Chrome VI & Chrome Salts: Authorisation & Replacement

As manufacturers of high performance coatings to the aerospace, defence and allied Industries, Indestructible has a long history of supplying anti-corrosive coatings that traditionally contained hexavalent chrome.

In the late 1990's we commenced investigation into chrome free alternative anti-corrosive primers, for both baking and room-temperature cure systems. Working closely with Pratt & Whitney Canada, followed by Pratt & Whitney America; the Safran Group and Airbus Helicopters in France and the Meggitt group in the UK, we developed high performance chrome free primers to meet the exacting standards of these groups.The approved products have now been in use for over 10 years.Typical uses are aerospace engineering components including aluminium and magnesium engine parts, helicopter gearboxes and componentry for wheels & braking systems.

Additionally our Ipcote range of sacrificial aluminium basecoats and sealcoats have been manufactured using chromium trioxide. Using exact formulating techniques and controlled manufacturing, the content of hexavalent chrome in the supplied slurry coatings has been kept to a minimum: typically in aluminium basecoats there will be less than 15-40ppm Chrome VI.

REACH LEGISLATION

The REACH regulations came into law throughout Europe about 10 years ago.The remit behind the law was to register and control the use of chemicals within Europe. This process/law looks at chemicals deemed by member states to be "dangerous" to either people or the environment, and to list these chemicals as "substances of very high concern" (SVHC's). Once a chemical is listed as a SVHC, it can be moved into annex XIV of the regulations: this will define a sunset date beyond which the chemical will not be allowed to be used without an authorisation issued by the commission, after investigation by the European Chemicals Agency (ECHA).

Chromium Trioxide and various chrome salts are listed in Annex XIV, and therefore have sunset dates. For record, the chemicals concerned that affect Indestructible Paint are:

Chromium Trioxide (CAS No: 1333-82-0) 21 September 2017
Strontium Chromate (CAS No: 7789-06-2) 22 January 2019
Zinc Tetroxy Chromate (CAS No: 49663-84) 22 January 2019

Indestructible are members of two Europe wide consortiums, formed to work towards the authorisation of SVHC listed chemicals, to allow continued authorised use for specific applications after the sunset date:

CTAC covers the use of chromium trioxide in specific uses in pre-treatments and sacrificial coatings. A dossier to cover authorisation for continued use has been submitted to ECHA.

CCST covers the use of hexavalent chrome salts used in anti-corrosive systems. For Indestructible, the two main chemicals are Strontium Chromate and Zinc Tetroxy Chromate. A dossier for authorisation is under preparation.

The position on Authorisation is ever changing up to the sunset date: for the latest update, please consult our technical team.

The latest information received from the European Chemicals Agency (ECHA), states that ECHA recommends authorising critical continued uses of Chromium Trioxide under strict conditions (September 2016). A copy of the press release issued by the CTAC consortium detailing this latest information is available from our sales technology team on request.

CHROME VI AND CHROME SALTS FREE SYSTEMS

Pre-Treatments

Traditionally pre-treatments systems, including conversion coatings, anodic processes and even etch primers have been chrome based.

Recently we have developed our own chrome free conversion coating which has been widely tested on both magnesium and aluminium alloys. For more information on the IPSLIP product range please contact our sales technology team.

Alongside this, working with a UK university, development into Sol-Gel chemistry has resulted in a coating to give excellent corrosion resistance on magnesium. This technology is now being evaluated on a range of aluminium alloys. Please request further information on our Mag-Sol coating.

Additionally we can offer a chrome free etch primer, which provides excellent adhesive properties, but limited anti-

corrosive properties. Continued development work is ongoing to provide a fully chrome free material that will give minimum 168 hours neutral salt spray performance. There is also a new "authorised" chrome version with similar corrosion performance. Again full information is available from our sales technology team.

Anti-Corrosive Primers

As previously noted, Indestructible have been manufacturing chrome salt free anti-corrosive primers for several years, and these products are now quite widely used in aerospace applications.

However, continued evaluation of newly available chrome free anti-corrosive pigments, together with detailed development into new resin systems, in some instances as part of a UK government funded research project, has resulted in new, higher performance coatings, in both baking and two component room temperature cure systems.

For samples or further information, please contact our sales technology team.

Sacrificial Aluminium Basecoats & Sealcoats

For some while, several manufacturers, including Indestructible, have had available chrome free sacrificial aluminium basecoats. These, however have been based on inorganic silicate chemistry, and have offered poorer corrosion resistance that the traditional chromate acidic systems.

A development goal at Indestructible has been to produce a chrome free, acidic sacrificial coating that will match the anti-corrosive, chemical and heat resistance of the traditional chrome containing Ipcote coating.

This development programme was initially self funded, but is now part of a UK government (Innovate UK) funded programme supported by both aerospace primes and SME's.

The project is scheduled to be completed by mid 2017, and it is predicted that by this time we will be able to offer a fully chrome free acidic sacrificial aluminium coating, with application and processing requirements similar to traditional Ipcote, allied to equivalent technical performance.

As this project is ongoing, please keep in contact with our sales technology team for more updates.

In addition to the funded work on basecoats, development is continuing on acidic based chrome free sealcoats. As this is not within the funded project, there are less limitations on release of samples for client evaluation: please therefore register your interest with our sales technology team for early issue of an evaluation sample.

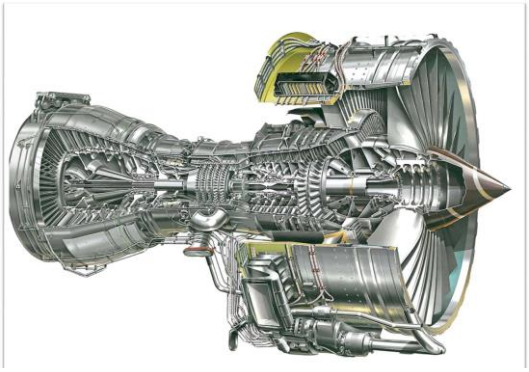
Chrome Free Diffusion Coatings

Alongside the development of sacrificial basecoat and sealcoats, a further Innovate UK funded project has been running on chrome free diffusion coatings. This particular project ends during Q4 of 2016, and product development is more advanced than with the sacrificial basecoat/sealcoat project.

Performance of the applied and diffused chrome free coating will be equivalent to the traditional IPAL or Sermaloy J.

Application trials with the developed product, CFIPDIFF, on client components is underway, to ensure correct application parameters on complex componentry. This will be followed by on site testing in clients own workshops, to include diffusion under inert gas.

Working with an associate company who control their own industrial turbines, in use field trials alongside chrome containing versions will be conducted to assess technical and corrosion performance.



This brochure covers the basics of what have been major development programmes for Indestructible into multiple areas of the use of Chrome VI and Chromium Salts, and their replacement with Chrome Free alternatives.

As the majority of the coatings involved will be used on aerospace components, thorough testing both in our own laboratories, but also in conjunction with primes and tier 1 suppliers to that industry has been and continues to be conducted.

For further information, including our detailed technical bulletin please consult our sales technology team.

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