

REACH and chromate coatings for aerospace, current status

Jim Rowbotham of Pexa takes Finishing through the latest regulations

The EU REACH regulation 1907 of 2006 controls the use of hazardous chemicals. All chemical substances have to be registered with ECHA (European Chemicals Agency) and substances of very high concern

“SVHCs”, such as CMRs (carcinogens, mutagens, reprotoxins) are required to be authorised and may not be used beyond their “sunset date” without authorisation. Annex XIV of REACH lists the substances which fall into this category. Annex XIV is an extremely important register of which chemicals are considered SVHCs and is updated with new entrants from time to time.

Compounds of hexavalent chromium (Cr VI) have been identified as SVHCs and have been allocated sunset dates. Their use as the principal corrosion inhibiting pigment in aerospace coatings is an important factor in the long-term protection of critical aerospace components. At present no alternative substances can be reliably shown to provide the same level of corrosion resistance for these applications.

The sunset dates for the Cr VI substances are in 2017 and 2019 (see specific dates below)

In line with the ECHA provisions for authorisation, a group of 28 companies formed a consortium - Chromium VI Compounds for Surface Treatment REACH Authorization “CCST” to develop applications for authorisation of the most important Cr VI substances.

Based on the Application for Authorisation (AfA); on the 9th December 2016 ECHA’s competent committees (“RAC” Risk Assessment Committee and “SEAC” Socio-economic Analysis Committee) have recommended the authorisation of the Cr VI substances for the uses applied for, if supplied by an authorised supplier. The authorisation, if adopted by the European Commission, will be for 7 years from the sunset dates. Although this authorisation will not be confirmed until it is published in the Official Journal of the European Commission (OJ), it is unlikely at this stage that it will not be granted.

3 key parameters can be identified

- 1) The SVHCs which will be authorised.
- 2) The uses for which those substances will be authorised.
- 3) The companies who have obtained authorisation and whose downstream users (DUs) will be able to make use of the authorisations. (These are a selected group of

Substance	Uses	Applicants (members of the submission groups)
S2	A, B	Henkel AG & Co. KGaA* Henkel Global Supply Chain B.V.
S3	A, B	Brenntag UK Ltd*
S4	A,B,C	Brenntag UK Ltd* Henkel AG & Co. KGaA AD International BV
S6	A,D	AkzoNobel Car Refinishes B.V.* Habich GmbH Henkel Global SupplyChain B.V. Indestructible Paint Ltd. Finalin GmbH Mapaero PPG Central (UK) Ltd in its legal capacity as Only Representative of PRC DeSoto International Inc. - OR5 PPG Industries (UK) Ltd PPG Coatings SA Aviall Services Inc.
S7		No applicant at this time
S8	A,E	PPG Industries (UK) Ltd * Finalin GmbH PPG Central (UK) Ltd in its legal capacity as Only Representative of PRC DeSoto International Inc. - OR5 PPG Coatings SA Aviall Services Inc.

the total consortium membership representing the upstream parties).

The SVHCs which have survived this process and been submitted for authorisation are

S2. Dichromium tris(chromate) CAS 24613-89-6 (sunset 22-1-19)

S3. Potassium Dichromate CAS 7778-50-9 (sunset 21-9-17)

S4. Sodium Dichromate CAS 10588-01-9 & 7789-12-0 (sunset 21-9-17)

S6. Strontium Chromate CAS 7789-06-2 (sunset 22-1-19)

S8. Potassium hydroxyoctaoxidizincatedichromate (often called Zinc Potassium Chromate) CAS 11103-86-9 (sunset 22-1-19)

Another substance (S7) Pentazinc chromate octahydroxide (zinctetrahydroxide chromate or zinc tetroxochromate) CAS 49663-84-5 had a draft application for authorisation but has not yet gone forward as an application. The deadline for an application would be 22nd July 2017 and for aerospace applications only.

The uses for which the applications have been made are as below. Different substances have different applications (see table 1).

A - Formulation of mixtures

B - Surface treatment of metals such as aluminium, steel, zinc, magnesium, titanium, alloys, composites and sealings of anodic films.

C - The electrolytic passivation of tin plated steel for the packaging industry

D - Application of paints, primers and specialty coatings containing Strontium Chromate in the construction of aerospace and aeronautical parts, including aeroplanes / helicopters, spacecraft, satellites, launchers, engines, and for the maintenance of such constructions.

E - Use of potassium hydroxyoctaoxidizincatedichromate in paints, in primer, sealants, and coatings (including as wash primers) [specifically for aerospace].

This authorisation structure limits the use of the substances to the authorised applicants or their DUs. At this stage CCST members are still able to join applications for additional submission groups. Non CCST members are able to benefit from access to the application dossiers of the CCST in order to make their own applications. This may be done by purchasing a letter of access from the CCST manager Jones Day at www.jonesdayreach.com.

In the field of aerospace paints, S6 Strontium Chromate (SrCrO₆) is of great importance as it is the main corrosion inhibiting pigment used in primers approved for the manufacture of primary metallic structures. The authorisation will permit Downstream Users (DUs) of the authorised suppliers to continue to use these products for the approved uses for the authorisation period (sunset + 7 years). Authorisations only flow downstream so an authorisation can only apply to the customer of an authorised party and not a supplier.

If the authorisations are not finalised before the sunset dates then the SHVCs may be used in line with all the stipulations of the pending authorisation.

Key Factors

- Substitution of Strontium Chromate for a less hazardous alternative must be done wherever technically possible

- Additional control measures will be required to manage the exposure scenarios (ES). The workplace and environmental requirements of the authorisation will apply.
- Note should be taken of Article 33 which covers actions if the amount of SrCrO₆ in a manufactured article exceeds 0.1% w/w. This concerns coated equipment and requires modelling of the weight vs. surface area, extensive work on this is available from the author.

The other uses such as in wash primers and conversion coatings will follow the same process.

The fact that the uses are authorised does not guarantee the continued availability of products, as increased avoidance of their use will start to impact the commercial viability of some products.

Significant R&D into chromate free products is currently underway and many common applications can now be met using state of the art chromate free technologies.

It is interesting to look at the recent (comparable) REACH authorisation for Lead Chromate pigments used in some industrial paints. Dominion Colour Corporation (DCC) has been authorised to supply these pigments for specified uses for 4 and 7 years. Some of these requirements may also be mandatory for the use of the Cr VI substances, for example

- The use is only for the precise authorised applications and other applications must find alternatives.

- Users must register with ECHA via their website.

- Users must provide a detailed justification for the use of the paints.

- User must perform air monitoring and biological monitoring of staff using the products.

- Users must follow the risk management procedures and operating conditions from the safety data sheets including engineering controls and PPE.

- Exposure scenarios will need to be developed.

So, what's the answer to the question – Is this product "REACH compliant"? Ask the following questions.

1) If it is made in the EU, are all the substances in the formulation registered with ECHA? (This may be difficult to validate as substance manufacturers are not obliged to reveal their intentions with regard to registering substances in the 1-100 tonnes category before the registration deadline of the 31st May 2018).

2) If it is imported into the EU are all the

substances registered with ECHA? If not, has the importer determined that they are not importing >1000Kg per annum of the substances?

3) Does the product contain any SVHCs? Has the supplier acknowledged the sunset date and undertaken not to put the product on the market after the sunset date without removing the SVHCs from the composition?

4) If the product contains SVHCs, have they been authorised by ECHA and can the supplier advise on the processes required for the authorised use of the products?

5) Is a REACH compliant sds available for the product?

Whilst not exhaustive, if the answer is yes to all these questions then the product is "REACH Compliant".

Remember – 'all SVHCs are substances but not all substances are SVHCs'

Chromium Trioxide (Chromic Acid)

Although this article focuses on Cr VI, a similar process has been undertaken for Chromium Trioxide (CAS 1333-82-1) used in many surface treatments including, for aerospace applications, chromic acid anodising. ECHA has given its opinion on the CTAC consortium's application for authorisation. The outcome is very similar to the Cr VI situation in that authorisation has been recommended for (6) specific uses and only for applicants and their downstream users. This subject is on a similar scale to the Cr VI topic and merits a separate evaluation.

GCCA

An additional consortium "Global Chromates Consortium for Aerospace" was created in 2015 in order to apply for specific additional authorisation for other particular uses of chromates in the aerospace industry based on a general approach. The Cr VI compounds include some of those within the CCST authorisation. These applications should be made by 22nd July 2017 and will then be in the public domain.

In addition to CCST, CTAC and GCCA individual applications for authorisations may occur for particular uses of chromate SVHCs. These are likely to be within a specific supply chain for critical applications where the processes are very controlled.

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