Titanium Dioxide, a critical raw material for paints – update on proposed classification in the EU and new liquid solutions

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Hungarocoat 10-11 February 2021

Topics

- Update on TiO_2 classification in the EU
- KRONOS TiO_2 slurries for the European market

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The European Titanium Dioxide Classification

TiO_2 classification - application timeline

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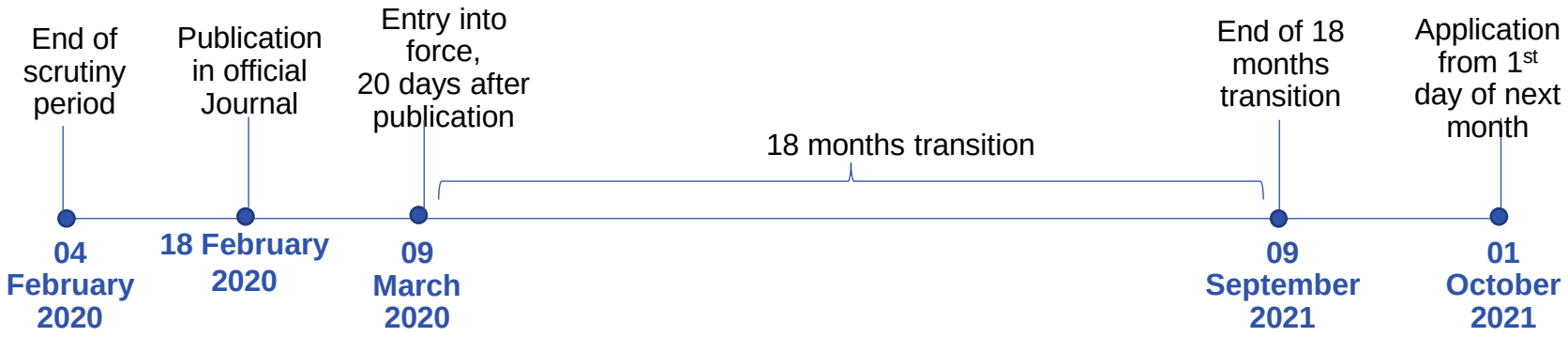
This Regulation shall enter into force on October 1st 2021



14th ATP: Annex VI entry for TiO_2

Index No	International Chemical Identification*	EC No	CAS No	Classification		Labelling		Notes
				Hazard Class and Category Code(s)	Hazard statement Code(s)	Pictogram, Signal Word Code(s)	Hazard statement Code(s)	
022-006-002	titanium dioxide; [in a powder form containing 1% or more of particles with aerodynamic diameter ≤ 10 µm]	236-675-5	13463-67-7	Carc. 2	H351 (inhalation)	GHS08 Wng	H351 (inhalation)	V, W 10

Labelling pictogram Signal word	GHS08	 Warning
Hazard statement	H351 (inhalation)	Suspected of causing cancer (inhalation)

New Footnotes to Annex VI

Note V

If the substance is to be placed on the market as fibres (with diameter < 3 µm, length > 5 µm and aspect ratio ≥ 3:1) or particles of the substance fulfilling the WHO fibre criteria or as particles with modified surface chemistry, their hazardous properties must be evaluated in accordance with Title II of this Regulation, to assess whether a higher category (Carc. 1B or 1A) and/or additional routes of exposure (oral or dermal) should be applied.

Note W

It has been observed that the carcinogenic hazard of this substance arises when respirable dust is inhaled in quantities leading to significant impairment of particle clearance mechanisms in the lung. This note aims to describe the particular toxicity of the substance; it does not constitute a criterion for classification according to this regulation.

Note 10

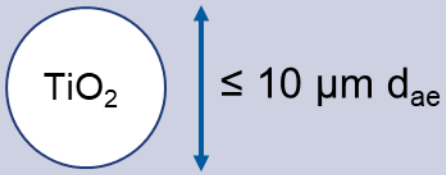
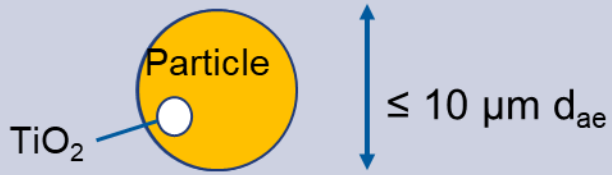
The classification as a carcinogen by inhalation applies only to mixtures in powder form containing 1% or more of titanium dioxide which is in the form of or incorporated in particles with aerodynamic diameter ≤ 10 µm.

Classification of mixtures: Footnote 10

Classification of titanium dioxide in powder mixtures has been extended:

"Note 10: The classification as a carcinogen by inhalation applies only to mixtures in powder form containing 1% or more of titanium dioxide which is in the form of or incorporated in particles with aerodynamic diameter ≤ 10 µm."

Powdery mixtures will have to be classified if they contain 1% or more TiO_2 either

1. in the form of **titanium dioxide particles**	2. or **incorporated in particles**
	

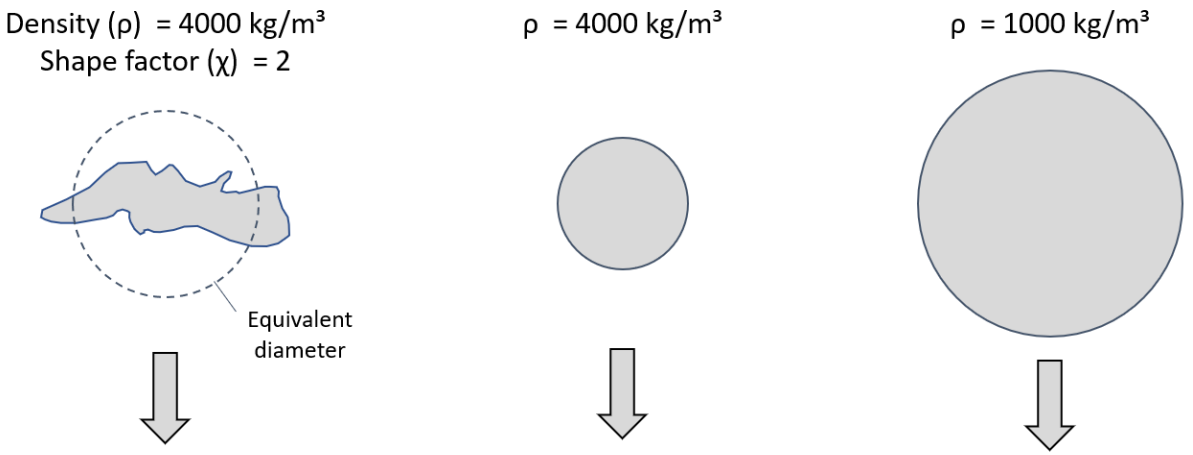
Aerodynamic diameter

Ability of particles to be suspended in the air and be able to reach the deep regions of the lung

Respirable fraction – only particles ≤ 10 µm aerodynamic diameter

Depends on size, density and shape

Should be determined in air



All particles have the same settling velocity and therefore the same aerodynamic diameter.

Particle size distribution measurement is normally determined in water with a dispersing aid and high dispersing forces and is therefore not valid for measuring particle aerodynamic diameter!

TiO_2 powder and liquid mixtures

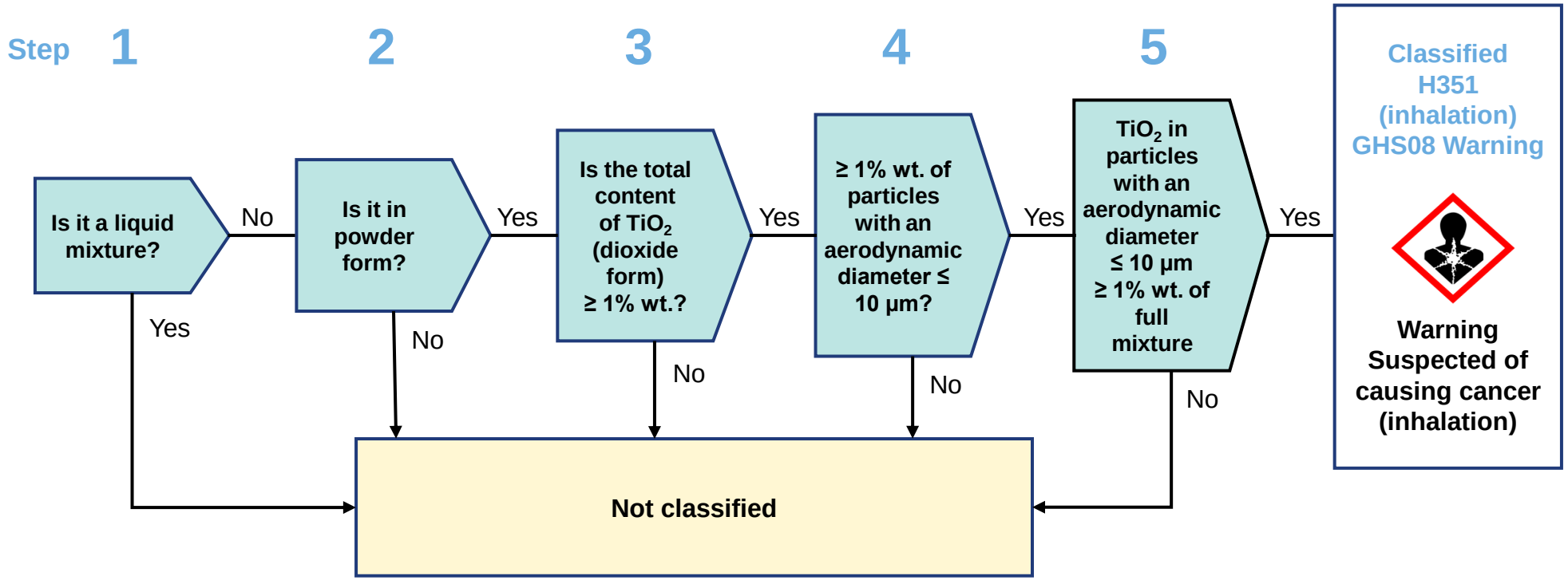
TiO_2 powder

- Method of determination of aerodynamic diameter still in discussion (rotating drum dust generator, venturi based aerosol generator…….)
  → **Classification remains unclear**

Liquid mixtures

- Any TiO_2 in a liquid mixture, regardless of the concentration is
  → **Not classified**
  – TiO_2 is insoluble
- Emulsion, suspension, liquid dispersion or a slurry in water
  → **Not classified**
  – All can be considered as liquid mixtures
- Some TiO_2 is also placed on the market in water slurry form
  → **Not classified**

Classification – Staged approach



Guidance assumes a weight basis.

(Source: TDMA)

Annex II - Labelling of Mixtures

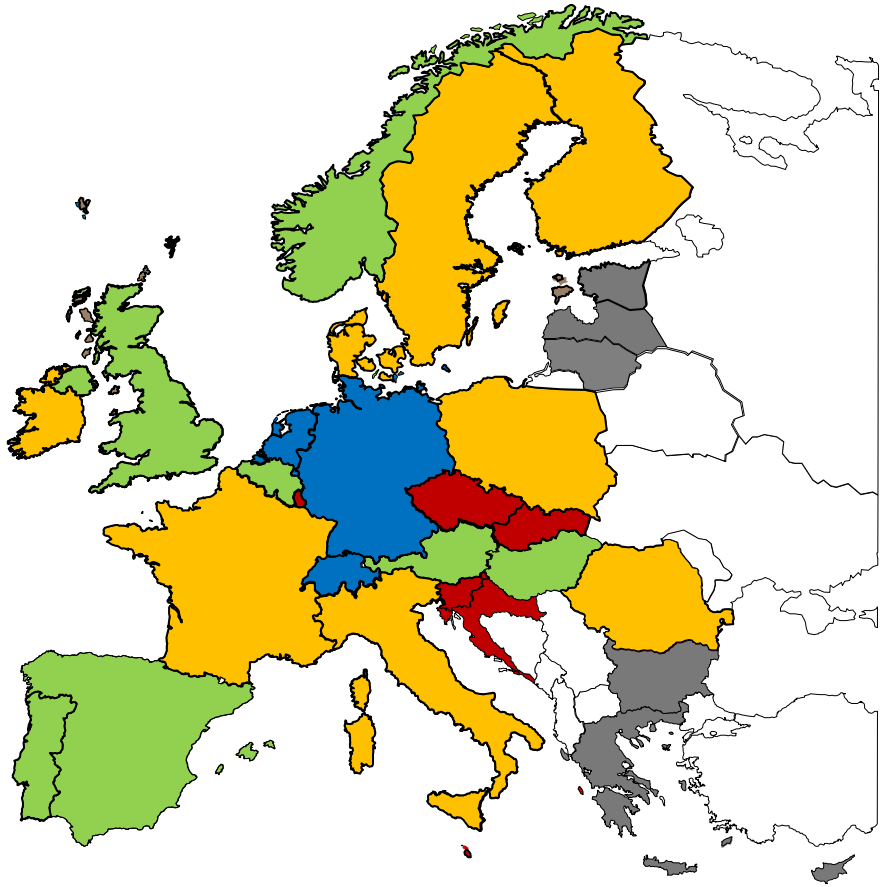
Situation	Code	Label on packaging
Liquid mixtures containing 1% or more of titanium dioxide particles with aerodynamic diameter equal to or below 10 µm	EUH211	Warning! Hazardous respirable droplets may be formed when sprayed. Do not breathe spray or mist.
Solid mixtures containing 1% or more of titanium dioxide	EUH212	Warning! Hazardous respirable dust may be formed when used. Do not breathe dust.
Non-classified liquid and solid mixtures labelled with EUH211 or EUH212 not intended for the general public	EUH210	Safety data sheet available on request.

Occupational Exposure Limits (OEL)

- It is our understanding that the classification does not automatically result in new or different workplace exposure limits.

- Existing **dust load limits** in the EU Member States should remain valid

➢ We understand the EU Commission plans to establish a **hamonized TiO_2 workplace exposure limit** applicable for all EU Member States in the future



Downstream Impacts

Restrictions on toys and cosmetics

The classification has a direct impact on certain toys and cosmetics;
if the concentration exceeds 1%.

→Industry Groups are currently seeking derogation for these sectors.

Hazardous Waste

Articles /packaging containing >1% TiO_2 may be classified as hazardous waste

→ A guidance draft is currently out for review by Member States and is only valid for dry powder with d_{ae} > 10 µm

Ecolabel

In most programs CMR properties are listed under the exclusion criteria.

→ Derogations have been granted by the leading Ecolabel organizations in EU for the next 2 years

KRONOS TiO_2 slurries for European markets

KRONOS European TiO_2 slurry concept

SP-base TiO_2 Slurry
interior applications

KRONOS production plant Nordenham/Germany

Surface-treated TiO_2 Slurries
exterior applications

CP premium - KRONOS 4320
Slurry based on KRONOS 2310

SP premium - KRONOS 4390
Slurry based on KRONOS 2190

Toll manufacturing partner: Omya Multiple sites available in Europe

Target markets - KRONOS European slurries

KRONOS 4045

- Paper mass (pulp)
- Paper & cardboard coatings
- Interior deco paints
- Cost-efficient primers (interior)
- Applications that require FDA/indirect food contact

KRONOS 4390

- Decorative coatings interior & exterior
- Industrial coatings
- Wood coatings
- Primers
- Inks

KRONOS 4320

- Premium decorative coatings (exterior)
- Premium industrial coatings
- OEM coatings
- Highly durable coatings
- Inks

Applications: “waterborne paints & inks, paper & cardboard”

Technical Properties

Slurry contents: KRONOS TiO_2-pigment, water, additives	▪ Universal compatibility with most commercial binders and tint pastes
70-77% solid content (delivery form)	▪ High solids content for formulation freedom regarding water balance in the paint formulation
Dispersion	▪ Efficient processing: ready-to-use, no dispersion required ▪ Stable pigment dispersion ▪ Free of agglomerates
Microbiological Stability	▪ Use of proven biocide packages (according to market needs) ▪ ‘as little as possible, as much as needed’
Storage Stability & Handling	▪ Stable viscosity, tint strength and pH-value ▪ ‘Soft sedimentation’ (easy to stir up even after months of storage) ▪ Easy to pump and meter

Customer Benefits

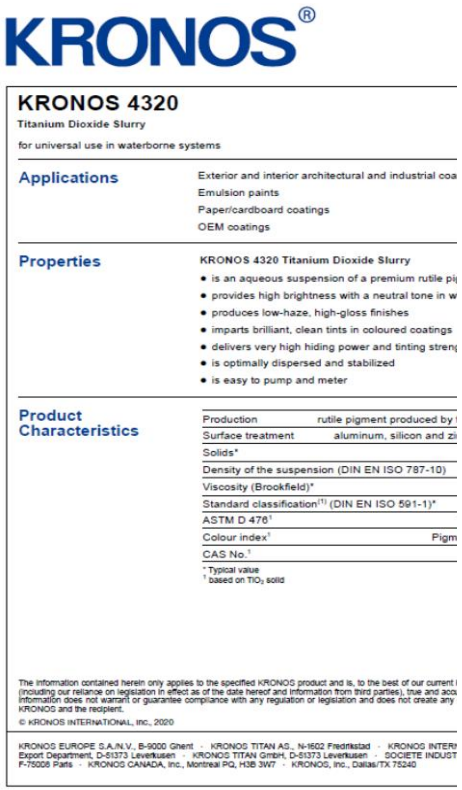
Quality	▪ **TiO_2 slurries help to improve and stabilize paint quality:** ▪ Improved batch-to-batch consistency of paint production (no color and viscosity shifts) ▪ Less off-spec batches ▪ Best hiding power and tint strength ▪ Post-addition of dispersed TiO_2 is possible!
Capacity and Flexibility	▪ **TiO_2 slurries help to gain flexibility and capacity:** ▪ No more limitations to plant capacity due to powder handling & dispersion ▪ Gain in plant capacity ▪ Boost the speed of production and flexibly react to orders at any quantity
Safety Health Environment	▪ **TiO_2 slurries help to create a better working environment:** ▪ Dust extraction systems and personal protection for work-force required ▪ TiO_2 powder classification in 2021 – slurries are not concerned ▪ Elimination of bag handling and – disposal ▪ Safe, dust-free and clean working environment in paint production

KRONOS TiO_2 Slurries

- For safety of supply, we offer a commercial long-term agreement with slurry deliveries
- Slurry production capacity available
- We support with engineering know-how on request (for production implementation of slurries)
- We support with formulation know-how
- Biocide package can be adapted on request

Documentation /Information available

MSDS / TDS



KRONOS®

KRONOS 4320

Titanium Dioxide Slurry

for universal use in waterborne systems

Applications

Exterior and interior architectural and industrial coa
Emulsion paints
Paper/cardboard coatings
OEM coatings

Properties

KRONOS 4320 Titanium Dioxide Slurry

- is an aqueous suspension of a premium rutile pi
- provides high brightness with a neutral tone in w
- produces low-haze, high-gloss finishes
- imparts brilliant, clean tints in coloured coatings
- delivers very high hiding power and tinting stren
- is optimally dispersed and stabilized
- is easy to pump and meter

Product Characteristics

Production	rutile pigment produced by
Surface treatment	aluminum, silicon and zi
Solids*	
Density of the suspension (DIN EN ISO 787-10)	
Viscosity (Brookfield)*	
Standard classification[1] (DIN EN ISO 591-1)*	
ASTM D 476[1]	
Colour index[1]	Pigm
CAS No.[1]	

* Typical value
[1] based on TiO_2 solid

The information contained herein only applies to the specified KRONOS product and is, to the best of our current
(including our reliance on legislation in effect as of the date hereof and information from third parties), true and acc
information does not warrant or guarantee compliance with any regulation or legislation and does not create any
KRONOS and the recipient.

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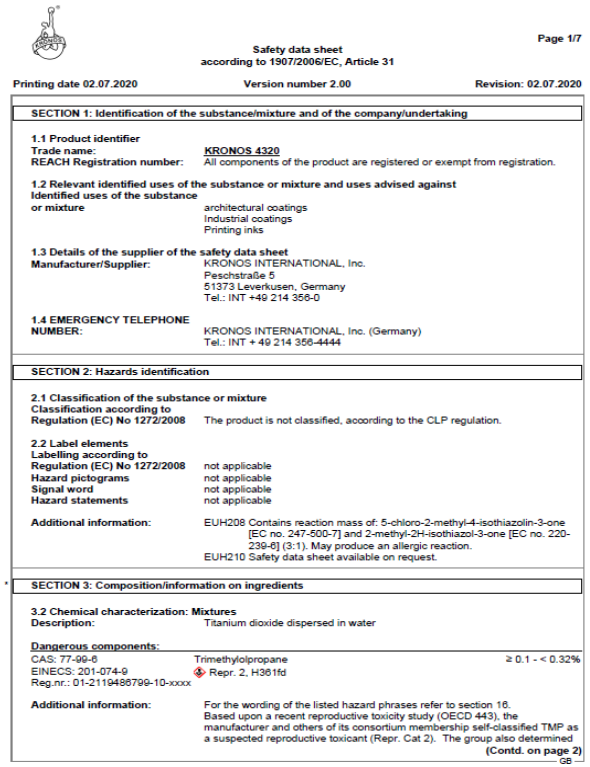

Page 1/7

Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 02.07.2020 **Version number 2.00** **Revision: 02.07.2020**

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier
Trade name: **KRONOS 4320**
REACH Registration number: All components of the product are registered or exempt from registration.

1.2 Relevant identified uses of the substance or mixture and uses advised against
Identified uses of the substance or mixture: architectural coatings, Industrial coatings, Printing inks

1.3 Details of the supplier of the safety data sheet
Manufacturer/Supplier: KRONOS INTERNATIONAL, Inc.
Peschstraße 5
51373 Leverkusen, Germany
Tel.: INT +49 214 356-0

1.4 EMERGENCY TELEPHONE NUMBER: KRONOS INTERNATIONAL, Inc. (Germany)
Tel.: INT + 49 214 356-4444

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture
Classification according to Regulation (EC) No 1272/2008 The product is not classified, according to the CLP regulation.

2.2 Label elements
Labelling according to Regulation (EC) No 1272/2008 not applicable
Hazard pictograms not applicable
Signal word not applicable
Hazard statements not applicable

Additional information: EUH208 Contains reaction mass of: 5-chloro-2-methyl-4-isothiazolin-3-one [EC no. 247-500-7] and 2-methyl-2H-isothiazol-3-one [EC no. 220-239-6] (3:1). May produce an allergic reaction.
EUH210 Safety data sheet available on request.

SECTION 3: Composition/information on ingredients

3.2 Chemical characterization: Mixtures
Description: Titanium dioxide dispersed in water

Dangerous components:

CAS: 77-99-6 Trimethylolpropane ≥ 0.1 - < 0.32%
EINECS: 201-074-9 Repr. 2, H361fd
Reg.nr.: 01-2119486799-10-xxxx

Additional information: For the wording of the listed hazard phrases refer to section 16.
Based upon a recent reproductive toxicity study (OECD 443), the manufacturer and others of its consortium membership self-classified TMP as a suspected reproductive toxicant (Repr. Cat 2). The group also determined

(Contd. on page 2)

GB

Product brochures and information

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KRONOS Slurries
Excellence in liquid white

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KRONOS Slurries 1.0