



Safety Data Sheet

LOCTITE 438 BK INSTANT ADHESIVE known as Loctite 438
25ml AU

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MSDS-No. : 204085

V001.3

Date of issue: 10.04.2015

Section 1. Identification of the substance/preparation and of the company/undertaking

Product name: LOCTITE 438 BK INSTANT ADHESIVE known as Loctite 438 25ml AU

Intended use: Adhesive

Supplier:
Henkel Australia Pty Ltd
135-141 Canterbury Road
Kilsyth, Victoria, 3137
Australia

Phone: +61 (3) 9724 6444

Emergency information: 24 HOUR EMERGENCY CONTACT NUMBER 03 9724 6556

Section 2. Hazards identification

Classification of the substance or mixture

Hazardous according to the criteria of Safe Work Australia.

GHS Classification:

<u>Hazard Class</u>	<u>Hazard Category</u>	<u>Target organ</u>
Flammable liquids	Category 4	
Skin irritation	Category 2	
Serious eye irritation	Category 2A	
Target Organ Systemic Toxicant - Single exposure	Category 3	respiratory tract irritation

Hazard pictogram:



Signal word:

Warning

Hazard statement(s):	H227 Combustible liquid. H315 Causes skin irritation. H319 Causes serious eye irritation. H335 May cause respiratory irritation.
Precautionary Statement(s):	
Prevention:	P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P261 Avoid breathing dust/fume/gas/mist/vapours/spray. P264 Wash hands thoroughly after handling. P271 Use only outdoors or in a well-ventilated area. P280 Wear protective gloves/eye protection.
Response:	P302+P352 IF ON SKIN: Wash with plenty of soap and water. P304+P340+P312 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to remove. Continue rinsing. P332+P313 If skin irritation occurs: Get medical advice/attention. P337+P313 If eye irritation persists: Get medical advice/attention. P362 Take off contaminated clothing. P370+P378 In case of fire: Use water spray (fog), foam, dry chemical or carbon dioxide to extinguish.
Storage:	P403+P233 Store in a well-ventilated place. Keep container tightly closed. P405 Store locked up.
Disposal:	P501 Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Classification of material Xi - Irritant

Risk phrases:
R36/37/38 Irritating to eyes, respiratory system and skin.

Safety phrases:
S23 Do not breathe vapour.
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.

Dangerous Goods information:
Not classified as Dangerous Goods according to the criteria of the Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Code).

Signal word:
HAZARDOUS

Section 3. Composition / information on ingredients

General chemical description: Mixture
Type of preparation: Cyanoacrylate Adhesive

Identity of ingredients:

Chemical ingredients	CAS-No.	Proportion
Ethyl 2-cyanoacrylate	7085-85-0	60- <= 100 %
Phthalic anhydride	85-44-9	< 1 %
Carbon black	1333-86-4	< 1 %
non hazardous ingredients~		< 10 %

Section 4. First aid measures

Ingestion:	Ensure that breathing passages are not obstructed. The product will polymerise immediately in the mouth making it almost impossible to swallow. Saliva will slowly separate the solidified product from the mouth (several hours).
Skin:	Do not pull bonded skin apart. It may be gently peeled apart using a blunt object such as a spoon, preferably after soaking in warm soapy water. Cyanoacrylates give off heat on solidification. In rare cases a large drop will generate enough heat to cause a burn. Burns should be treated normally after the adhesive has been removed from the skin. If lips are accidentally stuck together apply warm water to the lips and encourage maximum wetting and pressure from saliva inside the mouth. Peel or roll lips apart. Do not try to pull the lips apart with direct opposing action.
Eyes:	If the eye is bonded closed, release eyelashes with warm water by covering with wet pad. Cyanoacrylate will bond to eye protein and will cause periods of weeping which will help to debond the adhesive. Keep eye covered until debonding is complete, usually within 1-3 days. Do not force eye open. Medical advice should be sought in case solid particles of cyanoacrylate trapped behind the eyelid cause any abrasive damage.
Inhalation:	Move to fresh air, consult doctor if complaint persists.
First Aid facilities:	Eye wash and safety shower

Section 5. Fire fighting measures

Suitable extinguishing media:	Foam, extinguishing powder, carbon dioxide. Fine water spray
Decomposition products in case of fire::	Oxides of carbon, oxides of nitrogen, irritating organic vapors. Cyanides.
Special protective equipment for fire-fighters:	Wear self-contained breathing apparatus and full protective clothing, such as turn-out gear.

Section 6. Accidental release measures

Personal precautions:	Ensure adequate ventilation.
Environmental precautions:	Do not let product enter drains.
Clean-up methods:	Do not use cloths for mopping up. Flood with water to complete polymerization and scrape off the floor. Cured material can be disposed of as non-hazardous waste.

Section 7. Handling and storage

Precautions for safe handling:	Ventilation (low level) is recommended when using large volumes Use of dispensing equipment is recommended to minimise the risk of skin or eye contact
Conditions for safe storage:	For optimum shelf life store in original containers under refrigerated conditions at 2 - 8°C (35.6 - 46.4 °F)

Section 8. Exposure controls / personal protection**National exposure standards:**

Value type	form of exposure	TWA (ppm)	TWA (mg/m3)	Peak Limit. (ppm)	Peak Limit. (mg/m3)	STEL (ppm)	STEL (mg/m3)
PHTHALIC ANHYDRIDE 85-44-9		1	6.1	-	-	-	-
CARBON BLACK 1333-86-4			3	-	-	-	-

Engineering controls:

Use positive down-draft exhaust ventilation if general ventilation is insufficient to maintain vapor concentration below established exposure limits.

Eye protection:

Wear protective glasses.

Skin protection:

The use of chemical resistant gloves such as Nitrile is recommended.

Polyethylene or polypropylene gloves are recommended when using large volumes.

Do not use PVC, rubber or nylon gloves.

Please note that in practice the working life of chemical resistant gloves may be considerably reduced as a result of many influencing factors (e.g. temperature). Suitable risk assessment should be carried out by the end user. If signs of wear and tear are noticed then the gloves should be replaced.

Respiratory protection:

If inhalation risk exists, wear a respirator or air supplied mask complying with the requirements of AS/NZS 1715 and AS/NZS 1716.

Section 9. Physical and chemical properties

Appearance:	black Liquid
Odor:	irritating
Specific gravity:	1.1
Boiling point:	> 149 °C (> 300.2 °F)
Flash point: (Tagliabue closed cup)	80 - 93.4 °C (176 - 200.12 °F)
Vapor pressure:	< 0.3000000 mbar
Density:	1.1000 g/cm3
VOC content: (1999/13/EC)	< 3 %

Section 10. Stability and reactivity

Stability:	Stable under normal conditions of temperature and pressure.
Conditions to avoid:	Avoid excessive heat and ignition sources.
Incompatible materials:	Rapid exothermic polymerization will occur in the presence of water, amines, alkalis and alcohols.
Hazardous decomposition products:	May produce fumes when heated to decomposition. Fumes may contain carbon monoxide and other toxic fumes. Cyanides.

Section 11. Toxicological information

Health Effects:**Ingestion:**

Not expected to be harmful by ingestion. Rapidly polymerizes (solidifies) and bonds in mouth. It is almost impossible to swallow.

Skin:

Bonds skin in seconds. May cause skin irritation. Cyanoacrylates have been reported to cause allergic reaction but due to rapid polymerization at the skin surface, an allergic response is rare. Cyanoacrylates generate heat on solidification. In rare circumstances a large drop will burn the skin. Cured adhesive does not present a health hazard even if bonded to the skin.

Eyes:

Irritating to eyes. Causes excessive tearing. Eyelids may bond.

Inhalation:

Exposure to vapors above the established exposure limit results in respiratory irritation, which may lead to difficulty in breathing and tightness in the chest.

Chronic effects:

No chronic health effects are expected from the intended use of these products or from foreseeable handling of them in the workplace.

Acute toxicity:

Hazardous components CAS-No.	Value type	Value	Route of application	Exposure time	Species	Method
Ethyl 2-cyanoacrylate 7085-85-0	LD50	> 5,000 mg/kg	oral		rat	OECD Guideline 401 (Acute Oral Toxicity) OECD Guideline 402 (Acute Dermal Toxicity)
	LD50	> 2,000 mg/kg	dermal		rabbit	
Phthalic anhydride 85-44-9	LD50	1,530 mg/kg	oral		rat	
	LD50	> 10,000 mg/kg	dermal		rabbit	
Carbon black 1333-86-4	LD50	> 8,000 mg/kg	oral		rat	

Skin corrosion/irritation:

Hazardous components CAS-No.	Result	Exposure time	Species	Method
Ethyl 2-cyanoacrylate 7085-85-0	slightly irritating	24 h	rabbit	OECD Guideline 404 (Acute Dermal Irritation / Corrosion)
Carbon black 1333-86-4	not irritating		rabbit	OECD Guideline 404 (Acute Dermal Irritation / Corrosion)

Serious eye damage/irritation:

Hazardous components CAS-No.	Result	Exposure time	Species	Method
Ethyl 2-cyanoacrylate 7085-85-0	irritating	72 h	rabbit	OECD Guideline 405 (Acute Eye Irritation / Corrosion)
Phthalic anhydride 85-44-9	highly irritating		rabbit	
Carbon black 1333-86-4	not irritating		rabbit	

Respiratory or skin sensitization:

Hazardous components CAS-No.	Result	Test type	Species	Method
Ethyl 2-cyanoacrylate 7085-85-0	not sensitising		guinea pig	
Phthalic anhydride 85-44-9	sensitising	in vivo	guinea pig	
Phthalic anhydride 85-44-9	sensitising	Mouse local lymphnode assay (LLNA)	mouse	Mouse local lymphnode assay (LLNA)

Germ cell mutagenicity:

Hazardous components CAS-No.	Result	Type of study / Route of administration	Metabolic activation / Exposure time	Species	Method
Ethyl 2-cyanoacrylate 7085-85-0	negative negative negative	bacterial reverse mutation assay (e.g Ames test) mammalian cell gene mutation assay in vitro mammalian chromosome aberration test	with and without with and without		OECD Guideline 471 (Bacterial Reverse Mutation Assay) OECD Guideline 476 (In vitro Mammalian Cell Gene Mutation Test) OECD Guideline 473 (In vitro Mammalian Chromosome Aberration Test)
Phthalic anhydride 85-44-9	negative	bacterial reverse mutation assay (e.g Ames test)	with and without		

Section 12. Ecological information**General ecological information:**

Biological and Chemical Oxygen Demands (BOD and COD) are insignificant., Do not empty into drains / surface water / ground water.

Toxicity:

Hazardous components CAS-No.	Value type	Value	Acute Toxicity Study	Exposure time	Species	Method
Phthalic anhydride 85-44-9	LC50	313 mg/l	Fish	48 h	Leuciscus idus	DIN 38412-15
Phthalic anhydride 85-44-9	EC50	68 mg/l	Algae	72 h	Selenastrum sp.	OECD Guideline 201 (Alga, Growth Inhibition Test)
Carbon black 1333-86-4	LC50	> 10,000 mg/l	Fish	96 h	Brachydanio rerio (new name: Danio rerio)	OECD Guideline 203 (Fish, Acute Toxicity Test)
Carbon black 1333-86-4	EC50	> 5,600 mg/l	Daphnia	24 h	Daphnia magna	OECD Guideline 202 (Daphnia sp. Acute Immobilisation Test)
Carbon black 1333-86-4	NOEC	10,000 mg/l	Algae	72 h	Scenedesmus subspicatus (new name: Desmodesmus subspicatus)	OECD Guideline 201 (Alga, Growth Inhibition Test)
Carbon black 1333-86-4	EC50	> 10,000 mg/l	Algae	72 h	Scenedesmus subspicatus (new name: Desmodesmus subspicatus)	OECD Guideline 201 (Alga, Growth Inhibition Test)
Carbon black 1333-86-4	EC50	37.1 mg/l	Algae			OECD Guideline 201 (Alga, Growth Inhibition Test)

Persistence and degradability:

Hazardous components CAS-No.	Result	Route of application	Degradability	Method
Ethyl 2-cyanoacrylate 7085-85-0		aerobic	57 %	OECD Guideline 301 D (Ready Biodegradability: Closed Bottle Test)
Phthalic anhydride 85-44-9		aerobic	90 %	OECD Guideline 301 D (Ready Biodegradability: Closed Bottle Test)

Bioaccumulative potential / Mobility in soil:

Hazardous components CAS-No.	LogKow	Bioconcentration factor (BCF)	Exposure time	Species	Temperature	Method
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Ethyl 2-cyanoacrylate 7085-85-0	0.776				22 °C	EU Method A.8 (Partition Coefficient)
Phthalic anhydride 85-44-9	1.6					

Section 13. Disposal considerations

Waste disposal of product:

Cured adhesive: Dispose of as water insoluble non-toxic solid chemical in authorised landfill or incinerate under controlled conditions.
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 for uncleaned package:

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.

Section 14. Transport information

Road and Rail Transport:

Dangerous Goods information:

Not classified as Dangerous Goods according to the criteria of the Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Code).

Marine transport IMDG:

Not dangerous goods

Air transport IATA:

UN no.: 3334
Proper shipping name: Aviation regulated liquid, n.o.s. (Cyanoacrylate ester)
Class or division: 9
Packing group: III
Packing instructions (passenger): 964
Packing instructions (cargo): 964
Additional Information: Primary packs containing less than 500ml are unregulated by this mode of transport and may be shipped unrestricted.

Section 15. Regulatory information

SUSMP Poisons Schedule

None

AICS:

All components are listed or are exempt from listing on the Australian Inventory of Chemical Substances (AICS).

Section 16. Other information

Abbreviations/acronyms:

ADGC - Australian Dangerous Goods Code
IATA-DGR: International Air Transport Association – Dangerous Goods Regulations
IMDG: International Maritime Dangerous Goods code

Reason for issue:

Reviewed SDS. Reissued with new date. involved chapters: 1 - 16

Date of previous issue: 15.04.2011

Disclaimer:

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LOCTITE® 438™

February 2008

PRODUCT DESCRIPTION

LOCTITE® 438™ provides the following product characteristics:

Technology	Cyanoacrylate
Chemical Type	Ethyl cyanoacrylate
Appearance (uncured)	Black liquid ^{LMS}
Components	One part - requires no mixing
Viscosity	Low
Cure	Humidity
Application	Bonding
Key Substrates	Metals, Plastics and Rubbers

LOCTITE® 438™ is a rubber toughened adhesive with increased flexibility and peel strength along with enhanced resistance to shock. The product provides rapid bonding on a wide range of materials, including metals, plastics and elastomers, as well as porous and absorbent materials like wood, paper, leather and fabric.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Specific Gravity @ 25 °C	1.1
Flash Point - See SDS	
Viscosity, Cone & Plate, mPa·s (cP):	
Temperature: 25 °C, Shear Rate: 1,000 s ⁻¹	100 to 250 ^{LMS}

TYPICAL CURING PERFORMANCE

Under normal conditions, the atmospheric moisture initiates the curing process. Although full functional strength is developed in a relatively short time, curing continues for at least 24 hours before full chemical/solvent resistance is developed.

Cure Speed vs. Substrate

The rate of cure will depend on the substrate used. The table below shows the fixture time achieved on different materials at 22 °C / 50 % relative humidity. This is defined as the time to develop a shear strength of 0.1 N/mm².

Fixture Time, seconds:	
Steel (degreased)	30 to 45
Aluminum (Isopropanol wiped)	≤60 ^{LMS}
Zinc dichromate	105 to 120
Neoprene	30 to 45
Rubber, nitrile	<5
SBR	75 to 90
ABS	10 to 20
PVC	65 to 90
Polycarbonate	90 to 105
Phenolic	5 to 10
G-10 Epoxy	20 to 30
Wood (oak)	45 to 60
Wood (balsa)	<5

Cure Speed vs. Bond Gap

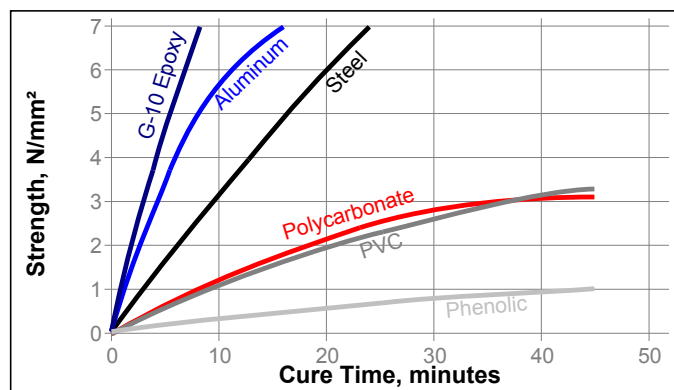
The rate of cure will depend on the bondline gap. Thin bond lines result in high cure speeds, increasing the bond gap will decrease the rate of cure.

Cure Speed vs. Activator

Where cure speed is unacceptably long due to large gaps, applying activator to the surface will improve cure speed. However, this can reduce ultimate strength of the bond and therefore testing is recommended to confirm effect.

Cure Speed vs. Time

The graph below shows the shear strength developed over time at 22 °C / 50 % RH on various substrates and tested according to ISO 4587.



TYPICAL PROPERTIES OF CURED MATERIAL

Cured for 24 hours @ 22 °C

Physical Properties:

Coefficient of Thermal Expansion, ISO 11359-2, K ⁻¹	80×10 ⁻⁶
Coefficient of Thermal Conductivity ISO 8302, W/(m·K)	0.1
Glass Transition Temperature ISO 11359-2, °C	130

Electrical Properties:

Surface Resistivity, IEC 60093, Ω	10×10 ¹⁵
Volume Resistivity, IEC 60093, Ω·cm	10×10 ¹⁵
Dielectric Breakdown Strength, IEC 60243-1, kV/mm	25
Dielectric Constant / Dissipation Factor, IEC 60250:	
0.1 kHz	2.65 / <0.02
1 kHz	2.75 / <0.02
10 kHz	2.75 / <0.02

TYPICAL PERFORMANCE OF CURED MATERIAL

Adhesive Properties

Cured for 24 hours @ 22 °C

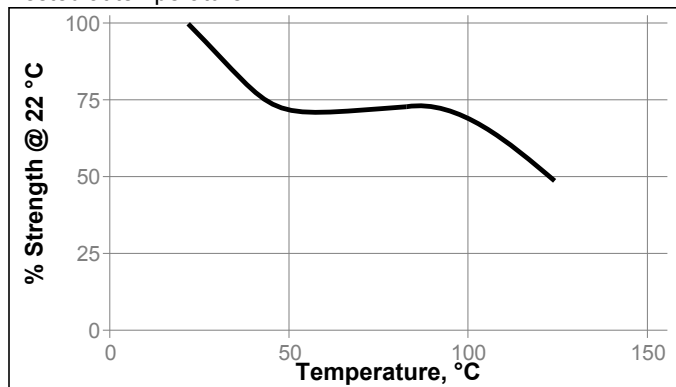
Lap Shear Strength, ISO 4587:

Steel (grit blasted)	N/mm ² 19 (psi) (2,800)
Aluminum	N/mm ² 18 (psi) (2,600)
Nitrile	N/mm ² 0.3 (psi) (40)
EPDM	N/mm ² 0.4 (psi) (60)
Block Shear Strength, ISO 13445:	
ABS	N/mm ² 10 (psi) (1,500)
PVC	N/mm ² 12 (psi) (1,800)
Polycarbonate	N/mm ² 6 (psi) (820)
Phenolic	N/mm ² 11 (psi) (1,500)
G-10 Epoxy	N/mm ² 20 (psi) (2,900)
Tensile Strength, ISO 6922:	
Steel (grit blasted)	N/mm ² 34 (psi) (4,900)
Buna-N	N/mm ² 4 (psi) (550)
Side Impact Resistance, J:	
Aluminum	≥4 ^{LMS}
Cured for 48 hours @ 22 °C	
Lap Shear Strength, ISO 4587:	
Steel (grit blasted)	N/mm ² ≥15 ^{LMS} (psi) (≥2,175)
180° Peel Strength, ISO 8510-2:	
Steel (grit blasted)	N/mm 4 (lb/in) (20)

TYPICAL ENVIRONMENTAL RESISTANCE

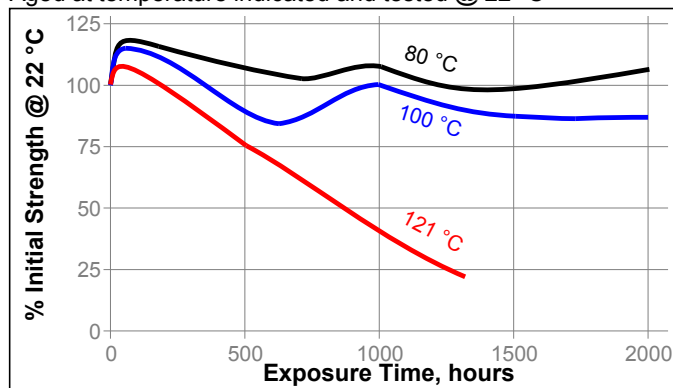
Cured for 72 hours @ 22 °C
Lap Shear Strength, ISO 4587:
Steel (grit blasted)

Hot Strength
Tested at temperature



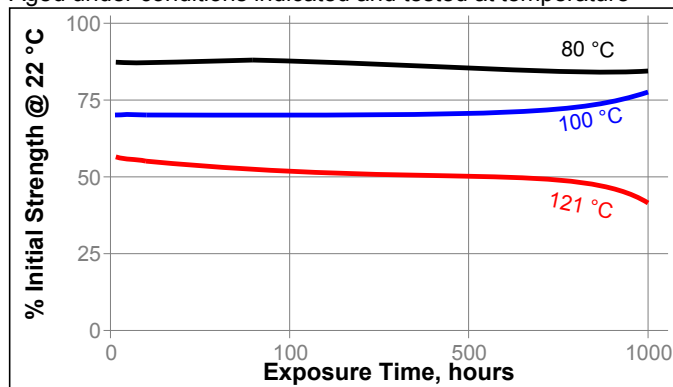
Heat Aging

Aged at temperature indicated and tested @ 22 °C



Heat Aging/Hot Strength

Aged under conditions indicated and tested at temperature



Chemical/Solvent Resistance

Aged under conditions indicated and tested @ 22 °C.

Environment	°C	% of initial strength		
		100 h	500 h	1000 h
Motor oil	40	100	100	100
Gasoline	22	100	100	95
Ethanol	22	100	100	100
Isopropanol	22	100	100	100
Heat/humidity 95% RH	40	100	100	95

Cured for 72 hours @ 22 °C
Block Shear Strength, ISO 13445:
Polycarbonate

Chemical/Solvent Resistance

Aged under conditions indicated and tested @ 22 °C.

Environment	°C	% of initial strength		
		100 h	500 h	1000 h
Heat/humidity 95% RH	40	100	100	100

GENERAL INFORMATION

This product is not recommended for use in pure oxygen and/or oxygen rich systems and should not be selected as a sealant for chlorine or other strong oxidizing materials.

For safe handling information on this product, consult the Safety Data Sheet (SDS).

Directions for use:

1. For best performance bond surfaces should be clean and free from grease.
2. This product performs best in thin bond gaps (0.05 mm).
3. Excess adhesive can be dissolved with Loctite cleanup solvents, nitromethane or acetone.

Loctite Material Specification^{LMS}

LMS dated November 01, 2005. Test reports for each batch are available for the indicated properties. LMS test reports include selected QC test parameters considered appropriate to specifications for customer use. Additionally, comprehensive controls are in place to assure product quality and consistency. Special customer specification requirements may be coordinated through Henkel Quality.

Storage

Store product in the unopened container in a dry location. Storage information may be indicated on the product container labeling.

Optimal Storage: 2 °C to 8 °C. Storage below 2 °C or greater than 8 °C can adversely affect product properties. Material removed from containers may be contaminated during use. Do not return product to the original container. Henkel Corporation cannot assume responsibility for product which has been contaminated or stored under conditions other than those previously indicated. If additional information is required, please contact your local Technical Service Center or Customer Service Representative.

Conversions

$$(^{\circ}\text{C} \times 1.8) + 32 = ^{\circ}\text{F}$$

$$\text{kV/mm} \times 25.4 = \text{V/mil}$$

$$\text{mm} / 25.4 = \text{inches}$$

$$\mu\text{m} / 25.4 = \text{mil}$$

$$\text{N} \times 0.225 = \text{lb}$$

$$\text{N/mm} \times 5.71 = \text{lb/in}$$

$$\text{N/mm}^2 \times 145 = \text{psi}$$

$$\text{MPa} \times 145 = \text{psi}$$

$$\text{N}\cdot\text{m} \times 8.851 = \text{lb}\cdot\text{in}$$

$$\text{N}\cdot\text{m} \times 0.738 = \text{lb}\cdot\text{ft}$$

$$\text{N}\cdot\text{mm} \times 0.142 = \text{oz}\cdot\text{in}$$

$$\text{mPa}\cdot\text{s} = \text{cP}$$

Note:

The information provided in this Technical Data Sheet (TDS) including the recommendations for use and application of the product are based on our knowledge and experience of the product as at the date of this TDS. The product can have a variety of different applications as well as differing application and working conditions in your environment that are beyond our control. Henkel is, therefore, not liable for the suitability of our product for the production processes and conditions in respect of which you use them, as well as the intended applications and results. We strongly recommend that you carry out your own prior trials to confirm such suitability of our product.

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