTACSub est toujours pendante auprès de la Commission Européenne.<sup>1</sup> S'agissant de l'Utilisation 3, la Commission Européenne a décidé de suspendre<sup>2</sup> la procédure d'autorisation pour des raisons juridiques<sup>3</sup> et a demandé aux demandeurs<sup>4,5</sup>, aux termes d'un courrier en date du 24 février 2020, de réaliser et de soumettre un « Plan de Remplacement » avant le 24 août 2020.<sup>6</sup>

Le Plan de Remplacement doit être soumis par les demandeurs en amont et réalisé sur la base des informations communiquées par les Utilisateurs en aval. Vous ne devez en aucun cas soumettre votre propre plan de substitution à la Commission Européenne.

Un Plan de Remplacement est un document par lequel les demandeurs doivent fournir des informations sur les efforts de remplacement du Trioxyde de Chrome (calendrier, R&D et investissement dans des alternatives, raisons pour lesquelles une substitution n'est pas possible pour une utilisation définie) dans le cadre des demandes d'autorisation pour une utilisation précise.

Si vous souhaitez poursuivre votre utilisation au-delà du 24 août 2020 dans le cadre de la demande d'autorisation (en amont) pendante, vous devez contribuer à la collecte d'informations pour le Plan de Remplacement. Les Membres du CTACSub ne sont pas en mesure de réaliser ce Plan de Remplacement sans la précieuse contribution des Utilisateurs en aval pour l'utilisation 3. Les informations communiquées doivent être complètes, détaillées et à jour. Si vous ne participez pas comme demandé, les membres du CTACSub ne recevront pas d'autorisation pour l'Utilisation 3. En conséquence, toutes les livraisons pour tous les Utilisateurs en aval de cette Utilisation 3 qui dépendent du CTASub devront s'arrêter au plus tard en 2021. Veuillez remettre à vos fournisseurs immédiats le certificat que Ramboll vous remettra après que vous aurez rempli le questionnaire.

Les informations que vous communiquerez seront traitées comme des « données commerciales confidentielles ». Ramboll, le consultant technique du CTACSub, agira comme tiers de confiance afin d'agrèger et de neutraliser l'ensemble des données avant toute soumission à la Commission.

Les Membres du CTACSub demandent à TOUS leurs Utilisateurs en aval de collaborer dans le cadre du processus qu'ils ont arrêté :

- CTACSub élabore en ce moment un questionnaire en ligne qui devra être rempli de manière détaillée par TOUS les Utilisateurs en aval qui souhaitent pouvoir continuer à bénéficier de la demande d'autorisation pour l'Utilisation 3. Ce questionnaire sera disponible en anglais, en français, en allemand, en italien et en espagnol.
- Afin de recevoir une invitation à remplir le questionnaire, vous devez vous enregistrer sur la plateforme <https://surveys.ramboll.com/LinkCollector?key=6RAA1MNNSN1P>. Une fois enregistrés, Ramboll vous enverra un lien vers le questionnaire dans la langue de votre choix.
- Après avoir communiqué le questionnaire, Ramboll, le consultant technique du CTACSub donnera plusieurs webinaires afin d'expliquer comment remplir ce questionnaire. Le calendrier des webinaires est détaillé dans l'encadré ci-dessous.
- Les utilisateurs en aval devront se familiariser avec le questionnaire, assister à un webinaire de leur choix et demander lors de ce webinaire les précisions dont ils ont besoin. Les liens vers les webinaires seront fournis une fois que vous aurez accompli la phase d'enregistrement.
- Les utilisateurs en aval devront compléter ce questionnaire avant le 15 mai 2020. Les utilisateurs en aval qui ne retourneront pas le questionnaire entièrement complété avant cette date seront considérés comme ne souhaitant plus bénéficier de la demande d'autorisation pendante et/ou comme n'utilisant de Trioxyde de Chrome pour son Utilisation 3.

Les associations industrielles et les fabricants d'équipement d'origine (MOEs) peuvent également remplir et soumettre à titre volontaire le questionnaire ou communiquer des informations additionnelles détaillées. Toutefois, leur contributions ne seront utilisées que pour compléter les informations des Utilisateurs en aval. Elles ne s'y substitueront pas.

Calendrier des webinaires	
<ul style="list-style-type: none"> <li>• Lundi 6 Avril – 11 h CET Allemand</li> <li>• Lundi 6 Avril – 15 h CET Italien</li> <li>• Lundi 6 Avril – 16 h CET Anglais</li> </ul>	<ul style="list-style-type: none"> <li>• Mardi 7 Avril – 15 h CET Français</li> <li>• Mardi 7 Avril – 16 h CET Espagnol</li> </ul>

En vous remerciant pour votre attention et pour votre participation à cet important travail de collecte de données.

#### Les Membres du Consortium CTACSub

<sup>1</sup> Pour plus d'informations, veuillez consulter les Q&Rs et les communiqués de presse disponibles sur [www.jonesdayreach.com](http://www.jonesdayreach.com).

<sup>2</sup> Après la soumission du Plan de Remplacement avant le 24 août 2020, le Comité CASE de l'ECHA's l'examinera. Ce Comité émettra alors une recommandation sur une décision sur l'autorisation de l'Utilisation 3 qu'il communiquera à la Commission Européenne probablement début 2021.

<sup>3</sup> Décision T-837/16 du Tribunal de l'Union Européenne; la Suède a sollicité l'annulation de l'autorisation REACH délivrée par la Commission pour une autre substance. La Commission Européenne a fait appel de cette décision du Tribunal sur plusieurs fondements.

<sup>4</sup> Chemservice GmbH in its legal capacity as Only Representative of **Brother CISA** (formerly LANXESS Deutschland GmbH in its legal capacity as Only Representative of LANXESS CISA (Pty) Ltd.); **Atotech Deutschland GmbH**; **Boeing Distribution, Inc.** [name of applicant in the original application: Aviall Services Inc updated due to a notified change of corporate name]; Prosper Chemical Logistic OÜ as Only Representative of **Aktyubinsk Chromium Chemicals Plant, Kazakhstan** [application transferred from: "Prosper Logistic Baltic OÜ as Only Representative of Aktyubinsk Chromium Chemicals Plant, Kazakhstan" due to a notified change of Only Representative] [application transferred from original Applicant: "BONDEX TRADING LTD in its legal capacity as Only Representative of Aktyubinsk Chromium Chemicals Plant, Kazakhstan" due to a notified change of Only Representative]; CROMITAL S.P.A. in its legal capacity as Only Representative of **Soda Sanayii A.S.**; **Elementis Chromium LLP** in its legal capacity as Only Representative of Elementis Chromium Inc; **MacDermid Enthone GmbH** [name of co-applicant in the original application: Enthone GmbH updated due to a notified legal entity name change].

<sup>5</sup> Il a également été demandé à plusieurs autres demandeurs pour une utilisation de chromage fonctionnel à but décoratif de soumettre un Plan de Remplacement.

<sup>6</sup> La Commission Européenne n'a pas encore décidé de prolonger ces délais en raison de la pandémie du Coronavirus/Covid- 19.

## Consorzio CTACSub

Nota Informativa

30 Marzo 2020

Alla cortese attenzione degli Utilizzatori a valle dei membri del Consorzio CTACSub che impiegano il Triossido di cromo per uso 3 'Cromatura funzionale con carattere decorativo'

Egregi Utilizzatori a valle,

Qualora stiate impiegando il triossido di cromo quale sostanza o miscela per cromatura funzionale con carattere decorativo, incluso il pretrattamento (ad esempio acquaforte) (uso 3), e lo stesso vi sia stato fornito direttamente o indirettamente (tramite i distributori o i responsabili della formulazione) da una delle società indicate di seguito, siete pregati di voler leggere con attenzione la presente Nota Informativa.

- Atotech Deutschland GmbH
- JSC (Aktyubinsk Chromium Chemicals Plant)
- Elementis
- Brother CISA (formerly LANXESS)
- MacDermid Enthone
- Sisecam (Soda Sanayii A.S.)

La domanda di autorizzazione REACH dei membri del Consorzio CTACSub è ancora pendente dinnanzi alla Commissione Europea<sup>1</sup>. Per l'uso 3, la Commissione Europea ha deciso di sospendere<sup>2</sup> la procedura autorizzativa per motivi legali<sup>3</sup> e, mediante lettera del 24 febbraio 2020, ha richiesto agli interessati<sup>45</sup> di redigere e presentare un cosiddetto Piano di Sostituzione entro il 24 agosto 2020<sup>6</sup>.

Il Piano di Sostituzione deve essere presentato dai richiedenti a monte e deve essere basato sulle informazioni degli Utilizzatori a valle. Il proprio Piano di Sostituzione non deve essere presentato alla Commissione Europea.

Un Piano di Sostituzione è un documento tramite il quale il richiedente deve fornire informazioni sul tentativo di sostituzione del Triossido di cromo (programma, sostituzioni dei rilasci drop-in, R&S e investimenti in sostanze alternative, motivi per cui la sostituzione non è possibile per un uso specifico, ecc.) per gli specifici utilizzi finali delle richieste.

Qualora intendiate continuare il Vostro utilizzo successivamente al 24 agosto 2020 in forza della richiesta di autorizzazione (a monte) pendente, dovete contribuire alla raccolta dei dati per il Piano di Sostituzione. I membri del CTACSub non possono redigere tale Piano di Sostituzione senza contributi completi e di qualità da parte degli Utilizzatori a valle dell'uso 3. Le informazioni da fornire devono essere dettagliate e aggiornate. Qualora i contributi non saranno presentati come richiesto, non riceveremo l'autorizzazione per l'uso 3. Di conseguenza, tutte le consegne a tutti gli utenti a valle dell'uso 3 che fanno affidamento sul Consorzio CTACSub dovranno terminare entro il 2021. Si prega di voler fornire al proprio fornitore immediato il certificato ricevuto da Ramboll per la compilazione del questionario.

Le informazioni fornite verranno trattate come "informazioni commerciali confidenziali". Il consulente tecnico del CTACSub, Ramboll, agirà quale amministratore fiduciario di terze parti, aggregnerà e anonimizzerà tali informazioni prima della presentazione alla Commissione Europea.

I membri del Consorzio CTACSub dovranno dunque seguire i seguenti passaggi e richiedere il contributo da parte di TUTTI i loro utilizzatori a valle:

- Il Consorzio CTACSub sta lavorando a un questionario online che dovrà essere compilato in ogni sua parte da TUTTI gli utenti a valle che desiderano continuare a fare affidamento su

questa domanda di autorizzazione per l'uso 3. Il questionario online sarà disponibile in inglese, francese, tedesco, italiano e spagnolo.

- Occorre registrarsi al sito <https://surveys.ramboll.com/LinkCollector?key=6RAA1MNNSN1P> al fine di ricevere il proprio invito al questionario. Una volta registrati, Ramboll invierà il link al questionario nella lingua di vostra scelta.
- Dopo aver pubblicato il questionario, Ramboll, il consulente tecnico del Consorzio CTACSub, terrà una serie di *webinar* per illustrare come compilare il questionario online. Il programma dei *webinar* è disponibile nel box riportato di seguito.
- Gli utenti a valle sono pregati di familiarizzare con il questionario online, partecipare a un *webinar* di loro scelta ed eventualmente chiedere in occasione dello stesso eventuali chiarimenti di cui abbiano bisogno. I link al *webinar* verranno forniti al completamento della fase di registrazione iniziale.
- Gli utenti a valle devono quindi compilare i questionari online entro il 15 maggio 2020. Gli utenti a valle che non inviano il questionario debitamente compilato entro tale data saranno considerati come soggetti che non fanno più affidamento su tale domanda di autorizzazione in sospeso e/o che non impiegano più il triossido di cromo per uso 3.

Anche le associazioni di categoria e gli OEM possono compilare e inviare il questionario su base volontaria o fornire ulteriori informazioni dettagliate. Tuttavia, il loro contributo verrà utilizzato esclusivamente per integrare le informazioni dei singoli utilizzatori a valle. Il loro questionario non sostituirà quello inviato dagli utilizzatori a valle.

Programma dei <i>webinar</i>	
<ul style="list-style-type: none"><li>• Lunedì 6 Aprile – 11am CET tedesco</li><li>• Martedì 6 Aprile – 3pm CET italiano</li><li>• Mercoledì 6 Aprile – 4pm CET inglese</li></ul>	<ul style="list-style-type: none"><li>• Giovedì 7 Aprile – 3pm CET francese</li><li>• Giovedì 7 Aprile – 4pm CET spagnolo</li></ul>

Vi ringraziamo per la Vs. cortese attenzione e per il contributo necessario ai fini dell'espletamento di questo importantissimo esercizio di raccolta dati!

I membri del Consorzio CTACSub

<sup>1</sup> Per maggiori informazioni, si prega di voler far riferimento ai documenti di Domande & Risposte e ai comunicati stampa disponibili al seguente indirizzo: [www.jonesdayreach.com](http://www.jonesdayreach.com).

<sup>2</sup> Successivamente alla presentazione entro il 24 agosto 2020, il comitato SEAC dell'ECHA esaminerà il piano di sostituzione. Una raccomandazione per una decisione sull'autorizzazione dell'uso 3 verrà quindi presentata alla Commissione Europea probabilmente all'inizio del 2021.

<sup>3</sup> Tribunale dell'Unione Europea, procedimento T-837/16: la Svezia aveva richiesto l'annullamento di una decisione di autorizzazione REACH della Commissione Europea per un'altra sostanza. La Commissione ha impugnato tale decisione del Tribunale sulla base di diversi motivi in diritto.

<sup>4</sup> Chemservice GmbH in its legal capacity as Only Representative of **Brother CISA** (formerly LANXESS Deutschland GmbH in its legal capacity as Only Representative of LANXESS CISA (Pty) Ltd.); **Atotech Deutschland GmbH**; **Boeing Distribution, Inc.** [name of applicant in the original application: Aviall Services Inc updated due to a notified change of corporate name]; Prosper Chemical Logistic OÜ as Only Representative of **Aktyubinsk Chromium Chemicals Plant, Kazakhstan** [application transferred from: "Prosper Logistic Baltic OÜ as Only Representative of Aktyubinsk Chromium Chemicals Plant, Kazakhstan" due to a notified change of Only Representative] [application transferred from original Applicant: "BONDEX TRADING LTD in its legal capacity as Only Representative of Aktyubinsk Chromium Chemicals Plant, Kazakhstan" due to a notified change of Only Representative]; CROMITAL S.P.A. in its legal capacity as Only Representative of **Soda Sanayii A.S.**; **Elementis Chromium LLP** in its legal capacity as Only Representative of Elementis Chromium Inc; **MacDermid Enthone GmbH** [name of co-applicant in the original application: Enthone GmbH updated due to a notified legal entity name change].

<sup>5</sup> Anche ad altri diversi altri richiedenti per il rivestimento funzionale con carattere decorativo è stato chiesto di presentare un piano di sostituzione.

<sup>6</sup> La Commissione Europea non ha ancora deciso se prolungare tali termini a causa della pandemia di Coronavirus/Covid-19.

## CTACSub Consortium

Nota informativa  
30 de marzo de 2020

### A los Usuarios Intermedios

miembros del Consorcio del CTACSub  
que utilizan el trióxido de cromo para  
“recubrimientos cromados con fines decorativos” (Uso 3)

Estimados Usuarios,

Si utilizan el trióxido de cromo o una mezcla con dicha sustancia, para recubrimientos cromados con fines decorativos, incluidos los tratamientos previos (como el aguafuerte) (Uso 3), suministrado directa o indirectamente (a través de distribuidores o fabricantes) por cualquiera de las empresas que se indican a continuación, por favor, lean atentamente este aviso informativo.

- Atotech Deutschland GmbH
- JSC (Aktyubinsk Chromium Chemicals Plant)
- Elementis
- Brother CISA (formerly LANXESS)
- MacDermid Enthone
- Sisecam (Soda Sanayii A.S.)

La Comisión Europea<sup>1</sup> sigue pendiente de resolver la solicitud de autorización REACH de los miembros del Consorcio CTACSub. Para el Uso 3, la Comisión Europea ha decidido suspender<sup>2</sup> el procedimiento de autorización por razones legales<sup>3</sup> y ha pedido a los solicitantes<sup>4 5</sup>, mediante carta fechada el 24 de febrero de 2020, que elaboren y presenten un “Plan de Sustitución” antes del 24 de agosto de 2020.<sup>6</sup>

El Plan de Sustitución tiene que ser presentado por los solicitantes anteriores y debe basarse en la información de los Usuarios Intermedios. Por favor, no presente su propio Plan de Sustitución a la Comisión Europea.

Un Plan de Sustitución es un documento en el que el solicitante o solicitantes deben proporcionar información sobre las medidas tomadas para la efectiva sustitución del trióxido de cromo (calendario, sustituciones, I+D e inversiones en alternativas; razones por las que la sustitución no es factible para un uso específico, etc.) para los propósitos a los que estaba destinado.

Si desea continuar empleando el producto más allá del 24 de agosto de 2020 en virtud de la solicitud de autorización pendiente mencionada, debe contribuir a la recopilación de datos del Plan de Sustitución. Los miembros de CTACSub no pueden elaborar este Plan de Sustitución sin una aportación exhaustiva y de calidad de los usuarios intermedios. La información que nos proporcionen deberá ser completa y actualizada. Es necesario que nos envíen la información solicitada, pues, de no hacerlo, no se nos concederá la autorización para el Uso 3. En tal caso, se detendrán todas las entregas a los usuarios del Uso 3 que dependan del CTACSub, a más tardar en 2021. Por favor, entregue a su proveedor inmediato el certificado recibido de Ramboll. Ramboll emitirá el certificado después de que los usuarios hayan rellenado el cuestionario, no antes.

Esta información será tratada como "información comercial confidencial". El consultor técnico del CTACSub, Ramboll, actuará como tercero fiduciario y la editará y anonimizará para su presentación a la Comisión Europea.

Por ello, los miembros del CTACSub tomarán las siguientes medidas y pedirán la opinión de TODOS sus usuarios:



- CTACSub está preparando un cuestionario on-line para ser completado por TODOS los usuarios que deseen seguir adherirse a la solicitud de autorización para el uso 3. El cuestionario on-line será publicado en inglés, francés, alemán, italiano y español.
- Debe registrarse en <https://surveys.ramboll.com/LinkCollector?key=6RAA1MNNSN1P> para recibir una invitación a la encuesta. Una vez que se haya registrado, Ramboll le enviará un enlace a la encuesta en el idioma que usted prefiera.
- El consultor técnico del CTACSub, Ramboll, llevará a cabo una serie de seminarios web para explicarles cómo rellenar el cuestionario on-line. El calendario de los seminarios web se muestra en el cuadro del final de la página.
- Se pide a los usuarios que se vayan familiarizando con el cuestionario on-line, que asistan a un seminario web de su elección y que pregunten sus dudas en ese seminario web y soliciten las aclaraciones que consideren oportunas.
- Los usuarios deberán rellenar los cuestionarios on-line antes del 15 de mayo de 2020. Se considerará que los usuarios que no envíen el cuestionario totalmente cumplimentado para entonces ya no dependen de esa solicitud de autorización pendiente y/o ya no trabajan con el trióxido de cromo para uso 3.

Las asociaciones industriales y los fabricantes de equipo original también pueden rellenar y enviar voluntariamente el cuestionario o proporcionar información adicional detallada. Sin embargo, sus aportaciones se utilizarán únicamente para complementar la información de los usuarios individuales de la fase posterior. No la sustituirá.

Calendario de seminarios web	
<ul style="list-style-type: none"> <li>• Lunes 6 de abril – 11am CET en alemán</li> <li>• Lunes 6 de abril – 3pm CET en italiano</li> <li>• Lunes 6 de abril – 4pm CET en inglés</li> </ul>	<ul style="list-style-type: none"> <li>• Martes 7 de abril – 3pm CET en francés</li> <li>• Tuesday 7 April – 4pm CET en español</li> </ul>

¡Agradecemos encarecidamente su atención y su esfuerzo en este importante ejercicio de recopilación de datos!

Atentamente, el Consorcio CTACSub.

<sup>1</sup> Para más información, por favor vea las preguntas y respuestas y los comunicados de prensa disponibles en [www.jonesdayreach.com](http://www.jonesdayreach.com).

<sup>2</sup> Después de la presentación de la solicitud para el 24 de agosto de 2020, el Comité SEAC de la ECHA examinará el Plan de Sustitución. A continuación, se presentará una recomendación a la Comisión Europea, probablemente a principios de 2021, para la decisión sobre la autorización del Uso 3.

<sup>3</sup> Tribunal General de la UE T-837/16; Suecia había solicitado la anulación de una decisión de autorización REACH de la Comisión para otra sustancia. La Comisión Europea ha apelado esta decisión del Tribunal General por varios motivos.

<sup>4</sup> Chemservice GmbH in its legal capacity as Only Representative of **Brother CISA** (formerly LANXESS Deutschland GmbH in its legal capacity as Only Representative of LANXESS CISA (Pty) Ltd.); **Atotech Deutschland GmbH**; **Boeing Distribution, Inc.** [name of applicant in the original application: Aviall Services Inc updated due to a notified change of corporate name]; Prosper Chemical Logistic OÜ as Only Representative of **Aktyubinsk Chromium Chemicals Plant, Kazakhstan** [application transferred from: "Prosper Chemical Logistic OÜ as Only Representative of Aktyubinsk Chromium Chemicals Plant, Kazakhstan" due to a notified change of Only Representative] [application transferred from original Applicant: "BONDEX TRADING LTD in its legal capacity as Only Representative of Aktyubinsk Chromium Chemicals Plant, Kazakhstan" due to a notified change of Only Representative]; CROMITAL S.P.A. in its legal capacity as Only Representative of **Soda Sanayii A.S.**; **Elementis Chromium LLP** in its legal capacity as Only Representative of Elementis Chromium Inc; **MacDermid Enthone GmbH** [name of co-applicant in the original application: Enthone GmbH updated due to a notified legal entity name change].

<sup>5</sup> También se ha pedido a varios otros solicitantes de revestimientos metálicos decorativos que presenten un Plan de Sustitución.

<sup>6</sup> La Comisión Europea aún no ha decidido si prolongará dichos plazos debido a la pandemia Coronavirus / Covid-19.

## SUBSTITUTION PLAN

### ANNEX III – PRODUCTS MANUFACTURED BY DOWNSTREAM USERS AFFECTED BY USE GROUP 3

In the subsequent sections a summary of the products affected by use group 3 is provided. The products were sorted according to substrate (*i.e.* plastic / metal) and the market sector for which they are produced.

The section does not differentiate between *plating* and *etching* as all products treated by *etching* are finally chrome plated (no products result from *etching* only).

*Please note that the summary tables provided for each market sector described solely the feedback from the DU survey. Therefore, the product lists only provide an exemplary overview of the market and are not comprehensive.*

**Table 27: Products affected in market sector "Sanitary"**

Substrate	Application	Product
<b>Plastic</b>	Bathroom appliances	Shower components/accessories, heating valves, handrails, handles, buttons for toilet cistern, bathroom fittings, faucet mounts, water taps, hooks, towel holders, covers for toilet systems, toilet fittings, water meters, temperature controllers, soap dispensers, hand dryers, sink outlets, bathroom mixer covers, foot covers, toilet brushes, water basins
	Consumer goods	Toothbrushes, shaving machines
	Plumbing	Tubes, fittings, pipes
<b>Metal</b>	Bathroom and kitchen appliances (private households, private buildings, hotels, public installations, industry, semi-public installations)	Faucet fittings, shower heads, shower bodies, rosettes, levers, bath plates, knobs, soap dishes, bathroom furniture components, washing basins, toilets, flushing systems, handles, pipes, fittings, towel holders, toilet paper holders, hooks, covers, bidets, valve covers, rotatory valves, soap dispenser, water pipes, spa fittings, hand dryers, outlets, sink connections, valve plugs for drains, overflow valves, mirrors, mirror furniture, decorative components, brush holder, bathroom brushes, sponge baskets, shower bars for disabled people, sanitary bag dispensers, tap extensions, angle valves, urinals, washbasin hole covers, radiators, temperature sensors, floor outlets
	Kitchen appliances	Faucet fittings, handles, extractor hoods, knobs, decorative components, dishwashing equipment, counter fittings
	Consumer products/others	Coffee machine parts, wire laundry baskets, fruit juicers, hose reel systems, beer and soft drink dispensers
	Plumbing	Parts for pneumatic mechanisms, tubes, pipes, frames, high pressure fittings, water meters, thermostat valves, hydraulic valves, pneumatic mechanisms, spouts, disposal bins, water-saving equipment, tube fittings, heating equipment, water connections, flow controllers, hoses, crane bodies
	Cleaning parts	Parts for cleaning cart and polishing machines

## SUBSTITUTION PLAN

**Table 28: Products affected in market sector "Automotive"**

Substrate	Application	Product
<b>Plastic</b>	Light weight and heavy-duty vehicles (interior parts)	Door handles, door knobs, buttons, decorative pieces, emblems, steering wheel components, gearshift levers, gearshift paddles, buttons, buttons with backlighting, caps, logos, lettering, dashboard covers, consoles, ventilis, breaking pedals, cockpit frames, covers for loudspeakers, seatbelt decoupling disks, seat adjusters, headrests, sensor aids, radio frames, switches, cupholders, mirrors, cap for ignition switch, hand break levers, ash trays, hinges on armrests, door levers, clocks, locking cylinders in heater box, interior mirror rods mirror brackets, motif bars, speaker grille meshes, door sills, restored pieces for old models, rear-view mirrors
	Light weight and heavy-duty vehicles (interior parts)	Front grilles, emblems, mirror caps, ledges, decorative strips, bumpers, decorative mouldings, wheel covers, ventilation inlet frames, valve displays, door handles, side strips, fog lamp covers, radiator guard frame, bottom covers, tailpipe covers, plaques, odometer, bezels, skid plates, fender vents, lift gate handles, exterior badges, tyre valve fittings, fuel tank covers, hub caps, mounts, restored pieces for old models
	Motorcycles	Fuel tanks, fenders, footrest, mudguards, trim parts, symbols, emblems, windshield frames, mufflers, headrest frames, fork shrouds, bezels, sump guards, tank badges
	Others	Car keys, key buttons, tyre air pressure attachment, airbag components
<b>Metal</b>	Light weight and heavy-duty vehicles (interior parts)	Door handles, door knobs, buttons, decorative pieces, emblems, steering wheels, gearshift levers, gearshift paddles, buttons, caps, logos, lettering, dashboard covers, consoles, ventilis, breaking pedals, cockpit frames, covers for loudspeakers, seatbelt guides, seatbelt decoupling disks, seat adjusters, headrests, sensor aids, radio frames, switches, cupholders, mirrors, cap for ignition switch, hand break levers, ash trays, hinges on armrests, door levers, clocks, locking cylinders in heater box, interior mirror rods, mirror brackets, motif bars, speaker grille meshes, door sills, restored pieces for old models
	Light weight and heavy-duty vehicles (interior parts)	Front grilles, emblems, mirror caps, ledges, decorative strips, bumpers, decorative strips, decorative mouldings, wheel covers, ventilation inlet frames, valve displays, door handles, side strips, fog lamp covers, radiator guard frame, bottom covers, tailpipe covers, plaques, odometer, bezels, skid plates, fender vents, lift gate handles, exterior badges, tyre valve fittings, fuel tank covers, plate holder, hub caps, wheel bolts, roof rack mounts, restored pieces for old models
	Motorcycles	Exhaust pipes, fuel tanks, wheel rims, fenders, front forks, rear shock absorber, footrests, mirrors, handlebars, silencer, downpipes, mudguards, chainguards, headlight rims, luggage carriers, trim parts, symbols, emblems, windshield frames, mufflers, exhaust pipes, headrest frames, fork shrouds, gear box levers, grab rails, handlebar eye bolts, headlamp brackets, heat shields, long curve tail pieces, lower cover tubes, meshes, mudguard stays, oil seal holders, pedals-gear change, pushrod cover tubes, rocker spindle dome nuts, seat knobs threaded, side stands, springs, steel rims, sump guards, tank badge screws, tank badges, wheels enclosed coils, ferrules, hinges, mounting studs, posts, socket cap screws, engine bars restored pieces for old models
	Others	Car keys, key buttons, tyre tread gauges, tyre air pressure attachment, elbow mandrels, airbag components, radio antenna components, break discs, battery compartments for electric cars, power supply rails

## SUBSTITUTION PLAN

**Table 29: Products affected in market sector "Furniture"**

Substrate	Application	Product
<b>Plastic</b>	Furniture and related parts	Wall plates for lighting, soap dishes, lamps, shelves, chairs, armchairs, handles, knobs, lightning covers, armrests, chair and table legs, logos, plugs, stands, furniture profiles, frames, fittings, cabinet handles, drawer handles, inserts for furniture handles, hinge covers for furniture doors, hinge covers for doors, hinge covers for windows, furniture body screws, furniture hole covers, ferrules for furniture handles, furniture inserts, furniture friezes, lighting lamp components, ferrules for lamps and chandeliers, parts of lamps and chandeliers, embellishing inserts for lamps and chandeliers, plates for bathroom fittings, buttons for bathroom fittings, small components for bathroom fittings, ferrules for bathroom fittings, knobs for bathroom fittings, taps for bathroom fittings, soap dishes, soap dispensers
	Household appliances, electronic devices and related parts	Stove and oven knobs, portholes for washing machines, intercom keys, teapots, cheese makers, juicers, beverage dispensers, coffee machine covers, grills, timer rings, telephone keys, refrigerator frames, washing machine components, paper and towel dispensers, ironing machine handles, detergent trays
<b>Metal</b>	Furniture articles and parts	Chairs, chair frames, tables, benches, desks, nightstands, shelves, cabinets, sofas, stools, furniture handles and hinges, locks, clothing racks for sales areas, shower cabin profiles, towel rails, dispenser, holders, hinges, handles, hangers, legs, armrests, panels, doorbells, license plates, lamps, lamp components, lamp fixtures, frames, trims, coat holders, napkin holders, office mobiliary, stalls, kitchen baskets, decorative metal articles, worktops, safe boxes, table frames, base crosses, drawers, laundry baskets, bookcases, ceiling roses, window fittings, letterboxes, grids, consoles, displays, dish racks, pantry units, shoe racks, name plates, side rails, bed heads, clocks, stove components, fireplace doors, wall trays, sockets, switch plates, door knobs
	House appliances and electronics	Television frames, touchpads, ovens, refrigerators, coffee machines, stoves, shaving machines, potato peelers, corkscrews, staplers, vacuum machine parts, cooking pots, pans, roasters and pressure cookers, pens, ink cartridges, hangers,
		Printing machines, parts for safety buttons, components for vending machines, components for slot machines, component for machines in the textile industry, baking machinery, plumbing machinery, weightlifting equipment, pole dancing equipment, components for sewing machines, components for packaging machines, refrigerator pieces
	Hospital mobiliary	Chairs, stools, trolleys, I.V holders, hospital beds, bed parts, stretchers, frames for neonatal incubators, monitor doors, visitor slides, window frames, tables, benches

## SUBSTITUTION PLAN

**Table 30: Products affected in market sector "Medical"**

Substrate	Application	Product
<b>Plastic</b>	Medical equipment	Ventilator components, laser devices, cases, buttons, housings, electrodes, cannulas, prostheses, pacemakers, stethoscopes, covers for electronic shielding, measuring devices, oxygen tanks
<b>Metal</b>	Medical, dental and veterinary equipment	Hospital equipment, supports, scrolling guides, connectors for dentist benches, walking equipment, wheelchairs, rehabilitation devices, supports for operating room chairs, aseptic components for operating rooms, oxygen valves, orthopaedic equipment, medical instruments, orthopaedic equipment, gas distribution valves, headrests for gynaecological chairs, detachable connections, respirators, ventilator systems, defibrillators, radiation shields, dentist equipment, veterinary equipment, needles, anaesthetising equipment, stair lift components, ball end stems, knee block parts, lateral brackets, eye and ear inspection equipment, rehabilitation instruments, oxygen and liquid carrying lines, plugs, hose clamps, flowmeter bodies and pressure reducers, X-ray machines, vacuum machines, life support machines, endoscopy apparatus, hearing equipment, ophthalmology instruments
	Laboratory supplies	Tripods, pliers, sequencing system components, microscope components, measuring devices, sensors, beakers, angle bars, handles, buttons,

**Table 31: Products affected in market sector "Cosmetics"**

Substrate	Application	Product
<b>Plastic</b>	Packaging	Perfume bottles and caps, casings, lipstick and mascara tubes, cream containers, hair care applicators, decorative elements for packaging, spray caps, vodka and cognac bottle corks,
	Consumer goods	Razor heads, belt and bag buckles, hairbrushes, hair combs
<b>Metal</b>	Packaging	Perfume caps and bottles, lipstick tubes and caps, packaging for cosmetic products
	Consumer products and parts	Pocket mirrors, fashion accessories, nail clippers, tweezers, badges, buttons, nippers, nail files, mirror frames, decorative elements for luxury items, handles for shaving machines, zippers

## SUBSTITUTION PLAN

**Table 32: Products affected in market sector "Others"**

Substrate	Application	Product
<b>Plastic</b>	Diverse appliances	Heels for shoes, studs for shoes, covers for leather, buttons for clothing, chains for clothing, chains for shoes and boots, costume jewellery for necklaces, bracelets, earrings, bracelets, puller for clothing, puller for boots, snap-on buckles for backpacks and handbags, snap-on buckles for underwear, snap-on buckles for swimsuits, clothing embellishment plates, rings for clocks, watch hands, trolley components, rings, bezels, heads and handles for umbrellas, logos, lettering, clothing labels
	Electronics and machinery	Electromagnetic shielding of electronic plugs, sewing machines, nozzles and controllers for varnishing devices, light switches, covers for mobile phones, frames for electronic equipment and displays, wire guide wheels for weaving machinery, light guide cylinders, levers and switches for electrical equipment, aesthetic parts for coffee machines, components for beverage dispensers
	Weapons and military	Covers for missile flares, sights for laser equipment, firefighter helmet components
<b>Metal</b>	Diverse appliances	Cow bells, dog collars, scaffolds, crossbows, shoulder straps, heat exchangers, decorative swords, fire sprinkler heads, diving equipment, turntables, device banderols with radioactive logos, safety signals on cruise ships, cabin numbers, fire door designations, descriptions of monuments, cycle path signals, descriptions of works of art, picture frames, keys, cutlery, trophies, roulette, transport tubes for airport luggage transportation, garden sprinklers, diving equipment, wall clocks, record players, steering and control equipment for kickboards and sleds, ice skate blades, fishing rods, rope fasteners, components for floor lamps, ceiling lights, suspensions, wall lamps and spotlights, record players, film industry equipment, USB modules, microphones, writing machines, sprinklers, signal horns for fire brigades, emergency doctors, ambulances and special vehicles including accessories such as snow protection caps, frames
	Electronics and machinery	Electrical components in relays, airplane cockpit components, mining tools, saws and knives for meat industry, road construction components, fire extinguisher supports, screwdrivers, spanners, ratchets, locks, steel rulers, measuring tubes, screws, pins, plates, caps, latches, hooks, hinges, buttons, joints, nuts, bezels, swivels, studs, rings, plates, cuffs, lock cases, shafts, gears, stands, levers, couplings, valves, brackets, pliers, sliders, cylinders, tractor components, drills, sharpeners, light switches, metal grid for metal printing, cameras, computer systems,
	Weapons and military	Rocket components, parts for guns, command joysticks, communication systems