

Cadmium Regulations Update

The European Restrictions Explained

European Restrictions:

The European Union has adopted a Directive (91/338/EEC 'the Cadmium Directive') on the use of cadmium pigments, which seeks to harmonise restrictions on their use within EU member states. This directive does not ban the use of cadmium pigments, but restricts their use where they are not seen to be essential.

The European Union has recognised that:

- Completely satisfactory substitutes to cadmium pigments are not available for use in many polymers.
- Their thermal and chemical stability cannot be equalled by other pigments of a similar hue.
- They are essential for technical or safety reasons in many polymers.

As substitution is not easy, the legislation (which is summarised below) has been introduced over several years. There are a number of notable exemptions to this legislation in the areas of masterbatch, ceramics, safety products, artists' colours and toys and these exemptions are also detailed below:

The key requirements of the 'Cadmium Directive' (91/338/EEC) are as follows:-

Cadmium and its' compounds should not be used to give colour to finished products manufactured from the following materials:

- Polyvinyl Chloride (PVC)
- Polyurethane (PUR)
- Low Density Polyethylene (except as masterbatch - see below)
- Cellulose Acetate
- Cellulose Acetate Butyrate (CAB)
- Epoxy Resins
- Melamine Formaldehyde (MF) resins
- Urea Formaldehyde (UF) resins
- Unsaturated Polyesters (UP)
- Polyethylene Terephthalate (PET)
- Polybutylene Terephthalate (PBT)
- Transparent / General Purpose Polystyrene
- Acrylonitrile Methylmethacrylate (AMMA)
- Cross-linked Polyethylene (VPE)
- High-Impact Polystyrene
- Polypropylene (PP)
- Paints, as defined by common customs tariff numbers CN 3208 and 3209

No Further Restrictions:

Following an independent risk assessment (by WS Atkins), commissioned by the European Union (DG III), on the lifecycle of cadmium pigments, Commission Directive 1999/51/EC has been issued. This effectively updates the 'Cadmium Directive' (91/338/EEC) to confirm that no further restrictions will be imposed on the use of cadmium pigments for the time being. The provisions on cadmium will be reviewed by 31 December 2002.

The risk assessment report concluded that emissions from the cadmium pigment lifecycle do not pose any significant risk to man or the environment.

Exemptions:

There are a number of exemptions to the above general restrictions:

- **Safety**

The restrictions of the cadmium directive do not apply to products to be coloured for safety reasons. Typical examples of this might be brightly coloured safety warning signs or pipes for hazardous materials.

- **LDPE Masterbatch**

The cadmium directive permits the colouration of low-density polyethylene masterbatch with cadmium pigments. This masterbatch could then be used to colour other unrestricted polymers.

- **Ceramics**

Prepared pigments, prepared opacifiers and prepared colours, vitrifiable enamels and glazes, slips, liquid lustre's and similar preparations, of a kind used in the ceramic, enamelling or glass industry are represented by CN3207. They are therefore not subject to the restrictions of the cadmium directive.

- **Artists' Colours**

Artists' colours are represented by customs tariff no. CN3213 and are not therefore subject to the restrictions of the 'Paints' clause of the cadmium directive.

- **Toys**

Restrictions on the use of cadmium in toys is covered by the safety of toys directive (88/378/EEC). In a clarifying statement from the EU Commission Services DGIII in November 1996, it was stated that the provisions of the toys directive have precedence over those of the cadmium directive. Cadmium pigments may therefore be used in any polymer for toys providing that the finished toy complies with the extraction limits given in 88/378/EEC i.e.75ppm soluble cadmium (these are currently identical to the extraction limits of EN71 : Part 3).

- **Packaging**

Restrictions on the use of certain heavy metals (including cadmium) in packaging are covered by the Packaging Directive (94/62/EC). The relevant sections of this directive have now been transcribed into UK law as the Packaging (Essential Requirements) Regulations 1998. The key aspect of this legislation is that the sum of the concentration levels of lead, mercury, cadmium and hexavalent chromium in packaging and packaging components should not exceed 100 ppm after 30 June 2001.

Also, in a clarifying statement from the Commission Services DGIII in November 1996, it was stated that the cadmium directive was superseded by the packaging directive. This leads to the interpretation that cadmium pigments may still be used at very low tint levels in any polymer for packaging, providing that the stringent concentration level given in the above paragraph is complied with.

- **Food Contact Plastics**

Johnson Matthey's cadmium pigments for plastics comply with the guidance given in Council of Europe Resolution AP(89)1 on the use of colourants in plastic materials coming into contact with food. This resolution recommends a maximum limit for acid-soluble cadmium of 0.01% and confirms that cadmium pigments can be used for food contact plastics where their special technological advantages cannot be met by alternative products. The above restrictions for packaging and the cadmium directive should still be taken into account.

Waste Electrical and Electronic Equipment Directive (WEEED) and The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Directive (ROHS)

As part of a developing strategy to place responsibility on manufactures for their products, the EU is intending to introduce a series of individual directives requiring suppliers to recover and recycle specific products at the end of their working life, including the requirement to ban the presence of lead, mercury, cadmium and hexavalent chromium in electrical and electronic equipment. These issues are currently under discussion between DG Enterprise and DG Environment.

- **End of Life Vehicles Directive**

This new directive sets out measures on prevention of waste caused by the disposal of cars and light vans at the end of their working lives. The use of cadmium, lead, mercury and hexavalent chromium is to be prohibited in components of motor vehicles, which are put on the market after 1 July 2003.

- **Hazard Classification for Supply**

Cadmium pigments (cadmium zinc sulphide & cadmium sulphoselenide) are not listed as hazardous for supply in the C.H.I.P Approved Supply List. They are excluded from A.S.L. entry 048-001-00-5 and therefore do not fall under the general hazard classification for cadmium compounds. Johnson Matthey's supplier assessment confirms that our cadmium pigments do not warrant a hazard classification under C.H.I.P.

- **Sweden / The Netherlands**

These countries have restrictions on cadmium that goes beyond the scope of EU Regulations.

Sweden has a Cadmium Ordinance (SFS 1985:839) which states that cadmium substances may not be used for surface treatment or as a stabiliser or colouring agent.

The Netherlands has a Cadmium Decree (1999 Chemical Substances Act) which prohibits the manufacture, import or sale of products (including plastics and paint) in which cadmium is used as a pigment, dye or stabiliser with a cadmium content of over 100 mg kg⁻¹, with certain exemptions for safety and other essential applications.

- **Denmark's Position on Heavy Metals**

Denmark became the first country in the world to impose a wide ranging ban on lead, as from March 2001. The move was in defiance of opposition from a majority of European Union's 15 member states and a negative opinion from the European Commission's chief scientific committee.

The Danish Environmental Ministry has also stated that the heavy metal restrictions will apply also to cadmium, mercury and nickel, in line with their declared goal of limiting the use of heavy metals as much as possible. A specific time-scale for these additional restrictions has not yet been provided.

1. *International*

Import/Export

Cadmium pigments are listed in the major national chemical control inventories, thus facilitating importation to:-

Australia	(AICS)
Canada	(DSL)
EU	(EINECS)
Japan	(ENCS/MITI)
Korea	(ECL)
Philippines	(PICCS)
USA	(TSCA)

They do not require prior import notification under the Rotterdam Convention International P.I.C. Procedure (Prior Informed Consent procedure for certain hazardous chemicals and pesticides in International trade).

2. USA

As with the EU, the US have restrictions on the use of cadmium (plus lead, mercury and hexavalent chromium) in packaging and packaging components where the sum of the content of these four metals should not exceed 100 ppm (CONEG Regulations).

Cadmium is not cited as a permitted material in the US Code of Federal Regulations 21 CFR Food and Drugs and should not therefore be used for food, drug, surgical or cosmetic applications in the USA.

The State of California (Proposition 65) has listed cadmium compounds as potential carcinogens and reproductive toxins and materials and articles put up for sale in this State may require warning labels of the general form "certain cadmium compounds are known to the State of California to cause cancer, birth defects and other reproductive harm".

Johnson Matthey cadmium pigments are tightly controlled to ensure that the soluble cadmium conforms to the USA TCLP Waste Leaching limits – 1.0 ppm soluble cadmium.

3. *European and International Dangerous Goods Transportation*

Johnson Matthey's cadmium pigments are not classified as hazardous for transportation under any European or International modal requirement (Sea - IMDG, Air - IATA/ICAO, Road/Rail - ADR/RID/CDG-CPL/DOT etc.). They may therefore be transported without recourse to UN approved packaging and do not require declaration as dangerous goods.