



An alternative to PVC and Phthalates in high density plasticol prints

Abstract

PVC and phthalates have been extensively used for plasticol prints in textile applications. This case story, provided by G-Star, describes their substitution of PVC and phthalates by silicon prints.

Substituted substance(s)

Polyvinyl chloride (PVC)
CAS No.9002-86-2
Chemical group: Polymers

Classification

The substance has no harmonised classification according to Annex VI of Regulation (EC) No 1272/2008 (CLP Regulation)

[ECHA's Classification and Labelling Inventory](#)

Dibutyl phthalate

CAS No.84-74-2 EC No. 201-557-4 Index No.607-318-00-4

Chemical group: Phthalates

Classification: R-phrases

R50 Very toxic to aquatic organisms

R61 May cause harm to the unborn child

R62 Risk of impaired fertility

Classification: hazard statements

H400 Very toxic to aquatic life

H360Df May damage the unborn child. Suspected of damaging fertility

Other adverse effects

The substance is: on the OSPAR list of substances of possible concern, endocrine disruptor cat. 1 (EU EDC database) as listed in the Substance Database according to SUBSPORT Screening Criteria (SDSC).

Di(2-ethylhexyl) phthalate

CAS No.117-81-7 EC No.204-211-0 Index No.607-317-00-9

Chemical group: Carboxylic acid esters

Classification: R-phrases

R60 May impair fertility

R61 May cause harm to the unborn child

Classification: hazard statements

H360FD May damage fertility. May damage the unborn child

Other adverse effects

The substance is: 2B carcinogen (IARC), on the OSPAR list of substances of possible concern, endocrine disruptor cat. 1 (EU EDC database) as listed in the Substance Database according to SUBSPORT Screening Criteria (SDSC).

Di-"isononyl" phthalate

CAS No. 28553-12-0 EC No. 249-079-5

Chemical group Phthalates

Other adverse effects

The substance is: endocrine disruptor (SIN List), endocrine disruptor cat. 2 (EU EDC database) as listed in the Substance Database according to SUBSPORT Screening Criteria (SDSC).

Classification

The substance has no harmonised classification according to Annex VI of Regulation (EC) No 1272/2008 (CLP Regulation)

[ECHA's Classification and Labelling Inventory](#)

Di-"isodecyl" phthalate

CAS No. 26761-40-0 EC No. 247-977-1

Chemical group Phthalates

Other adverse effects

The substance is: endocrine disruptor cat. 2 (EU EDC database) as listed in the Substance Database according to SUBSPORT Screening Criteria (SDSC).

Classification

The substance has no harmonised classification according to Annex VI of Regulation (EC) No 1272/2008 (CLP Regulation)

[ECHA's Classification and Labelling Inventory](#)

Alternative substance(s)

Dimethyl siloxane, hydrogen terminated

CAS No. 70900-21-9

Chemical group Organosilicon compounds

Classification

The substance has no harmonised classification according to Annex VI of Regulation (EC) No 1272/2008 (CLP Regulation)

[ECHA's Classification and Labelling Inventory](#)

Dimethyl, methyl hydrogen siloxane

CAS No. 68037-59-2

Classification

The substance has no harmonised classification according to Annex VI of Regulation (EC) No 1272/2008 (CLP Regulation)

[ECHA's Classification and Labelling Inventory](#)

Hazard assessment

Many of the substituted phthalates are classified as toxic to reproduction and are on the "Hazardous substance database" according to SUBSPORT Screening Criteria (SDSC). The alternatives have no official classification and are not on the SDSC.



Substitution description

PVC is a widely used thermoplastic polymer. It can be made softer and more flexible by the addition of plasticizers, the most widely-used being phthalates. In this form, it is used in clothing and accessories. It is commonly used in coats, jackets, aprons and bags. The global phase-out of PVC is advocated because it is claimed that dioxin is produced as a byproduct of vinyl chloride manufacture and from incineration of waste PVC in domestic garbage.

Phthalates are a class of organic compounds added to plastics to increase flexibility. In textiles and apparel, phthalates can be associated with flexible plastic components, trims, screen and plasticol prints. Several phthalates are known to be reprotoxic and can cause birth defects and changes in hormone levels.

G-Star is continuously striving towards sustainable solutions and achieving the goal of zero discharge of hazardous chemicals in its supply chain. One of these goals is completely phasing out PVC and Phthalates. Intensive investigations using accredited third party testing institutes showed that part of the prints used on products did not meet the requirements as laid down in G-Star's Restricted Substances List (RSL). With the cooperation of the suppliers a broad research program was initiated. This resulted in a successful replacement of PVC and Phthalates in High Density Plasticol prints by High Density Silicon prints. The substitution process started in March 2012 and is ongoing in the global supply chain, in which the company works closely with suppliers, technicians and ink suppliers. Research is ongoing to find suitable ink and paste for the different product groups in the supply chain.

Dimethyl siloxane, hydrogen terminated and Dimethyl, methyl hydrogen siloxane can replace Phthalates without major process changes. A number of Phthalates are listed on the Candidate list for SVHC, Annex XIV the Authorisation list and/or in Annex XVII REACH.

Case/substitution evaluation

This case story describes the phase out of PVC and its associated phthalates in textile plasticol prints. Silicon prints were found suitable as substitutes. The mentioned siloxanes have no official classification nor are on the SDSC.