G-STAR RAW MANUFACTURING RESTRICTED SUBSTANCES LIST

VERSION 2.0 - MARCH 2016

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INTRODUCTION

Scope

This Manufacturing Restricted Substance List (MRSL) applies to all G-Star Raw C.V. suppliers. The document addresses hazardous substances potentially used and discharged into the environment during manufacturing and related processes, not just those which could be present in finished products. G-Star Raw C.V, anticipates that suppliers will work closely with their chemicals suppliers to ensure substances mentioned in this MRSL are not present in any of the chemical commercial products that are purchased from chemical suppliers. This MRSL is an important part of G-Star's Corporate Responsibility program and must be shared with all suppliers, sub-contractors and others involved in the production of G-Star products.

The following production processes are targeted by this document: Textile and synthetic leather, so as leather processing.

Background

G-Star Raw C.V. is a member of the Zero Discharge of Hazardous Chemicals Foundation (ZDHC) and committed to defined and develop a Manufacturing Restricted Substance List (MRSL) for the apparel and footwear industry. In doing so, brands recognized the value of addressing hazardous substances potentially used and discharged into the environment during manufacturing and related processes deep within our supply chain - not just those substances that could be present in finished products. In June 2014, the ZDHC brands achieved a significant milestone and published the first version of the ZDHC MRSL.

Purpose of the list

G-Star cares about consumers and the environment. Our suppliers are critical partners in our commitments in the area of consumer safety and environmental protection. The MRSL contains a list of chemical substances by CAS# that are subject to a usage ban.

The MRSL applies to chemicals used in the manufacturing of materials, components and finished products, which include solvents, cleaners, adhesives, paints, inks, detergents, dyes, colorants, auxiliaries and finishing agents used during raw material production, wet processing, maintenance, waste water treatment, sanitation and pest control. There should be no intentional use of the MRSL listed substances in facilities.

IMPORTANT

Threshold limit values on restricted substances in chemical formulations are in some cases substantially higher than limits on restricted substances in finished products. This is because restricted substances in finished products are almost always found in smaller concentrations than in the chemical formulations used to produce them. Chemical formulations are highly concentrated before being diluted upon application to textiles and other materials.

Note: The MRSL does not replace applicable national environmental or workplace safety restrictions. Worker exposure to the listed and other hazardous substances must not exceed occupational exposure limits and chemical formulations must comply with all applicable legal restriction, including any subsequent restrictions that establish stricter limits. The MRSL does not replace legal restrictions on hazardous substances in finished products (RSL requirements).

G-Star Raw C.V. advises you to communicate the MRSL requirements to raw material supplier, including sub-contractors and factories assembling or manufacturing garments and footwear. To support our goal of using MRSL compliant formulations, G-Star Raw C.V. also expects that material suppliers and factories will communicate with the chemical suppliers to ensure that listed substances are not present in chemical formulation above established limits.

Definitions Chemical Substance

means a chemical element and its compounds in the natural state or obtained by any manufacturing process, including any additive necessary to preserve its stability and any impurity deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition.

Commercial Chemical Product

is a proprietary blend of several chemical substances or a reaction product used to create a 'trade name' or 'functional' product that is available for purchase from a chemical supplier. Note this document will not list commercial chemical products.

CAS - Chemical Abstract Service index number

It is a unique numeric identifier, designates only one substance, has no chemical significance, is a link to a wealth of information about a specific chemical substance.

It includes up to 9 digits which are separated into 3 groups by hyphens. The first part of the number, starting from the left, has up to 6 digits; the second part has 2 digits and the final part consists of a single check digit.

INTRODUCTION

Usage Ban

Chemical Products used for the manufacturing of articles (e.g. colorants) must not intentionally contain these substances or substances groups.

MRSL Creation Process

The MRSL includes relevant substances from the original 11 priority chemical groups along with additional substances discussed with qualified experts from the Zero Discharge of Hazardous Chemicals Technical Advisory Committee (ZDHC TAC). Several of the listed substances are regulation in finished products and have been successfully restricted for years. Though already restricted by ZDHC brands, their inclusion on the list keep it consistent with existing industry standards. Where possible, the content of the MRSL was peer-reviewed by independent third-party technical experts and industry associations related to the production of our key raw materials. Collaboration with leading technical experts allows to develop a MRSL that pragmatically represents progress and supports our long-term goal of zero discharge.

MRSL Instructions

Appendix I: MRSL for Textiles and Synthetic Leather Processing

This section applies to chemical formulations and substances used during the creation and wet processing of textile fibers and during the creation process and processing of synthetic leather.

Appendix II: MRSL for Natural Leather Processing

This section applies to chemical formulations and substances used throughout the production of natural leather, from raw hide to finished leather.

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G-STAR RAW APPENDIX I: MRSL

FOR TEXTILES AND SYNTHETIC LEATHER PROCESSING

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| Substance PHTHALATES | CAS number | Criteria | (| Guidelines | Test Method | MRSL limit in ppm | Common Potential Use | Mill | Printer | CMT | Finish | Accessoires |
|--|---------------------------|---|------------------------------------|--|---------------------------------|---|---|------|---------|-----|--------|-------------|
| Bic/2-ethylbeyyl) phthalate (DEHP) | 117-81-7 | | | | | | | | | | | |
| Dibuty(phthalate (DBP) | 84-74-9 | | | | | | | | | | | |
| Butylbenzyl obthalate (BBP) | 85-68-7 | | | | | | | | | | | |
| Di-isononyl phthalate (DINP) | 28553-12-0 and 68515-48-0 | | | | | | | | | | | |
| Di-isodecyl phthalate (DIDP) | 26761-40-0 and 68515-49-1 | | | | | | | | | | | |
| Di-n-octvl phthalate (DNOP) | 117-84-0 | | | | | | | | | | | |
| Di-isobutyl phthalate (DIBP) | 84-69-5 | | | | | | Phthalates are a class of organic compounds added to plastics to | | | | | |
| 1,2-Benzenedicarboxylic acid, di-C7- 11-branched and linear alkyl esters (DHNUP) | 68515-42-4 | | scharge | Declaration needed from | Gas Chromatography | sum of all obthalates | increase flexibility. In textiles and apparel, phthalates can be associated with flexible plastic components, trims, screen and plastisol prints. Phthalates | | v | | | |
| 1,2-Benzenedicarboxylic acid, di-C6-8- branched alkyl esters, C7-rich (DIHP) | 71888-89-6 | Usage Ban | cero Dis | chemical supplier/ raw material supplier | Mass spectormetry (GC-MS) | 250ppm | are often classified as repro-toxic and can cause birth defects and changes in hormone levels. | х | х | | х | х |
| 1,2-Benzenedicarboxylic acid, dipentylester, branched and linear | 84777-06-0 | | | | | | Phthalates can be found in Flexible Plastic components (e.g. PVC), Pigment printing, Adhesives, Plastic buttons, Plastic sleavings, Costings, etc. | | | | | |
| Di-iso-pentyl phthalate (DIPP) | 605-50-5 | | | | | | Flastic sieevings, Coatings, etc. | | | | | |
| n-Pentyl-isopentyl phthalate | 776297-69-9 | | | | | | | | | | | |
| Di-n-pentyl phthalate (DnPP) | 131-18-0 | | | | | | | | | | | |
| Bis(2-methoxyethyl) phthalate (DMEP) | 117-82-8 | | | | | | | | | | | |
| Di-n-hexyl phthalate (DHP) | 84-75-3 | | | | | | | | | | | |
| Dimethyl phthalate (DMP) | 131-11-3 | | | | | | | | | | | |
| FLAME RETARDENTS | | | | | | | | | | | | |
| Tris-(2,3-dibromopropyl)- phosphate (TRIS) | 126-72-7 | | | | | 5ppm | | | | | | |
| Tris - (aziridinyl) - phosphineoxide (TEPA) | 5455-55-1 | | | | | 5ppm | | | | | | |
| Polybromobiphenyls (PBB) | 59536-65-1 | | | | | 5ppm | | | | | | |
| Hexabromocyclododecane (HBCDD) | 25637-99-4 | | e | | | 5ppm | | | | | | |
| Octabromodiphenylether (OctaBDE) | 32536-52-0 | | charç | Declaration needed from | | 5ppm | Flame retardant chemicals potentially | | | | | |
| Tris-(2-chloroethyl)-phosphate (TCEP) | 115-96-8 | Usage Ban Usage | chemical supplier/ raw material | | 5ppm | used in clothing and tent fabric (PU clothings) to meet safety standards. | х | х | | х | Х | |
| Pentabromodiphenyl ether (PentaBDE) | 32534-81-9 | | supplier | | 5ppm | | | | | | | |
| Bis(2,3-dibromopropyl) phosphate (BBP) | 5412-25-9 | | | | 5ppm | | | | | | | |
| Bis(2,3-dibromopropylether) of tetrabromobisphenol (BDBPT) | 21850-44-2 | | | | 5ppm | | | | | | | |
| Decabromodiphenyl Ether (DecaBDE) | 1163-19-5 | | | | | 5ppm | | | | | | |

| | CAS number | Criteria F ARYL AMINES | Guid | idelines | Test Method | MRSL limit in ppm | Common Potential Use | Mill | Printer | CMT | Finish | Accessoires |
|--|-------------------------------|---------------------------|--------|-------------|-----------------------|-------------------|--|------|---------|-----|--------|-------------|
| | AVAGE MAT RELEASE ONE OR MORI | EARTLAMINES | | | | | | | | | | |
| Biphenyl-4-ylamin, 4-aminobiphenyl xenylamine | 92-67-1 | | | | | 150ppm | | | | | | |
| Benzidine | 92-87-5 | | | | | 150ppm | | | | | | |
| 4-chloro-o-toluidine | 95-69-2 | | | | | 150ppm | | | | | | |
| 2-naphtylamine | 91-59-8 | | | | | 150ppm | | | | | | |
| o-aminoazotoluene, 4-amino-2',3-dimethylazobenzene 4-o-tolylazo-otoluidine | 97-56-3 | | | | | 150ppm | | | | | | |
| 5-nitro-o-toluidine | 99-55-8 | | | | | 150ppm | | | | | | |
| 4-chloroaniline | 106-47-8 | | | | | 150ppm | | | | | | |
| 4-methoxy-m-phenylenediamine | 615-05-4 | | | | | 150ppm | | | | | | |
| 4,4'-methylenedianiline 4,4'-diaminodiphenylmethane | 101-77-9 | | | | | 150ppm | Azo dves and pigments are colorants that | | | | | |
| 3,3'-dichlorobenzidine 3,3'-dichlorobiphenyl-4,4'-ylenediamine | 91-94-1 | | e B | te un tén a | Liquid | 150ppm | incorporate one or several azo groups (-N=N-) bound with aromatic compounds. Thousands of azo dyes exist, but only | | | | | |
| 3,3-dimethoxybenzidine o-dianisidine | 119-90-4 | Users Bar | | eded from | (LC); | 150ppm | those which degrade to form listed amines are restricted. Azo dyes are used | v | v | | v | v |
| 3,3-dimethylbenzidine, 4,4'-bi-o-toluidine | 119-93-7 | Usage Dan | | material | Gas Chromatography | 150ppm | in dyed fabric or leather. | ^ | ^ | | ^ | ^ |
| 4,4'-methylenedi-o-toluidine | 838-88-0 | | N Supp | pilei | (GS) | 150ppm | Restricted amines also may be present or formed during cleavage of unintended | | | | | |
| 6-methoxy-m-toluidine p-cresidine | 120-71-8 | | | | | 150ppm | impurities in raw materials used for dyestuff production. | | | | | |
| 4,4'-metylene-bis-(2-chloro-aniline) 2,2'-dichloro-4,4'-ethylenedianiline | 101-14-4 | | | | | 150ppm | | | | | | |
| 4,4'-oxydianiline | 101-80-4 | | | | | 150ppm | | | | | | |
| 4,4'-thiodianiline | 139-65-1 | | | | | 150ppm | | | | | | |
| o-toluidine, 2-aminotoluene | 95-53-4 | | | | | 150ppm | | | | | | |
| 4-methyl-m-phenylenediamine | 95-80-7 | | | | | 150ppm | | | | | | |
| 2,4,5-trimethylaniline | 137-17-7 | _ | | | | 150ppm | | | | | | |
| o-anisidine (2-methoxyanilin) | 90-04-0 | _ | | | | 150ppm | | | | | | |
| 4-amino azobenzene | 60-09-3 | | | | 150ppm | | | | | | | |
| 2,4-xylidine | 95-68-1 | | | | | 150ppm | | | | | | |
| 2,6-xylidine | 87-62-7 | | | | | 150ppm | | | | | | |

| | CAS number | Criteria | | | Guidelines | Test Method | MRSL limit in ppm | Common Potential Use | Mill | Printer | CMT | Finish | Accessoires |
|--|---|----------|-----------|----------------|--|---|--------------------------------------|---|------|---------|-----|--------|-------------|
| Tributyltin (TBT) + compounds Triphenyltin (TPhT)) + compounds Dibutyltin (DBT)) + compounds Dioctyltin (DOT) + compounds | 56573-85-4 668-34-8 1002-53-5 15231-44-4 | | Usage Ban | Zero Discharge | Declaration needed from chemical supplier/ raw material supplier | Gas Chromatography Mass spectormetry (GC-MS); Low Resolution Mass spectometry (LRMS) | 5ррт 5ррт 5ррт 5ррт | Organotins are a class of chemicals combining tin and organics such as butyl and phenyl groups. Organotins are predominantly found in the environment as antifoulants in marine paints, but they can also be used as biocides (e.g., antibacterials), catalysts in plastic and glue productions, and heat stabilizers in plastics/rubber. In textiles and apparel, organotins may be associated with textiles plastics/rubber, inks, paints, metallic glitter, and heat transfer material, but also in polyurethane coatings and polyurethane membranes. | x | x | | x | |
| CHLOROBENZENES AND CHLOROTOL | UENES | | | | | | | | | | | | |
| Dichlorobenzenes * | 95-50-1, 541-73-1, 106-47-7 | | | | | | 1000ppm | | | | | | |
| Tetrachlorobenzenes | 87-61-6, 120-82-1, 108-70-3 | | | | | | | | | | | | |
| Pentachlorobenzenes | 608-93-5 | | | Θ | | | | | | | | | |
| Hexachlorobenzene | 118-74-1 | | | charg | Declaration needed from | Gas Chromatography | | Chlorobenzenes (Chlorinated aromatic hydrocarbons) can be used as carriers in | | | | | |
| Chlorotoluenes | 95-49-8 | | Usage Ban | o Dis | chemical supplier/ raw material | Mass spectormetry | Sum of all other isomers = 200ppm | the dyeing process of polyester or wool/ polyester fibers. They can also be used | х | х | Х | х | х |
| Dichlorotoluenes * | 95-73-8, 118-69-4, 95-75-0 | | | Zer | supplier | (GC-MS) | | as solvents. | | | | | |
| Trichlorotoluenes * | 98-07-7,2077-46-5, 6639-30-1 | | | | | | | | | | | | |
| Tetrachlorotoluenes * | 5216-25-1, 81-19-6, 134-25-8 | | | | | | | | | | | | |
| Pentachlorotoluenes * | 877-11-2, 13014-24-9 | | | | | | | | | | | | |

*For some chlorinated benzenes and toluenes several CAS Numbers are applicable.

| Substance CHLORINATED/HALOGENTED SOLVEN | CAS number TS | Criteria | Guidelines | Test Method | MRSL limit in ppm | Common Potential Use | Mill | Printer | CMT | Finish | Accessoires |
|--|------------------|-----------|----------------------------|-----------------------|-------------------|--|------|---------|-----|--------|-------------|
| 1,2,3-Trichloropropane | 96-18-4 | | | | 5ppm | | | | | | |
| 1,2-Dichloroethane | 107-06-2 | | | | 5ppm | | | | | | |
| Pentachloroethane | 76-01-7 | | | | 5ppm | | | | | | |
| Chloroform | 67-66-3 | | | | 5ppm | | | | | | |
| Trichloroethane | 79-00-5 | | 8 | | 5ppm | | | | | | |
| 1,1,1,2-Tetrachloroethane | 630-20-6 | Haana Ban | Declaration needed from | Gas Chromatography | 5ppm | In apparel and footwear, solvents are used as finishing/cleaning and printing | ~ | ~ | v | v | v |
| 1,1-Dichloroethylene | 75-35-4 | Osage Ban | raw material | spectormetry | 5ppm | oils and adhesives (e.g., in degreasing or | ^ | ^ | ^ | ^ | ^ |
| 1,1,1-Trichloroethane | 71-55-6 | | N | (66-103) | 5ppm | cleaning operations). | | | | | |
| Carbon Tetra Chloride | 56-23-5 | | | | 5ppm | | | | | | |
| Tetrachloroethylene | 127-18-4 | | | | 5ppm | | | | | | |
| Trichloroethylene | 79-01-6 | | | | 5ppm | | | | | | |
| Methylene chloride | 75-09-2 | | | | 5ppm | | | | | | |

| Substance | CAS number | Criteria | | Guidelines | Test Method | MRSL limit in ppm | Common Potential Use | Mill | Printer | CMT | Finish | Accessoires |
|--|------------|---------------------|----------------------------|-------------------------|-------------------------|--|---|------|---------|-----|--------|-------------|
| CHLOROPHENOLS | | | | | | | | | | | | |
| Tetrachlorophenol (TeCP) | 25167-83-3 | | | | | 20ppm | | | | | | |
| Pentachlorophenol (PCP) | 87-86-5 | | | | | | | | | | | |
| 2,3,5,6 - Tetrachlorophenol (TeCP) | 935-95-5 | | | | | | | | | | | |
| 2,3,4,6 - Tetrachlorphenol (TeCP) | 58-90-2 | | | | | | | | | | | |
| 2,3,4,5 - Tetrachlorphenol (TeCP) | 4901-59-3 | | | | | | | | | | | |
| 2-Chlorophenol | 95-57-8 | | | | | | | | | | | |
| 2,4-Dichlorophenol | 120-83-2 | Usage Ban o | | | | Chlorophenols are polychlorinated compounds used as preservatives or | | | | | | |
| 2,5-Dichlorophenol | 583-78-8 | | | | | | | | | | | |
| 2,6-Dichlorophenol | 87-65-0 | | Declaration | Gas Chromatography | | pesticides. Pentachlorphenol (PCP) and Tetrachlorphenol (TeCP) are sometimes | | | | | | |
| 2,4,5-Trichlorophenol | 95-95-4 | Usage B | San | chemical supplier/ | Mass spectormetry | Sum of all 50ppm | used to prevent mould and kill insects | х | х | х | х | х |
| 2,4,6-Trichlorophenol | 88-06-2 | | Zero | supplier | (GC-MS) EN ISO 17070 | | transporting fabrics. PCP/TeCP can also | | | | | |
| 3,5-Dichlorophenol | 591-35-5 | | | | | | and in certain disperse dyes. | | | | | |
| 2,3-Dichlorophenol | 576-24-9 | | | | | | | | | | | |
| 3,4-Dichlorophenol | 95-77-2 | | | | | | | | | | | |
| 3-Chlorophenol | 108-43-0 | | | | | | | | | | | |
| 4-Chlorophenol | 106-48-9 | | | | | | | | | | | |
| 2,3,4-Trichlorophenol | 15950-66-0 | | | | | | | | | | | |
| 2,3,5-Trichlorophenol | 933-78-8 | | | | | | | | | | | |
| 3,4,5-Trichlorophenol | 609-19-8 | | | | | | | | | | | |
| CHLORINATED PARAFFINS | | Usage Ban O N | | | | | | | | | | |
| Short-chain chlorinated paraffins (SCCP) | 85535-84-8 | | Declaration needed from | Gas Chromatography | 5ppm | SCCP's: used as flame retardants, in plasticizers, paints and adhesives and for fat liquoring of leather. SCCP's may cause long-term adverse effects in the aquatic environment. | | v | | × | ~ | |
| Medium-chain chlorinated paraffins (MCCP) | 85535-85-9 | | raw material supplier | spectormetry (GC-MS) | 5ppm | | | ^ | | ^ | ^ | |

| Substance HEAVY METALS | CAS number | Criteria | | Guidelines | Test Method | MRSL limit in ppm | Common Potential Use | Mill | Printer | CMT | Finish | Accessoires | | |
|---------------------------------|--|-----------|--|--|---|--------------------------|--|--------|--|-----|--------|-------------|--|--|
| Arsenic (As) | 7440-38-2 | | | | | 50ppm | Arsenic and its compounds can be used in some preservatives, pesticides and defailants for cotton | | | | | | | |
| Cadmium (Cd) | 7440-43-9 | | | | | 20ppm/50ppm for pigments | Cadmium compounds are found in or used as: Pigments (particularly red, orange, yellow, and green), Stabilizer for PVC plastic, Fertilizers, Biocides and paints (e.g. surface paints on zippers and buttons.) | | | | | | | |
| Chromium (Cr VI) | 7440-47-3 | | | | ICP-OFS- | 10ppm | Chromium is used in leather tanning and can be oxidised into Cr6+. | | | | | | | |
| Lead (Pb) | 7439-92-1 | Usage Ban | Discharge | Declaration needed from chemical supplier/ raw material | Inductively coupled plasma - optical emission spectrometry | 50ppm | In apparel and footwear, lead may be associated with plastics, paints, inks, pigments, surface coatings and metal components. | x | x | | x | x | | |
| Mercury (Hg) | 7439-97-6 | | Zero | supplier | AAS - Atomic Absorption Spectroscopy | 2ppm/25ppm for pigments | Mercury compounds can be present in pesticides and can be found as contamination in caustic soda (NaOH). Mercury compounds can be used in paints (e.g. surface paints on zippers and buttons). | | | | | | | |
| Nickel (Ni) | 7440-020 | | | | | 250ppm | Nickel metal is mainly used for plating of alloys, improving the corrosion resistance in alloys, improving the hardness of alloys and is a key element in the production of stainless steel. Certain dyestuffs contain complexbound Nickel. Both Nickel metal and Nickel compounds can occur as an impurities in pigments and alloys. | | | | | | | |
| ALKYLPHENOLS (AP) AND ALKYPHENC | OL ETHOXYLATES (APEO) | | _ | | | | | | | | | | | |
| Nonylphenols (NP) | 25154-52-3 104-40-5 11066-49-2 84852-15-3 | | | | Liquid | 250ppm | APEOs can be used as or found in: Detergents, Scouring agents, Wetting agents, Softeners, Emulsifier/dispersing agents for dves and prints. Impregnation | | | | | | | |
| Octylphenols (OP) | 27193-28-8 140-66-9 1806-26-4 | | Usage Ban Usage Ban Usage Ban Usage Ban Usage Ban Usage Ban | | Declaration | Declaration | Liquid Chromatography Mass spectrometry | 250ppm | agents for dyes and prints, Impregnating agents, Degreasing agents for leather, Leather Finishing, De-gumming for silk production, Dyes and pigment | | | | | |
| Nonylphenolethoxylates (NPEO) | 9016-45-9 26027-38-3 37205-87-1 127087-87-0 | Usage Ban | | | Gas Chromatography Mass spectormetry | 500ppm | Down/featurins, rolyeoser pacting and Down/feature fillings. APEOs degrade only partially during waste water treatment, reverting to the more toxic AP (alkylphenol)/ OP (octylphenol) and particularly NP | Х | х | Х | х | х | | |
| Octylphenolsethoxylates (OPEO) | 9063-89-2 9036-19-5 38987-90-6 9002-93-1 | | | | (GC-MS) | 500ppm | (nonylphenol). NP is very persistent in the environment and does not degrade readily, very toxic to aquatic organisms and described as endocrine disrupter. | | | | | | | |

| Substance | CAS number | Criteria | Guidelines | Test Method | MRSL limit in ppm | Common Potential Use | Mill | Printer | CMT | Finish | Accessoires | | | |
|--|-------------|--|--|---|-------------------|--|------|---------|-----|--------|-------------|--|--|--|
| PERFLUORINATED CHEMICALS | | | | | | | | | | | | | | |
| Perfluoroctanesulfonates (PFOS) | 1763-23-1 | | | | 1ppm | Perfluoroctane suphonate (PFOS) and | | | | | | | | |
| Perfluoroctane acids (PFOA) | 335-67-1 | | | | 2ppm | present as unintended by-products in long-chain commercial water, oil and stain repellent agents. PFOA can also be generated from other by-products (esp. the telomer alcohols) contained in long- chain PFC. G-Star has a complete ban on the use of Perfluorinated Chemicals (long, but also short chain); alternative water repellent finishing has to be used. | | | | | | | | |
| 1H,1H,2H,2H-Perfluorooctylacrylate (6:2 FTA) | 17527-29-6 | | | | | | | | | | | | | |
| 1H,1H,2H,2H-Perfluorodecylacrylate (8:2 FTA) | 27905-45-9 | | ٥ | | | | | | | | | | | |
| 1H,1H,2H,2H-Perfluorododecylacrylate (10:2 FTA) | 17741-60-05 | Usage Ban alternative water repellent finishing has to be used | Declaration needed from chemical supplier/ raw material supplier | Liquid Chromatography Mass spectrometry (LC-MS) | | Perfluorinated chemicals (PFC's) can | х | | | x | x | | | |
| 1H,1H,2H,2H-Perfluoro-1-hexanol (4:2 FTOH) | 2043-47-2 | | | | Not Detected | be used as impregnation agents and cleaning products. PFC's are persistent, bioaccumulative and poisonous and possibly carcinogenic. | | | | | | | | |
| 1H,1H,2H,2H-Perfluoro-1oktanol (6:2 FTOH) | 647-42-7 | | | | | | | | | | | | | |
| 1H,1H,2H,2H-Perfluoro-1-decanol (8:2 FTOH) | 678-39-7 | | | | | | | | | | | | | |
| 1H,1H,2H,2H-Perfluoro-1-dodecanol (10:2 FTOH) | 865-86-1 | | | | | | | | | | | | | |

| Backerighters Boss Sass Backelighters Sass Backelighters Sass Backelighters Sass Backelighters Sass Backelighters Sass | Substance | CAS number | Criteria | | | Guidelines | Test Method | MRSL limit in ppm | Common Potential Use | Mill | Printer | CMT | Finish | Accessoires |
|---|--------------------------------|-----------------------|----------|--|--------------------------|-----------------------------------|--------------------------|---|--|------|---------|-----|--------|-------------|
| Benzel (spreci Benzel (sprec | POLYCYCLIC AROMATIC HYDROCARBO | ONS (PAH'S) | | | _ | | | | | | | | | |
| Bacadgiona 1997 Bacadgiona 6853 Chyona 6853 Geogloinanchan 2903 Geogloinanch 2903 Geogloinan Cha | Benzo{a}pyrene | 50-32-8 | | | | | | 20ppm | | | | | | |
| Bancellower <br< td=""><td>Benzo(e)pyrene</td><td>192-97-2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></br<> | Benzo(e)pyrene | 192-97-2 | | | | | | | | | | | | |
| Chyber1010 (10 000000000000000000000000000000 | Benzo(a)anthracene | 56-55-3 | | | | | | | | | | | | |
| Bancel (Inconstitution of 1990 2) Bencel (Inconstitution 0) < | Chrysene | 218-01-9 | | | | | | | | | | | | |
| Bancing(bingroundmention Borizolity) | Benzo(b)fluoroanthene | 205-99-2 | | | | | | | | | | | | |
| Banaci(h)duronational of 30:03Gas analytic for and 30:03Gas and 40:03Gas and 40:04Gas and 40:04Ga | Benzo(j)fluoroanthene | 205-82-3 | | | | | | | Polycyclic Aromatic Hydrocarbons | | | | | |
| Debraco(A)shaftnacone8470-3Gas and State of the s | Benzo(k)fluoroanthene | 207-08-9 | | | | | | | oil and they are a common residue from | | | | | |
| Accanaphhene93.329Uaga Ban Observational SectionUaga Ban AccanaphingUaga Ban SectionSection S | Dibenzo(a,h)anthracene | 53-70-3 | | | ۲L | Declaration | Cas | | oil refining. PAHs have a characteristic smell similar to the smell of car tires or | | | | | |
| Accessphitylene 208 408-8 Odagie Luin per set un material minipum i marterial minipum i supplier set un material mi supplier | Acenaphthene | 83-32-9 | | Llanga Pan | ANC | needed from | Chromatography Maco | | are added in rubber and plastics as a | v | v | v | v | v |
| Artracone120127Benzed(h)perylene191242Bioranthene206440Fluoranthene66440Fluoranthene86737Indeno(1,2,3-cd)pyrene8930-510adeno(1,2,3-cd)pyrene9290-01290-01290-0Nathene9290-01201001202-0012010001202-00120100001202-0012010000001202-0012010000000000000000000000000000000000 | Acenaphthylene | 208-96-8 | | Usage Ban | DITIO | raw material | spectormetry | sum of all PAH = 200ppm | are risky in rubber, plastics, lacquers | ^ | ^ | ^ | ^ | ^ |
| Benzoghiperylene 191242 Floranthene 20644-0 Floranthene 66737 Indone(1,2,3-cd)pyrene 393-5 Indone(1,2,3-cd)pyrene 200-0 Naghhane 200-0 Naghhane 200-0 ALLERGENCDISPERSURS 200-0 C1. Dispers Blue 10 292-01-7 C1. Dispers Blue 124 6615-17 C1. Dispers Blue 124 6615-17 C1. Dispers Blue 124 695-17 C1. Dispers Grange 3/159/76 12223-57-23 C1. Dispers Blue 324 75-65 C1. Dispers Blue 34 6250pm C1. Dispers Blue 34 <td< td=""><td>Antracene</td><td>120-12-7</td><td></td><td></td><td>AD</td><td>supplier</td><td>(GC-M3)</td><td></td><td>the outsoles of footwear and in printing</td><td></td><td></td><td></td><td></td><td></td></td<> | Antracene | 120-12-7 | | | AD | supplier | (GC-M3) | | the outsoles of footwear and in printing | | | | | |
| Flooranthene 266:40 Reference Reference <threference< th=""> Reference <th< td=""><td>Benzo(ghi)perylene</td><td>191-24-2</td><td></td><td></td><td></td><td></td><td></td><td></td><td>present as impurities in Carbon Black.</td><td></td><td></td><td></td><td></td><td></td></th<></threference<> | Benzo(ghi)perylene | 191-24-2 | | | | | | | present as impurities in Carbon Black. | | | | | |
| Fluenen86-73-7103-93-5Image: Province of the series of th | Fluoranthene | 206-44-0 | | | | | | | rubber to avoid PAHs. | | | | | |
| Indenci (1,2,3-cd)pyrene193.95194.94Phenanthrene86-01.8Pyrene192.00192.03ALLERGENIC DISPERSURS2010C. Diaperse Blue 12010-10C. Diaperse Yellow 32832.40-8C. Diaperse Yellow 32822.75-2C. Diaperse Slue 1241951.517C. Diaperse Slue 1241951.517C. Diaperse Slue 351222.75-2C. Diaperse Slue 351222.75-2C. Diaperse Slue 3761223.33.6/1301.61-6C. Diaperse Slue 3761223.33.6/1301.61-6C. Diaperse Slue 3761223.33.6/1301.61-6C. Diaperse Blue 321223.33.6/1301.61-6C. Diaperse Blue 321223.33.6/1301.61-6C. Diaperse Blue 321233.6/1301.61-6C. Diaperse Blue 331243.6C. Diaperse Blue 341263.6C. Diaperse Blue 351263.6C. Diaperse Blue 341263.6C. Diaperse Blue 351263.6D. Diaperse Blue 34 | Fluorene | 86-73-7 | | | | | | | | | | | | |
| Phenanthrene8501-8Phenanthrene <th< td=""><td>Indeno(1,2,3-cd)pyrene</td><td>193-39-5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<> | Indeno(1,2,3-cd)pyrene | 193-39-5 | | | | | | | | | | | | |
| Pyrene 129-0-0 Image: Pyrene Pyren | Phenanthrene | 85-01-8 | | | | | | | | | | | | |
| Naphthalene 9120-3 Image: Constraint of the state of | Pyrene | 129-00-0 | | | | | | | | | | | | |
| ALLERGENIC DISPERSE DYES 2475-45-8 2475-45-8 260000 2600000 260000 26000 | Naphthalene | 91-20-3 | | | | | | | | | | | | |
| Cl. Disperse Blue 1 2475-45-4 Cl. Disperse Allou 3 2832-40-8 Cl. Disperse Blue 106 12223-01-7 Cl. Disperse Blue 124 6195-17 Cl. Disperse Blue 35 1222-75-2 Cl. Disperse Orange 3 730-40-5 Cl. Disperse Orange 37/59/76 1222-33-5/13301-61-6 Cl. Disperse Blue 3 2475-48-4 Cl. Disperse Blue 3 2475-48-4 Cl. Disperse Blue 3 2875-28 Cl. Disperse Blue 3 3806-63-7 Cl. Disperse Blue 7 3806-63-7 | ALLERGENIC DISPERSE DYES | | | | | | | | | | | | | |
| Cl. Disperse Yellow 3 2832-40-8 G.L. Disperse Blue 106 1223-01-7 G.I. Disperse Blue 124 61961-57.7 G.I. Disperse Blue 35 1222-75-2 G.I. Disperse Orange 37/59/76 12223-33-5/13301-61-6 G.I. Disperse Blue 3 2872-52.8 G.I. Disperse Blue 3 2872-53.4 G.I. Disperse Blue 3 2872-54.8 G.I. Disperse Blue 3 2870-64.9 G.I. Disperse Blue 3 2860-63.7 G.I. Disperse Blue 26 3860-63.7 | C.I. Disperse Blue 1 | 2475-45-8 | | | | | | 250ppm | | | | | | |
| C1. Disperse Blue 106 1222.01-7 61951-57 500pm Disperse dyes are a class of water-insoluble dyes that penetrate the fiber should dives that penetrate the fiber should dive the fiber should dive that | C.I. Disperse Yellow 3 | 2832-40-8 | | | | | | 250ppm | | | | | | |
| Cl. Disperse Blue 124 61951-57 Cl. Disperse Blue 35 12222-75-2 Cl. Disperse Orange 3 730-40-5 Cl. Disperse Orange 37/59/76 1223-33-5/13301-61-6 Cl. Disperse Blue 36 2475-46-9 Cl. Disperse Blue 26 3860-63-7 Cl. Disperse Blue 26 3860-63-7 | C.I. Disperse Blue 106 | 12223-01-7 | | | | | | 250ppm | | | | | | |
| C.I. Disperse Blue 35 1222-75-2 C.I. Disperse Orange 3 730-40-5 V.I. Disperse Orange 3/59/76 12223-33-5/13301-61-6 C.I. Disperse Red 1 2872-52-8 C.I. Disperse Blue 35 2475-46-9 C.I. Disperse Blue 26 3860-63-7 | C.I. Disperse Blue 124 | 61951-51-7 | | | | | | 250ppm | Disperse dyes are a class of water- insoluble dyes that penetrate the fiber | | | | | |
| C.I. Disperse Orange 3 730-40-5 Usage Ban Usage Ban Liquid chromatography raw material supplier Liquid Chromatography raw material supplier 250ppm Disperse Organe 30, 50, 50, 50, 50, 50, 50, 50, 50, 50, 5 | C.I. Disperse Blue 35 | 12222-75-2 | | | ALLY | Declaration | | 250ppm | system of synthetic or manufacted fibers and are held in place by physical forces | | | | | |
| C.I. Disperse Orange 37/59/76 1223-33-5/13301-61-6 prove material supplier | C.I. Disperse Orange 3 | 730-40-5 | | Usage Ban | NOI | needed from chemical supplier/ | Liquid Chromatography | 250ppm | without performing chemical bonds. Disperse Dyes are used in synthetic | х | | х | | х |
| C.I. Disperse Red 1 2872-52-8 2670 pm of causing all ergic reactions and should no longer be used for dysing of textiles. C.I. Disperse Blue 3 2475-46-9 250ppm 250ppm C.I. Disperse Blue 26 3806-63-7 250ppm 250ppm | C.I. Disperse Orange 37/59/76 | 12223-33-5/13301-61-6 | | Usage Ban USage Gan USAGE | raw material supplier | (LC) | 250ppm | fiber (e.g. polyester, acetate, polyamide). Restricted disperse dyes are suspected | | | | | | |
| C.I. Disperse Blue 3 2475-46-9 C.I. Disperse Blue 7 3179-90-6 C.I. Disperse Blue 26 3860-63-7 Second Plane 250ppm Disperse Blue 26 250ppm | C.I. Disperse Red 1 | 2872-52-8 | | | | | 250ppm | of causing allergic reactions and should no longer be used for dyeing of textiles. | | | | | | |
| C.I. Disperse Blue 7 3179-90-6 250ppm C.I. Disperse Blue 26 3860-63-7 250ppm | C.I. Disperse Blue 3 | 2475-46-9 | E supp | | | 250ppm | | | | | | | | |
| C.I. Disperse Blue 26 3860-63-7 250ppm | C.I. Disperse Blue 7 | 3179-90-6 | | < Comparison of the second sec | | | | 250ppm | | | | | | |
| | C.I. Disperse Blue 26 | 3860-63-7 | | | | | | 250ppm | | | | | | |

| | CAS number | Criteria | | Guidelines | Test Method | MRSL limit in ppm | Common Potential Use | Mill | Printer | CMT | Finish | Accessoires |
|-----------------------------------|------------|------------------------|------------------------------------|----------------------------|------------------------|---|--|------|---------|-----|--------|-------------|
| ALLERGENIC DISPERSE DIES (CONT.) | 10000.07.8 | | | | | 050 | | | | | | |
| | 12222-97-8 | | | | | 250ppm | | | | | | |
| C.I. Disperse Brown 1 | 23355-64-8 | | | | | 250ppm | | | | | | |
| | 2581-69-3 | | | | | 250ppm | Disperse dyes are a class of water- | | | | | |
| C.I. Disperse Red 11 | 2872-48-2 | | | | | 250ppm | insoluble dyes that penetrate the fiber | | | | | |
| C.I. Disperse Red 17 | 3179-89-3 | | INAL | Declaration needed from | Liquid | 250ppm | and are held in place by phyliccal forces without performing chemical bonds. | | | | | |
| C.I. Disperse Yellow 1 | 119-15-3 | Usage Ban | DITIC | raw material | Chromatography (LC) | 250ppm | Disperse Dyes are used in synthetic fiber (e.g. polyester, acetate, polyamide). | x | | х | | x |
| C.I. Disperse Yellow 9 | 6373-73-5 | | ADD | supplier | | 250ppm | Restricted disperse dyes are suspected of causing allergic reactions and should | | | | | |
| C.I. Disperse Yellow 39 | 12236-29-2 | | | | | 250ppm | no longer be used for dyeing of textiles. | | | | | |
| C.I. Disperse Yellow 49 | 54824-37-2 | | | | | 250ppm | | | | | | |
| C.I. Disperse Orange 149 | 85136-74-9 | | | | | 250ppm | | | | | | |
| C.I. Disperse Yellow 23 | 6250-23-3 | | | | | 250ppm | | | | | | |
| CARCINOGENIC DYES | | | _ | | | | | | | | | |
| C.I. Acid Red 26 | 3761-53-3 | | | | | 250ppm | | | | | | |
| C.I. Basic Red 9 | 569-61-9 | | | | | 250ppm | | | | | | |
| C.I. Direct Black 38 | 1937-37-7 | | ≻. | | | 250ppm | | | | | | |
| C.I. Direct Blue 6 | 2602-46-2 | | ALL | Declaration | Liquid | 250ppm | Most of those substances are regulated | | | | | |
| C.I. Direct Red 28 | 573-58-0 | Usage Ban | TION | chemical supplier/ | Chromatography | 250ppm | and should no longer be used for dyeing | х | | х | | х |
| C.I. Disperse Blue 1 | 2475-45-8 | | IDDI | supplier | (10) | 250ppm | of textiles | | | | | |
| C.I. Disperse Yellow 3 | 2832-40-8 | | | | | 250ppm | | | | | | |
| C.I. Basic Violet 14 | 632-99-5 | | | | | 250ppm | | | | | | |
| C.I. Disperse orange 11 | 82-28-0 | | | | | 250ppm | | | | | | |
| GLYCOLS | | | | | | | | | | | | |
| Bis(2-methoxyethyl)-ether | 111-96-6 | | | | | 50ppm | | | | | | |
| 2-ethoxyethanol | 110-80-5 | | | | High Performance | 50ppm | | | | | | |
| 2-ethoxyethyl acetate | 111-15-9 | Usage Ban Usage Ban | | Liquid | 50ppm | | | | | | | |
| Ethylene glycol dimethyl ether | 110-71-4 | | Declaration needed from | (HPLC) | 50ppm | In apparel and footwear, solvents are used as finishing/cleaning and printing | | | | | | |
| 2-methoxyethanol | 109-86-4 | | chemical supplier/ raw material | Liquid Chromatography | 50ppm | agents, for dissolving and diluting fats, oils and adhesives (e.g., in degreasing or | х | х | х | х | х | |
| 2-methoxyethylacetate | 110-49-6 | | supplier | Mass- spectrometry | 50ppm | cleaning operations). | | | | | | |
| 2-methoxypropylacetate | 70657-70-4 | | | | 50ppm | | | | | | | |
| Triethylene glycol dimethyl ether | 112-49-2 | | | | | 50ppm | | | | | | |

| Substance | CAS number | Criteria | | Guidelines | Test Method | MRSL limit in ppm | Common Potential Use | Mill | Printer | CMT | Finish | Accessoires |
|---------------------------------|-------------------|-----------|--------------|--|--|-------------------|--|------|---------|-----|--------|-------------|
| DYES WITH ENVIRONMENTAL | | | | [| | | | | | | | |
| Navy Blue | 118685-33-9 | Usage Ban | ADDITIONALLY | Declaration needed from chemical supplier/ raw material supplier | Liquid Chromatography (LC) | 250ppm | Navy Blue has a high aquatic toxicity and is harmful to the environment. Shall not be placed on the market or used for colouring textiles and leather articles. | x | | x | | х |
| OTHER SOLVENTS/VOLATILE ORGANIC | C COMPOUNDS (VOC) | | | | | | | | | | | |
| Xylene | 1330-20-7 | | | | | 500ppm | These volatile organic compounds | | | | | |
| o-cresol | 95-48-7 | | IALLY | Declaration | Gas | 500ppm | should not be used in textile auxiliary chemical preparations. They are | | | | | |
| p-cresol | 106-44-5 | Usage Ban | TION | chemical supplier/ | Chromatography Mass | 500ppm | associated with solvent-based porcesses like solvent-based PU | х | х | х | х | х |
| m-cresol | 108-39-4 | | .IQQ | supplier | (GC-MS) | 500ppm | coatings and glues/adhesives. They should not be used for any kind of facility | | | | | |
| Benzene | 71-43-2 | | | | | 50ppm | cleaning or post-cleaning. | | | | | |
| POLYVINYLCHLORIDE (PVC) | | | | | | | | | | | | |
| Polyvinylchloride | 9002-86-2 | Usage Ban | ADDITIONALLY | Declaration needed from chemical supplier/ raw material supplier | Attenuated total reflection Infrared spectroscopy (ATR-FT IR) | ND | The use of PVC is voluntarily restricted because it is claimed that dioxins are produced as a byproduct of vinyl chloride manufacture and from burning of waste PVC. | x | x | x | x | x |

G-STAR RAW APPENDIX II: MRSL

FOR NATURAL LEATHER PROCESSING

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| | | | | | | | | ather |
|--|---------------------------|-----------|----------|--|--|---------------------------------|---|-------|
| Substance | CAS number | Criteria | | Guidelines | Test Method | MRSL limit in ppm | Common Potential Use | Le |
| PHTHALATES | | | | | | | | |
| Bis(2-ethylhexyl) phthalate (DEHP) | 117-81-7 | | | | | | | |
| Dibutyl phthalate (DBP) | 84-74-2 | | | | | | | |
| Butylbenzyl phthalate (BBP) | 85-68-7 | | | | | | | |
| Di-isononyl phthalate (DINP) | 28553-12-0 and 68515-48-0 | | | | | | | |
| Di-isodecyl phthalate (DIDP) | 26761-40-0 and 68515-49-1 | Usage Ban | | | | | | |
| Di-n-octyl phthalate (DNOP) | 117-84-0 | | | Declaration needed from | | | Phthalates are a class of organic | |
| Di-isobutyl phthalate (DIBP) | 84-69-5 | | | | Gas Chromatography Mass spectormetry (GC-MS) | | increase flexibility. In textiles and | |
| 1,2-Benzenedicarboxylic acid, di-C7- 11-branched and linear alkyl esters (DHNUP) | 68515-42-4 | | scharge | | | sum of all phthalates 250ppm | apparel, phthalates can be associated with flexible plastic components, trins, screen and plastisol prints. Phthalates are often classified as repro-toxic and can cause birth defects and changes in hormone levels. Polymeric coatings for leather finishing. | |
| 1,2-Benzenedicarboxylic acid, di-C6-8- branched alkyl esters, C7-rich (DIHP) | 71888-89-6 | | Zero Dis | chemical supplier/ raw material supplier | | | | х |
| 1,2-Benzenedicarboxylic acid, dipentylester, branched and linear | 84777-06-0 | | | | | | dedusting agents in colourants, fat liquors and greases could be a source for phthalates in formulations for leather | |
| Di-iso-pentyl phthalate (DIPP) | 605-50-5 | | | | | | processing. | |
| n-Pentyl-isopentyl phthalate | 776297-69-9 | | | | | | | |
| Di-n-pentyl phthalate (DnPP) | 131-18-0 | | | | | | | |
| Bis(2-methoxyethyl) phthalate (DMEP) | 117-82-8 | | | | | | | |
| Di-n-hexyl phthalate (DHP) | 84-75-3 | | | | | | | |
| Dimethyl phthalate (DMP) | 131-11-3 | | | | | | | |
| FLAME RETARDENTS | | | | _ | | | | |
| Tris-(2,3-dibromopropyl)- phosphate (TRIS) | 126-72-7 | | | | | 5ppm | | |
| Tris - (aziridinyl) - phosphineoxide (TEPA) | 5455-55-1 | | | | | 5ppm | | |
| Polybromobiphenyls (PBB) | 59536-65-1 | | | | | 5ppm | Flame retardant chemicals potentially | |
| Hexabromocyclododecane (HBCDD) | 25637-99-4 | | e | | | 5ppm | used in clothing and tent fabric (PU clothings) to meet safety standards. | |
| Octabromodiphenylether (OctaBDE) | 32536-52-0 | | chare | Declaration needed from | Gas Chromatography | 5ppm | These flame retardant chemicals can | |
| Tris-(2-chloroethyl)-phosphate (TCEP) | 115-96-8 | Usage Ban | o Dis | chemical supplier/ raw material | Mass spectormetry | 5ppm | potentially be used in leather processing for technical and industrial purposes | Х |
| Pentabromodiphenyl ether (PentaBDE) | 32534-81-9 | | Zere | supplier | (GC-MS) | 5ppm | (e.g. drive belts) and unholstery leather for trains and planes. The mentioned substances shall no longer be used in apparel and footwear. | |
| Bis(2,3-dibromopropyl) phosphate (BBP) | 5412-25-9 | | | | | Бррт | | |
| Bis(2,3-dibromopropylether) of tetrabromobisphenol (BDBPT) | 21850-44-2 | | | | | 5ppm | | |
| Decabromodiphenyl Ether (DecaBDE) | 1163-19-5 | | | | | 5ppm | | |

| | | | | | | | eather |
|--|------------------------------|-----------|------------------|-----------------------------------|-------------------|---|--------|
| Substance | CAS number | Criteria | Guidelines | Test Method | MRSL limit in ppm | Common Potential Use | Ľ |
| AZO DYES WHICH BY REDUCTIVE CLEA | AVAGE MAY RELEASE ONE OR MOR | | | | | | |
| Biphenyl-4-ylamin, 4-aminobiphenyl xenylamine | 92-67-1 | | | | 150ppm | | |
| Benzidine | 92-87-5 | | | | 150ppm | | |
| 4-chloro-o-toluidine | 95-69-2 | | | | 150ppm | | |
| 2-naphtylamine | 91-59-8 | | | | 150ppm | Azo dyes and pigments are colorants that incorporate one or several azo groups (N=N-) bound with aromatic compounds. Thousands of azo dyes exist, but only those which degrade to form listed amines are restricted. Azo dyes are used in dyed fabric or leather. Restricted amines also may be present or formed during cleavage of unintended impurities in raw materials used for dyestuff production. | |
| o-aminoazotoluene, 4-amino-2',3-dimethylazobenzene 4-o-tolylazo-otoluidine | 97-56-3 | | | | 150ppm | | |
| 5-nitro-o-toluidine | 99-55-8 | | | | 150ppm | | |
| 4-chloroaniline | 106-47-8 | | | | 150ppm | | |
| 4-methoxy-m-phenylenediamine | 615-05-4 | | | | 150ppm | | |
| 4,4'-methylenedianiline 4,4'-diaminodiphenylmethane | 101-77-9 | | | | 150ppm | | |
| 3,3'-dichlorobenzidine 3,3'-dichlorobiphenyl-4,4'-ylenediamine | 91-94-1 | | 8 Declaration | Liquid Chromatography (LC); | 150ppm | | |
| 3,3-dimethoxybenzidine o-dianisidine | 119-90-4 | Users Ber | needed from | Gas Chromatography (GS) | 150ppm | | v |
| 3,3-dimethylbenzidine, 4,4'-bi-o-toluidine | 119-93-7 | Usage Dan | raw material | | 150ppm | | ^ |
| 4,4'-methylenedi-o-toluidine | 838-88-0 | | N | EN ISO 17234-1 | 150ppm | | |
| 6-methoxy-m-toluidine p-cresidine | 120-71-8 | | | EN ISO 17234-2 | 150ppm | | |
| 4,4'-metylene-bis-(2-chloro-aniline) 2,2'-dichloro-4,4'-ethylenedianiline | 101-14-4 | | | | 150ppm | | |
| 4,4'-oxydianiline | 101-80-4 | | | | 150ppm | | |
| 4,4'-thiodianiline | 139-65-1 | | | | 150ppm | | |
| o-toluidine, 2-aminotoluene | 95-53-4 | | | | 150ppm | | |
| 4-methyl-m-phenylenediamine | 95-80-7 | | | | 150ppm | | |
| 2,4,5-trimethylaniline | 137-17-7 | | | | 150ppm | | |
| o-anisidine (2-methoxyanilin) | 90-04-0 | | | | 150ppm | | |
| 4-amino azobenzene | 60-09-3 | | | | 150ppm | | |
| 2,4-xylidine | 95-68-1 | | | | 150ppm | | |
| 2,6-xylidine | 87-62-7 | | | | 150ppm | | |

| Substance ORGANOTIN COMPOUNDS | CAS number | Criteria | | Guidelines | Test Method | MRSL limit in ppm | Common Potential Use | Leather |
|-----------------------------------|------------------------------|---------------------------------------|--------------------------|--|-------------------------|--|--|---------|
| Tributyltin (TBT) + compounds | 56573-85-4 | | | | Liquid | 20ppm (Exception 100ppm for polyurethane based thickeners used at the loading at <20% loading) | Organotins are a class of chemicals combining tin and organics such as butyl and phenyl groups. Organotins are predominantly found in the environment as antifoulants in marine paints, but they can also be used as biocides (e.g., antibacterials), catalysts in plastic and glue productions, and heat stabilizers in plastics/rubber. In textiles and anoarel. | |
| Triphenyltin (TPhT)) + compounds | 668-34-8 | | ge | Declaration needed from | Chromatography (LC); | 5ppm | | |
| Dibutyltin (DBT)) + compounds | 1002-53-5 | Usage Ban Usage Ban Corra Su | schar | | | 5ppm | | |
| Dioctyltin (DOT) + compounds | 15231-44-4 | | raw material supplier | Chromatography (GS) EN ISO 17234-1 EN ISO 17234-2 | Бррт | organotins may be associated with textiles plastics/rubber, inks, paints, metallic glitter, and heat transfer material. Polyurethane thickeners, which could contain traces of DBT, are commonly used for viscosity adjustments of leather chemical formulations. | | |
| CHLOROBENZENES AND CHLOROTOR | LUENES | | | | | | | |
| Dichlorobenzenes * | 95-50-1, 541-73-1, 106-47-7 | | | | | 1000ppm | | |
| Trichlorobenzenes * | 87-61-6, 120-82-1, 108-70-3 | | | | | | | |
| Tetrachlorobenzenes | 17700-09-3 | | | | | | | |
| Pentachlorobenzenes | 608-93-5 | | rge | Declaration | Gas | | | |
| Hexachlorobenzene | 118-74-1 | Usage Ban | scha | needed from chemical supplier/ | Chromatography Mass | | Chlorobenzenes and Cholortoluenes can be used for degreasing sheep and | x |
| Chlorotoluenes | 95-49-8 | oougo buii | ro Di | raw material | spectormetry (GC-MS) | Sum of all other isomers = 200ppm | pig skins. They can also be used as solvents (e.g. in chemical synthesis). | ~ |
| Dichlorotoluenes * | 95-73-8, 118-69-4, 95-75-0 | | Ze | | (80-1113) | | | |
| Trichlorotoluenes * | 98-07-7,2077-46-5, 6639-30-1 | | | | | | | |
| Tetrachlorotoluenes * | 5216-25-1, 81-19-6, 134-25-8 | | | | | | | |
| Pentachlorotoluenes * | 877-11-2, 13014-24-9 | | | | | | | |

| Substance CHLORINATED/HALOGENTED SOLVEN | CAS number ITS | Criteria | | Guidelines | Test Method | MRSL limit in ppm | Common Potential Use | Leather |
|--|-------------------|-----------------------|-------------|--------------|-----------------------|-----------------------|---|---------|
| 1,2,3-Trichloropropane | 96-18-4 | | | | | 5ppm | | |
| 1,2-Dichloroethane | 107-06-2 | Criteria Usage Ban | | | | 5ppm | | |
| Pentachloroethane | 76-01-7 | | | | | 5ppm | | |
| Chloroform | 67-66-3 | Criteria Usage Ban | | | | 5ppm | In apparel and footwear, solvents are used as finishing/cleaning and printing agents, for dissolving and diluting fats, oils and adhesives (e.g., in degreasing or | |
| Trichloroethane | 79-00-5 | | ag | Destaution | 0 | 5ppm | | |
| 1,1,1,2-Tetrachloroethane | 630-20-6 | Hanna Ban | Ban Ban Ban | needed from | Gas Chromatography | 5ppm | | v |
| 1,1-Dichloroethylene | 75-35-4 | Criteria Usage Ban | ō Di | raw material | spectormetry | 5ppm | | ^ |
| 1,1,1-Trichloroethane | 71-55-6 | | supplier | (60-103) | 5ppm | cleaning operations). | | |
| Carbon Tetra Chloride | 56-23-5 | | | | | 5ppm | | |
| Tetrachloroethylene | 127-18-4 | | 5ppm | | | | | |
| Trichloroethylene | 79-01-6 | | | | | 5ppm | | |
| Methylene chloride | 75-09-2 | | | | | 5ppm | | |

| Substance CHLOROPHENOLS | CAS number | Criteria | | Guidelines | Test Method | MRSL limit in ppm | Common Potential Use | Leather |
|---|------------|-----------|----------------|--|--|-------------------|--|---------|
| Tetrachlorophenol (TeCP) | 25167-83-3 | | | | | 20ppm | | |
| Pentachlorophenol (PCP) | 87-86-5 | | | | | | | |
| 2,3,5,6 - Tetrachlorophenol (TeCP) | 935-95-5 | | | Declaration | | | | |
| 2,3,4,6 - Tetrachlorphenol (TeCP) | 58-90-2 | | | | Gas Chromatography | | | |
| 2,3,4,5 - Tetrachlorphenol (TeCP) | 4901-59-3 | | | | | | Chlorophenols are polychlorinated compounds used as preservatives or pesticides. | |
| 2-Chlorophenol | 95-57-8 | | | | | | | |
| 2,4-Dichlorophenol | 120-83-2 | | | | | | | |
| 2,5-Dichlorophenol | 583-78-8 | | 0 | | | | | |
| 2,6-Dichlorophenol | 87-65-0 | Usage Ban | narge | | | | | |
| 2,4,5-Trichlorophenol | 95-95-4 | | Discl | chemical supplier/ | Mass spectormetry | Sum of all 50ppm | Pentachlorophenol (PCP) and Tetrachlorophenol (TeCP) have been | х |
| 2,4,6-Trichlorophenol | 88-06-2 | | Zero | supplier | (GC-MS) EN ISO 17070 | Sum of an Soppin | used in the past to prevent mould when storing/transporting raw hides and | |
| 3,5-Dichlorophenol | 591-35-5 | | | | | | leather. They are regulated and shall not be used. | |
| 2,3-Dichlorophenol | 576-24-9 | | | | | | | |
| 3,4-Dichlorophenol | 95-77-2 | | | | | | | |
| 3-Chlorophenol | 108-43-0 | | | | | | | |
| 4-Chlorophenol | 106-48-9 | | | | | | | |
| 2,3,4-Trichlorophenol | 15950-66-0 | | | | | | | |
| 2,3,5-Trichlorophenol | 933-78-8 | | | | | | | |
| 3,4,5-Trichlorophenol | 609-19-8 | | | | | | | |
| CHLORINATED PARAFFINS | | | | | | | | |
| Short-chain chlorinated paraffins (SCCP) | 85535-84-8 | Usage Ban | Zero Discharge | Declaration needed from chemical supplier/ raw material supplier | GC-ECNI-MS Gas Chromatography electron capture negative ion-mass spectrometry EN ISO 18219 | 250ppm | SCCP's: used as flame retardants, in plasticizers, paints and adhesives and for fat liquoring of leather. SCCP's may cause long-term adverse effects in the aquatic environment. | x |

| Substance HEAVY METALS | CAS number | Criteria | Guidelines | Test Method | MRSL limit in ppm | Common Potential Use | Leather |
|---------------------------|------------|------------|--|--|--------------------------|---|---------|
| Arsenic (As) | 7440-38-2 | liters Ber | | ICP-OES - Inductively coupled plasma - optical emission spectrometry AAS - Atomic Absorption Spectroscopy Cr (III) Tanning Agents can be monitored for Cr (VI) EN ISO 17075 (current use) ISO/DIS 19071 (draft) | 50ppm | Arsenic and its compounds can be used in some preservatives, pesticides and defoliants for cotton. Arsenic is not a typical residue in leather chemicals. | |
| Cadmium (Cd) | 7440-43-9 | | | | 20ppm/50ppm for pigments | Cadmium compounds are found in or used as: Pigments (particularly red, orange, yellow, and green), Stabilizer for PVC plastic, Fertilizers, Biocides and paints (e.g. surface paints on zippers and buttons.) | x |
| Chromium (Cr VI) | 7440-47-3 | | Declaration needed from chemical supplier/ | | 10ppm | The two-bath process for tanning using potassium dichromate (VI) is no longer used by the leather industry. Potassium dichromate (VI) and other chromium VI compounds are banned and chromium VI residues in chromium (III) tanning agents are restricted. | |
| Lead (Pb) | 7439-92-1 | | c raw material supplier | | 50ppm | In apparel and footwear, lead may be associated with plastics, paints, inks, pigments, surface coatings and metal components. | |
| Mercury (Hg) | 7439-97-6 | | | | 2ppm/25ppm for pigments | Mercury compounds can be present in pesticides and can be found as contamination in caustic soda (NaOH). Mercury compounds can be used in paints (e.g. surface paints on zippers and buttons). | |
| Nickel (Ni) | 7440-020 | | | | 250ppm | Nickel metal is mainly used for plating of alloys, improving the corrosion resistance in alloys, improving the hardness of alloys and is a key element in the production of stainless steel. Certain dyestuffs contain complexbound Nickel. Both Nickel metal and Nickel compounds can occur as an impurities in pigments and alloys. | |

| Substance | CAS number | Criteria | | Guidelines | Test Method | MRSL limit in ppm | Common Potential Use | Leather |
|--|--|-----------|----------------|--|--|-------------------|--|---------|
| ALKYLPHENOLS (AP) AND ALKYPHENC | OL ETHOXYLATES (APEO) | | | | | | | |
| Nonylphenols (NP) | 25154-52-3 104-40-5 11066-49-2 84852-15-3 | | | | Liquid Chromatography Mass spectrometry (LC-MS); Gas Chromatography Mass spectormetry (GC-MS) EN ISO 18219-1 EN ISO 18219-2 | 250ppm | APEOs can be used as or found in: Detergents, Scouring agents, Wetting agents, Softeners, Emulsifier/dispersing agents for dyes and prints, Impregnating agents, Degreasing agents for leather, Leather Finishing, De-gumming for silk production, Dyes and pigment preparations, Polyester padding and Down/feather fillings. NP and OP are not used by the leather industry, but could be present as contaminants. | |
| Octylphenols (OP) | 27193-28-8 140-66-9 1806-26-4 | Usage Ban | Zero Discharge | Declaration needed from chemical supplier/ raw material supplier | | 250ppm | | |
| Nonylphenolethoxylates (NPEO) | 9016-45-9 26027-38-3 37205-87-1 68412-54-4 127087-87-0 | | | | | 500ppm | | х |
| Octylphenolsethoxylates (OPEO) | 9063-89-2 9036-19-5 38987-90-6 9002-93-1 | | | | | 500ppm | | |
| PERFLUORINATED CHEMICALS | | | | | | | | |
| Perfluoroctanesulfonates (PFOS) | 1763-23-1 | | | | | 1ppm | Perfluoroctane suphonate (PFOS) and Perfluoroctanoic acid (PFOA) may be present as unintended by-products in long-chain commercial water, oil and stain repellent agents. PFOA can also be generated from other by-products (esp. the telomer alcohols) contained in long- chain PFC. G-Star has a complete ban on the use of Perfluorinated Chemicals (long, but also short chain); alternative water repellent finishing has to be used. | |
| Perfluoroctane acids (PFOA) | 335-67-1 | | | | | 2ppm | | |
| 1H,1H,2H,2H-Perfluorooctylacrylate (6:2 FTA) | 17527-29-6 | | arge | Declaration | Liquid | ND | | |
| 1H,1H,2H,2H-Perfluorodecylacrylate (8:2 FTA) | 27905-45-9 | Usage Ban | o Disch | needed from chemical supplier/ raw material | Chromatography Mass spectrometry | ND | | х |
| 1H,1H,2H,2H-Perfluorododecylacrylate (10:2 FTA) | 17741-60-05 | | Zerd | supplier | (LC-MS) | ND | | |
| 1H,1H,2H,2H-Perfluoro-1-hexanol (4:2 FTOH) | 2043-47-2 | | | | | ND | | |
| 1H,1H,2H,2H-Perfluoro-1oktanol (6:2 FTOH) | 647-42-7 | | | | | ND | | |
| 1H,1H,2H,2H-Perfluoro-1-decanol (8:2 FTOH) | 678-39-7 | | | | | ND | | |
| 1H,1H,2H,2H-Perfluoro-1-dodecanol (10:2 FTOH) | 865-86-1 | | | | | ND | | |

| Substance POLYCYCLIC AROMATIC HYDROCARE | CAS number IONS (PAH'S) | Criteria | _ | Guidelines | Test Method | MRSL limit in ppm | Common Potential Use | Leather |
|--|----------------------------|-----------|------|--|---|-------------------------|--|---------|
| Benzo(a)pyrene | 102.07.2 | | | | | 2000 | | |
| Benzo(a)anthracene | 56-55-3 | | | | | | | |
| Chrysene | 218-01-9 | | | | | | | |
| Benzo(b)fluoroanthene | 205-99-2 | | | | Gas Chromatography Mass | | | |
| Benzo(j)fluoroanthene | 205-82-3 | | | | | | Polycyclic Aromatic Hydrocarbons (PAHs) are natural components of crude oil and they are a common residue from oil refining. PAHs have a characteristic smell similar to the smell of car tires or asphalt. Oil residues containing PAHs are added in rubber and plastics as a softener or extender. Therefore, PAHs are in tubber autorise lacourte | |
| Benzo(k)fluoroanthene | 207-08-9 | | | | | | | |
| Dibenzo(a,h)anthracene | 53-70-3 | | | | | | | |
| Acenaphthene | 83-32-9 | | | | | (DALL 000 | | |
| Acenaphthylene | 208-96-8 | | ~ | | (GC-MS) | sum of all PAH = 200ppm | and coatings. PAHs are often found in the outcoles of footwear and in printing | |
| Antracene | 120-12-7 | | AALU | Declaration | | | pastes of screen prints. PAHs can be present as impurities in Carbon Black | |
| Benzo(ghi)perylene | 191-24-2 | Usage Ban | ITIO | chemical supplier/ raw material supplier | | | Clean mineral oils should be used in the rubber to avoid PAHs. | х |
| Fluoranthene | 206-44-0 | | ADD | | | | | |
| Fluorene | 86-73-7 | | | | | | | |
| Indeno(1,2,3-cd)pyrene | 193-39-5 | | | | | | | |
| Phenanthrene | 85-01-8 | | | | | | | |
| Pyrene | 129-00-0 | | | | | | | |
| Naphthalene | 91-20-3 | | | | Gas Chromatography Mass spectormetry (GC-MS) Liquid Chromatography Mass spectrometry (LC-MS) | 300ppm | In the leather chemical industry, naphthalene is used as raw material for manufacture of synthetic tanning agents (syntans) and for manufacture of active substances in dispersing agents used during leather processing. | |
| ALLERGENIC DISPERSE DYES | | | | | | | | |
| Disperse dyes have no applicability to leather processing. | | | | | | | | |

| | | | | | | | | ler |
|-----------------------------------|-------------------|-----------|---|--|---------------------------------|-------------------|---|------|
| Substance | CAS number | Criteria | | Guidelines | Test Method | MRSL limit in ppm | Common Potential Use | Leat |
| CARCINOGENIC DYES | | | | | | | | |
| C.I. Acid Red 26 | 3761-53-3 | | | | | 250ppm | | |
| C.I. Basic Red 9 | 569-61-9 | | | | | 250ppm | | |
| C.I. Direct Black 38 | 1937-37-7 | | Declaration Li needed from C chemical supplier/ M | Liquid | 250ppm | | | |
| C.I. Direct Blue 6 | 2602-46-2 | | | | 250ppm | | | |
| C.I. Direct Red 28 | 573-58-0 | Usage Ban | | chemical supplier/ | Mass spectrometry (LC-MS) | 250ppm | Most of these substances are regulated and should no longer be used for dyeing of leather. | х |
| C.I. Disperse Blue 1 | 2475-45-8 | | ADDI | supplier | | 250ppm | | |
| C.I. Disperse Yellow 3 | 2832-40-8 | | | | | 250ppm | | |
| C.I. Basic Violet 14 | 632-99-5 | | | | | 250ppm | | |
| C.I. Disperse orange 11 | 82-28-0 | | | | 250ppm | | | |
| GLYCOLS | | | | | | | | |
| Bis(2-methoxyethyl)-ether | 111-96-6 | | | | | 50ppm | In apparel and footwear, solvents are used as finishing/cleaning and printing agents, for dissolving and diluting fats, oils and adhesives (e.g., in degreasing or cleaning operations). | |
| 2-ethoxyethanol | 110-80-5 | | | | High Performance Liquid | 50ppm | | |
| 2-ethoxyethyl acetate | 111-15-9 | | LLY | Declaration | | 50ppm | | |
| Ethylene glycol dimethyl ether | 110-71-4 | Usage Ban | ONA | needed from | (HPLC) | 50ppm | | ¥ |
| 2-methoxyethanol | 109-86-4 | Usage Dan | DITIO | raw material | Liquid Chromatography | 1000pm | | ^ |
| 2-methoxyethylacetate | 110-49-6 | | AD | Supplier | Mass- | 50ppm | | |
| 2-methoxypropylacetate | 70657-70-4 | | | | | 50ppm | | |
| Triethylene glycol dimethyl ether | 112-49-2 | | | | | 50ppm | | |
| OTHER SOLVENTS/VOLATILE ORGANIC | C COMPOUNDS (VOC) | | | | | | | |
| o-cresol | 95-48-7 | | Γ | | _ | 500ppm | These volatile organic compounds should not be used in leather and textile auxiliary chemical preparations. They are associated with solvent-based porcesses like solvent-based PU coatings and glues/adhesives. They should not be used for any kind of facility cleaning or post-cleaning. | |
| p-cresol | 106-44-5 | | NAL | Declaration needed from | Gas Chromatography | 500ppm | | |
| m-cresol | 108-39-4 | Usage Ban | DITIC | chemical supplier/ raw material supplier | Mass spectrometry | 500ppm | | х |
| Benzene | 71-43-2 | | ADI | | (GC-MS) | 50ppm | | |

G-STAR RAW

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Information provided in this document is valid as of March 2016. Changes, modifications and/or actualizations will be notified from time to time, and will make part of this list as of such date.

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