



## Safety Data Sheet according to (EC) No 1907/2006

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Loctite 272 Threadlocker

SDS No. : 153465  
V005.0

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Replaces version from: 22.01.2015

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

#### 1.1. Product identifier

Loctite 272 Threadlocker

#### Contains:

N,N-(m-phenylene)dimalimide  
Hydroxypropyl methacrylate  
Cumene hydroperoxide  
Maleic acid  
Acetic acid, 2-phenylhydrazide

#### 1.2. Relevant identified uses of the substance or mixture and uses advised against

Intended use:  
Anaerobic Adhesive

#### 1.3. Details of the supplier of the safety data sheet

Henkel Ltd  
Wood Lane End  
HP2 4RQ Hemel Hempstead

Great Britain

Phone: +44 1442 278000  
Fax-no.: +44 1442 278071

ua-productsafety.uk@uk.henkel.com

#### 1.4. Emergency telephone number

24 Hours Emergency Tel: +44 (0)1442 278497

### SECTION 2: Hazards identification


#### 2.1. Classification of the substance or mixture

##### Classification (CLP):

Skin irritation	Category 2
H315 Causes skin irritation.	
Serious eye damage	Category 1
H318 Causes serious eye damage.	
Skin sensitizer	Category 1
H317 May cause an allergic skin reaction.	
Specific target organ toxicity - single exposure	Category 3
H335 May cause respiratory irritation.	
Target organ: respiratory tract irritation	

#### 2.2. Label elements

##### Label elements (CLP):

<b>Hazard pictogram:</b>		
<b>Signal word:</b>	Danger	
<b>Hazard statement:</b>	H315 Causes skin irritation. H317 May cause an allergic skin reaction. H318 Causes serious eye damage. H335 May cause respiratory irritation.	
<b>Precautionary statement:</b>	***For consumer use only: P101 If medical advice is needed, have product container or label at hand. P102 Keep out of reach of children. P501 Dispose of waste and residues in accordance with local authority requirements***	
<b>Precautionary statement: Prevention</b>	P261 Avoid breathing vapours. P280 Wear protective gloves/eye protection.	
<b>Precautionary statement: Response</b>	P302+P352 IF ON SKIN: Wash with plenty of water. P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P333+P313 If skin irritation or rash occurs: Get medical advice/attention.	
<b>Precautionary statement: Storage</b>	P403+P233 Store in a well-ventilated place. Keep container tightly closed.	

### 2.3. Other hazards

This product contains a substance that is classified as Acute Toxicity Category 2, Inhalation, in powder form. Experimental data show that this substance, as an ingredient in this mixture, is not biologically available according to CLP Art. 12 b.

## SECTION 3: Composition/information on ingredients

### 3.2. Mixtures

#### General chemical description:

Methacrylate resin based threadlocker

**Declaration of the ingredients according to CLP (EC) No 1272/2008:**

Hazardous components CAS-No.	EC Number REACH-Reg No.	content	Classification
N,N-(m-phenylene)dimaleimide 3006-93-7	221-112-8	10- 20 %	Skin Irrit. 2; Dermal H315 Skin Sens. 1; Dermal H317 Eye Dam. 1 H318 Acute Tox. 2; Inhalation H330
Hydroxypropyl methacrylate 27813-02-1	248-666-3 01-2119490226-37	1- 5 %	Skin Sens. 1 H317 Eye Irrit. 2 H319
Cumene hydroperoxide 80-15-9	201-254-7	1- < 2,5 %	Acute Tox. 4; Dermal H312 STOT RE 2 H373 Acute Tox. 4; Oral H302 Org. Perox. E H242 Acute Tox. 3; Inhalation H331 Aquatic Chronic 2 H411 Skin Corr. 1B H314
Maleic acid 110-16-7	203-742-5 01-2119488705-25	0,1- 1 %	Acute Tox. 4; Oral H302 Acute Tox. 4; Dermal H312 Skin Irrit. 2 H315 Skin Sens. 1 H317 Eye Irrit. 2 H319 STOT SE 3 H335
N,N-dimethyl-o-toluidine 609-72-3	210-199-8	0,1- 1 %	STOT RE 2 H373 Aquatic Chronic 3 H412 Acute Tox. 3; Inhalation H331 Acute Tox. 3; Dermal H311 Acute Tox. 3; Oral H301
N,N-Diethyl-p-toluidine 613-48-9	210-345-0	0,1- 1 %	Acute Tox. 3; Oral H301 Acute Tox. 3; Dermal H311 Acute Tox. 3; Inhalation H331 STOT RE 2 H373 Aquatic Chronic 3 H412
Acetic acid, 2-phenylhydrazide 114-83-0	204-055-3	0,1- < 1 %	Acute Tox. 3; Oral H301 Skin Irrit. 2 H315 Skin Sens. 1 H317 Eye Irrit. 2 H319

			STOT SE 3; Inhalation H335 Carc. 2 H351
1,4-Naphthalenedione 130-15-4	204-977-6	0,01 - 0,1 %	Acute Tox. 3; Oral H301 Skin Irrit. 2; Dermal H315 Skin Sens. 1; Dermal H317 Eye Irrit. 2 H319 Acute Tox. 1; Inhalation H330 STOT SE 3; Inhalation H335 Aquatic Acute 1 H400 Aquatic Chronic 1 H410 M factor: 10

For full text of the H - statements and other abbreviations see section 16 "Other information".  
Substances without classification may have community workplace exposure limits available.

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

**Inhalation:**

Move to fresh air. If symptoms persist, seek medical advice.

**Skin contact:**

Rinse with running water and soap.

Obtain medical attention if irritation persists.

**Eye contact:**

Rinse immediately with plenty of running water (for 10 minutes), seek medical attention from a specialist.

**Ingestion:**

Rinse mouth, drink 1-2 glasses of water, do not induce vomiting, consult a doctor.

### 4.2. Most important symptoms and effects, both acute and delayed

EYE: Irritation, conjunctivitis.

SKIN: Redness, inflammation.

SKIN: Rash, Urticaria.

RESPIRATORY: Irritation, coughing, shortness of breath, chest tightness.

### 4.3. Indication of any immediate medical attention and special treatment needed

See section: Description of first aid measures

## SECTION 5: Firefighting measures

### 5.1. Extinguishing media

**Suitable extinguishing media:**

Carbon dioxide, foam, powder

**Extinguishing media which must not be used for safety reasons:**

High pressure waterjet

**5.2. Special hazards arising from the substance or mixture**

Trace amounts of toxic and/or irritating fumes may be released and the use of breathing apparatus is recommended.

**5.3. Advice for firefighters**

Wear self-contained breathing apparatus and full protective clothing, such as turn-out gear.

**SECTION 6: Accidental release measures**

**6.1. Personal precautions, protective equipment and emergency procedures**

Avoid skin and eye contact.

**6.2. Environmental precautions**

Do not let product enter drains.

**6.3. Methods and material for containment and cleaning up**

For small spills wipe up with paper towel and place in container for disposal.

For large spills absorb onto inert absorbent material and place in sealed container for disposal.

**6.4. Reference to other sections**

See advice in section 8

**SECTION 7: Handling and storage**

**7.1. Precautions for safe handling**

Use only in well-ventilated areas.

Avoid skin and eye contact.

Prolonged or repeated skin contact should be avoided to minimise any risk of sensitisation.

Hygiene measures:

Good industrial hygiene practices should be observed.

Wash hands before work breaks and after finishing work.

Do not eat, drink or smoke while working.

**7.2. Conditions for safe storage, including any incompatibilities**

Store in original containers at 8-21°C (46.4-69.8°F) and do not return residual materials to containers as contamination may reduce the shelf life of the bulk product.

**7.3. Specific end use(s)**

Anaerobic Adhesive

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

#### Occupational Exposure Limits

Valid for  
Great Britain

Ingredient [Regulated substance]	ppm	mg/m <sup>3</sup>	Value type	Short term exposure limit category / Remarks	Regulatory list
Silicon dioxide 112945-52-5 [SILICA, AMORPHOUS, INHALABLE DUST]		6	Time Weighted Average (TWA):		EH40 WEL
Silicon dioxide 112945-52-5 [SILICA, AMORPHOUS, RESPIRABLE DUST]		2,4	Time Weighted Average (TWA):		EH40 WEL
Cumene 98-82-8 [CUMENE]	50	250	Short Term Exposure Limit (STEL):		EH40 WEL
Cumene 98-82-8 [CUMENE]			Skin designation:	Can be absorbed through the skin.	EH40 WEL
Cumene 98-82-8 [CUMENE]	25	125	Time Weighted Average (TWA):		EH40 WEL
Cumene 98-82-8 [CUMENE]	50	250	Short Term Exposure Limit (STEL):	Indicative	ECTLV
Cumene 98-82-8 [CUMENE]	20	100	Time Weighted Average (TWA):	Indicative	ECTLV

#### Predicted No-Effect Concentration (PNEC):

Name on list	Environmental Compartment	Exposure period	Value				Remarks
			mg/l	ppm	mg/kg	others	
Methacrylic acid, monoester with propane-1,2-diol 27813-02-1	aqua (freshwater)					0,904 mg/L	
Methacrylic acid, monoester with propane-1,2-diol 27813-02-1	aqua (marine water)					0,904 mg/L	
Methacrylic acid, monoester with propane-1,2-diol 27813-02-1	STP					10 mg/L	
Methacrylic acid, monoester with propane-1,2-diol 27813-02-1	aqua (intermittent releases)					0,972 mg/L	
Methacrylic acid, monoester with propane-1,2-diol 27813-02-1	sediment (freshwater)					6,28 mg/kg	
Methacrylic acid, monoester with propane-1,2-diol 27813-02-1	sediment (marine water)					6,28 mg/kg	
Methacrylic acid, monoester with propane-1,2-diol 27813-02-1	soil					0,727 mg/kg	
Maleic acid 110-16-7	aqua (freshwater)					0,074 mg/L	
Maleic acid 110-16-7	aqua (intermittent releases)					0,744 mg/L	
Maleic acid 110-16-7	sediment (freshwater)					0,0624 mg/kg	
Maleic acid 110-16-7	STP					3,33 mg/L	

**Derived No-Effect Level (DNEL):**

Name on list	Application Area	Route of Exposure	Health Effect	Exposure Time	Value	Remarks
Methacrylic acid, monoester with propane-1,2-diol 27813-02-1	Workers	Dermal	Long term exposure - systemic effects		4,2 mg/kg bw/day	
Methacrylic acid, monoester with propane-1,2-diol 27813-02-1	Workers	Inhalation	Long term exposure - systemic effects		14,7 mg/m <sup>3</sup>	
Methacrylic acid, monoester with propane-1,2-diol 27813-02-1	general population	Dermal	Long term exposure - systemic effects		2,5 mg/kg bw/day	
Methacrylic acid, monoester with propane-1,2-diol 27813-02-1	general population	Inhalation	Long term exposure - systemic effects		8,8 mg/m <sup>3</sup>	
Methacrylic acid, monoester with propane-1,2-diol 27813-02-1	general population	oral	Long term exposure - systemic effects		2,5 mg/kg bw/day	
Maleic acid 110-16-7	Workers	Dermal	Acute/short term exposure - local effects		0,55 mg/cm <sup>2</sup>	
Maleic acid 110-16-7	Workers	Dermal	Long term exposure - local effects		0,04 mg/cm <sup>2</sup>	
Maleic acid 110-16-7	Workers	Dermal	Acute/short term exposure - systemic effects		58 mg/kg bw/day	
Maleic acid 110-16-7	Workers	Dermal	Long term exposure - systemic effects		3,3 mg/kg bw/day	

**Biological Exposure Indices:**

None

**8.2. Exposure controls:****Respiratory protection:**

Use only in well-ventilated areas.

An approved mask or respirator fitted with an organic vapour cartridge should be worn if the product is used in a poorly ventilated area

Filter type: A

**Hand protection:**

Chemical-resistant protective gloves (EN 374).

Suitable materials for short-term contact or splashes (recommended: at least protection index 2, corresponding to &gt; 30 minutes permeation time as per EN 374):

nitrile rubber (NBR;  $\geq$  0.4 mm thickness)

Suitable materials for longer, direct contact (recommended: protection index 6, corresponding to &gt; 480 minutes permeation time as per EN 374):

nitrile rubber (NBR;  $\geq$  0.4 mm thickness)

This information is based on literature references and on information provided by glove manufacturers, or is derived by analogy with similar substances. Please note that in practice the working life of chemical-resistant protective gloves may be considerably shorter than the permeation time determined in accordance with EN 374 as a result of the many influencing factors (e.g. temperature). If signs of wear and tear are noticed then the gloves should be replaced.

**Eye protection:**

Wear protective glasses.

**Skin protection:**

Wear suitable protective clothing.

**SECTION 9: Physical and chemical properties****9.1. Information on basic physical and chemical properties**

Appearance	liquid Orange-red
Odor	characteristic
Odour threshold	No data available / Not applicable
pH ( )	3 - 6
Initial boiling point	Not determined
Flash point	> 93,3 °C (> 199.94 °F); Tagliabue closed cup
Decomposition temperature	No data available / Not applicable
Vapour pressure (25 °C (77 °F))	< 0,13 mbar
Vapour pressure (50 °C (122 °F))	< 300 mbar
Density	No data available / Not applicable
Bulk density	No data available / Not applicable
Viscosity	No data available / Not applicable
Viscosity (kinematic)	No data available / Not applicable
Explosive properties	No data available / Not applicable
Solubility (qualitative) (Solvent: Water)	Slight
Solubility (qualitative) (Solvent: Acetone)	Partially miscible
Solidification temperature	No data available / Not applicable
Melting point	No data available / Not applicable
Flammability	No data available / Not applicable
Auto-ignition temperature	No data available / Not applicable
Explosive limits	No data available / Not applicable
Partition coefficient: n-octanol/water	No data available / Not applicable
Evaporation rate	No data available / Not applicable
Vapor density	No data available / Not applicable
Oxidising properties	No data available / Not applicable

**9.2. Other information**

No data available / Not applicable

**SECTION 10: Stability and reactivity****10.1. Reactivity**

Reducing agents.  
Strong oxidizing agents.

**10.2. Chemical stability**

Stable under recommended storage conditions.

**10.3. Possibility of hazardous reactions**

See section reactivity

**10.4. Conditions to avoid**

No decomposition if stored and applied as directed.

**10.5. Incompatible materials**

None if used properly.

**10.6. Hazardous decomposition products**

None known.



## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

#### General toxicological information:

The mixture is classified based on the available hazard information for the ingredients as defined in the classification criteria for mixtures for each hazard class or differentiation in Annex I to Regulation 1272/2008/EC. Relevant available health/ecological information for the substances listed under Section 3 is provided in the following.

#### STOT-single exposure:

May cause respiratory irritation.

#### Oral toxicity:

May cause irritation to the digestive tract.

#### Skin irritation:

Causes skin irritation.

#### Eye irritation:

Causes serious eye damage.

#### Sensitizing:

May cause an allergic skin reaction.

#### Acute oral toxicity:

Hazardous components CAS-No.	Value type	Value	Route of application	Exposure time	Species	Method
N,N-(m-phenylene)dimalaideimide 3006-93-7	LD50	2.025 mg/kg	oral		rat	OECD Guideline 401 (Acute Oral Toxicity)
Hydroxypropyl methacrylate 27813-02-1	LD50	> 2.000 mg/kg	oral		rat	
Cumene hydroperoxide 80-15-9	LD50	550 mg/kg	oral		rat	
Maleic acid 110-16-7	LD50	708 mg/kg	oral		rat	

#### Acute dermal toxicity:

Hazardous components CAS-No.	Value type	Value	Route of application	Exposure time	Species	Method
Hydroxypropyl methacrylate 27813-02-1	LD50	> 5.000 mg/kg	dermal		rabbit	
Maleic acid 110-16-7	LD50	1.560 mg/kg	dermal		rabbit	

#### Skin corrosion/irritation:

Hazardous components CAS-No.	Result	Exposure time	Species	Method
Cumene hydroperoxide 80-15-9	corrosive		rabbit	Draize Test

#### Germ cell mutagenicity:

Hazardous components CAS-No.	Result	Type of study / Route of administration	Metabolic activation / Exposure time	Species	Method
Cumene hydroperoxide 80-15-9	positive	bacterial reverse mutation assay (e.g Ames test)	without		OECD Guideline 471 (Bacterial Reverse Mutation Assay)
Cumene hydroperoxide 80-15-9	negative	dermal		mouse	

**Repeated dose toxicity**

Hazardous components CAS-No.	Result	Route of application	Exposure time / Frequency of treatment	Species	Method
Cumene hydroperoxide 80-15-9		inhalation: aerosol	6 h/d5 d/w	rat	

**SECTION 12: Ecological information****General ecological information:**

The mixture is classified based on the available hazard information for the ingredients as defined in the classification criteria for mixtures for each hazard class or differentiation in Annex I to Regulation 1272/2008/EC. Relevant available health/ecological information for the substances listed under Section 3 is provided in the following.

Biodegradable product of low ecotoxicity.

Cured Loctite products are typical polymers and do not pose any immediate environmental hazards.

Biological and Chemical Oxygen Demands (BOD and COD) are insignificant.

**12.1. Toxicity****Ecotoxicity:**

Do not empty into drains / surface water / ground water.

Hazardous components CAS-No.	Value type	Value	Acute Toxicity Study	Exposure time	Species	Method
Hydroxypropyl methacrylate 27813-02-1	LC50	493 mg/l	Fish	48 h	Leuciscus idus melanotus	DIN 38412-15
Hydroxypropyl methacrylate 27813-02-1	EC50	> 130 mg/l	Daphnia	48 h	Daphnia magna	OECD Guideline 202 (Daphnia sp. Acute Immobilisation Test)
Cumene hydroperoxide 80-15-9	LC50	3,9 mg/l	Fish	96 h	Oncorhynchus mykiss	OECD Guideline 203 (Fish, Acute Toxicity Test)
Cumene hydroperoxide 80-15-9	EC50	18 mg/l	Daphnia	48 h	Daphnia magna	OECD Guideline 202 (Daphnia sp. Acute Immobilisation Test)
Cumene hydroperoxide 80-15-9	ErC50	3,1 mg/l	Algae	72 h	Pseudokirchnerella subcapitata	OECD Guideline 201 (Alga, Growth Inhibition Test)
Maleic acid 110-16-7	LC50	> 245 mg/l	Fish	48 h	Leuciscus idus	DIN 38412-15
Maleic acid 110-16-7	EC50	42,81 mg/l	Daphnia	48 h	Daphnia magna	OECD Guideline 202 (Daphnia sp. Acute Immobilisation Test)
1,4-Naphthalenedione 130-15-4	EC50	0,011 mg/l	Algae	72 h	Dunaliella bioculata	OECD Guideline 201 (Alga, Growth Inhibition Test)

**12.2. Persistence and degradability****Persistence and Biodegradability:**

The product is not biodegradable.

Hazardous components CAS-No.	Result	Route of application	Degradability	Method
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Hydroxypropyl methacrylate 27813-02-1	readily biodegradable	aerobic	94,2 %	OECD Guideline 301 E (Ready biodegradability: Modified OECD Screening Test)
Cumene hydroperoxide 80-15-9		no data	0 %	OECD Guideline 301 B (Ready Biodegradability: CO2 Evolution Test)
Maleic acid 110-16-7	readily biodegradable	aerobic	97,08 %	OECD Guideline 301 B (Ready Biodegradability: CO2 Evolution Test)
1,4-Naphthalenedione 130-15-4		no data	0 - 60 %	OECD 301 A - F

**12.3. Bioaccumulative potential / 12.4. Mobility in soil****Mobility:**

Cured adhesives are immobile.

**Bioaccumulative potential:**

No data available.

Hazardous components CAS-No.	LogKow	Bioconcentration factor (BCF)	Exposure time	Species	Temperature	Method
Hydroxypropyl methacrylate 27813-02-1	0,97					
Cumene hydroperoxide 80-15-9		9,1		calculation		OECD Guideline 305 (Bioconcentration: Flow- through Fish Test)
Cumene hydroperoxide 80-15-9	2,16					
Maleic acid 110-16-7	-1,3				20 °C	OECD Guideline 107 (Partition Coefficient (n- octanol / water), Shake Flask Method)
Acetic acid, 2- phenylhydrazide 114-83-0	0,74					
1,4-Naphthalenedione 130-15-4	1,71					

**12.5. Results of PBT and vPvB assessment**

Hazardous components CAS-No.	PBT/vPvB
Hydroxypropyl methacrylate 27813-02-1	Not fulfilling Persistent, Bioaccumulative and Toxic (PBT), very Persistent and very Bioaccumulative (vPvB) criteria.
Maleic acid 110-16-7	Not fulfilling Persistent, Bioaccumulative and Toxic (PBT), very Persistent and very Bioaccumulative (vPvB) criteria.

**12.6. Other adverse effects**

No data available.

**SECTION 13: Disposal considerations****13.1. Waste treatment methods**

Product disposal:

Dispose of in accordance with local and national regulations.

Contribution of this product to waste is very insignificant in comparison to article in which it is used

Disposal of uncleaned packages:

After use, tubes, cartons and bottles containing residual product should be disposed of as chemically contaminated waste in an authorised legal land fill site or incinerated.

Disposal must be made according to official regulations.

Waste code

08 04 09 waste adhesives and sealants containing organic solvents and other dangerous substances

## SECTION 14: Transport information

- 14.1. UN number**  
Not hazardous according to RID, ADR, ADN, IMDG, IATA-DGR.
- 14.2. UN proper shipping name**  
Not hazardous according to RID, ADR, ADN, IMDG, IATA-DGR.
- 14.3. Transport hazard class(es)**  
Not hazardous according to RID, ADR, ADN, IMDG, IATA-DGR.
- 14.4. Packaging group**  
Not hazardous according to RID, ADR, ADN, IMDG, IATA-DGR.
- 14.5. Environmental hazards**  
Not hazardous according to RID, ADR, ADN, IMDG, IATA-DGR.
- 14.6. Special precautions for user**  
Not hazardous according to RID, ADR, ADN, IMDG, IATA-DGR.
- 14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**  
not applicable

## SECTION 15: Regulatory information

**15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture**

VOC content < 3 %  
(2010/75/EC)

**15.2. Chemical safety assessment**

A chemical safety assessment has not been carried out.

## SECTION 16: Other information

The labelling of the product is indicated in Section 2. The full text of all abbreviations indicated by codes in this safety data sheet are as follows:

- H242 Heating may cause a fire.
- H301 Toxic if swallowed.
- H302 Harmful if swallowed.
- H311 Toxic in contact with skin.
- H312 Harmful in contact with skin.
- H314 Causes severe skin burns and eye damage.
- H315 Causes skin irritation.
- H317 May cause an allergic skin reaction.
- H318 Causes serious eye damage.
- H319 Causes serious eye irritation.
- H330 Fatal if inhaled.
- H331 Toxic if inhaled.
- H335 May cause respiratory irritation.
- H351 Suspected of causing cancer.
- H373 May cause damage to organs through prolonged or repeated exposure.
- H400 Very toxic to aquatic life.
- H410 Very toxic to aquatic life with long lasting effects.
- H411 Toxic to aquatic life with long lasting effects.
- H412 Harmful to aquatic life with long lasting effects.

### Further information:

This information is based on our current level of knowledge and relates to the product in the state in which it is delivered. It is intended to describe our products from the point of view of safety requirements and is not intended to guarantee any particular properties.

### Label elements (DPD):

Xi - Irritant



### Risk phrases:

- R37/38 Irritating to respiratory system and skin.
- R41 Risk of serious damage to eyes.
- R43 May cause sensitisation by skin contact.

### Safety phrases:

- S24/25 Avoid contact with skin and eyes.
- S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
- S28 After contact with skin, wash immediately with plenty of water and soap.
- S37/39 Wear suitable gloves and eye/face protection.
- S51 Use only in well-ventilated areas.

### Additional labeling:

- For consumer use only: S2 Keep out of the reach of children.
- S46 If swallowed, seek medical advice immediately and show this container or label.

### Contains:

- N,N-(m-phenylene)dimaldimide,
- Hydroxypropyl methacrylate,
- Maleic acid

**Relevant changes in this safety data sheet are indicated by vertical lines at the left margin in the body of this document. Corresponding text is displayed in a different color on shadowed fields.**