



Safety Data Sheet

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LOCTITE 493

SDS No. : 153539

V001.6

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

Product name: LOCTITE 493

Other means of identification: LOCTITE 493 BO50G EGFD

Product code: IDH234058

Recommended use of the chemical and restrictions on use

Intended use: Adhesive

Identification of manufacturer, importer or distributor

Importer: Henkel Singapore Pte Ltd 401 Commonwealth Drive, #03-01/02, Haw Par Technocentre, Singapore. 149598
Phone : +65 62660100 Fax : +65 62661161

E-mail address of person responsible for Safety Data Sheet: ap-ua-psra.sea@henkel.com

Emergency information: FOR EMERGENCIES ONLY (Spill, major leak, Fire, Exposure, or Accident). Call CHEMTREC: +1 703-741-5970

Section 2. Hazards identification

GHS Classification:

<u>Hazard Class</u>	<u>Hazard Category</u>	<u>Target organ</u>
Skin corrosion/irritation	Category 2	
Serious eye damage/eye irritation	Category 2	
Specific target organ toxicity - single exposure	Category 3	respiratory tract irritation

GHS label elements:

Hazard pictogram:



Signal word:

Warning

Hazard statement: H315 Causes skin irritation.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.

Precaution:

Prevention: P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P264 Wash hands thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.

Response: P302+P352 IF ON SKIN: Wash with plenty of 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 do. Continue rinsing.
P333+P313 If skin irritation or rash occurs: Get medical advice/attention.
P337+P313 If eye irritation persists: Get medical advice/attention.
P362+P364 Take off contaminated clothing and wash it before reuse.

Storage: P403+P233 Store in a well-ventilated place. Keep container tightly closed.

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.

Section 3. Composition / information on ingredients

Substance or Mixture:
Mixture

Declaration of hazardous chemical:

Hazard component CAS-No.	Content	GHS Classification
Mecrilate 137-05-3	60- 100 %	Skin irritation 2 H315 Serious eye damage/eye irritation 2 H319 Target Organ Systemic Toxicant - Single exposure 3 H335
Hydroquinone 123-31-9	< 0.1 %	Acute toxicity 4; Oral H302 Serious eye damage/eye irritation 1 H318 Skin Sensitization 1 H317 Germ cell mutagenicity 2 H341 Carcinogenicity 2 H351 Acute hazards to the aquatic environment 1 H400 Chronic hazards to the aquatic environment 1 H410

Section 4. First aid measures

Inhalation:	Move to fresh air, consult doctor if complaint persists.
Skin contact:	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.
Eye contact:	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.
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).
Indication of immediate medical attention and special treatment needed:	See section: Description of first aid measures

Section 5. Fire fighting measures

Suitable extinguishing media:	Foam, extinguishing powder, carbon dioxide. Fine water spray
Specific hazards arising from the chemical:	In the event of a fire, carbon monoxide (CO) and carbon dioxide (CO ₂) can be released. In case of fire, keep containers cool with water spray.
Special protection equipment and precautions for firefighters:	Fire fighters should wear positive pressure self-contained breathing apparatus (SCBA).
Hazardous combustion products:	Oxides of carbon, oxides of nitrogen, irritating organic vapors.

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

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
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**Components with specific control parameters for workplace:**

METHYL 2-CYANOACRYLATE 137-05-3	Value type	Time Weighted Average (TWA):
	ppm	0.2
	Remarks	ACGIH
HYDROQUINONE 123-31-9	Value type	Time Weighted Average (TWA):
	mg/m³	1
	Remarks	ACGIH
HYDROQUINONE (DIHYDROXY BENZENE) 123-31-9	Value type	Time Weighted Average (TWA):
	mg/m³	2
	Remarks	SG PEL

Respiratory protection:

Ensure adequate ventilation.

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 (EN 14387)

Hand protection:

Chemical-resistant protective gloves (EN 374).

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

nitrile rubber (NBR; ≥ 0.4 mm thickness)

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

nitrile rubber (NBR; ≥ 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.

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.

The use of chemical resistant gloves such as Neoprene or Natural Rubber is recommended

Eye protection:

Wear protective glasses.

Protective eye equipment should conform to EN166.

Body protection:

Wear suitable protective clothing.

Protective clothing should conform to EN 14605 for liquid splashes or to EN 13982 for dusts.

Engineering controls:

Ensure good ventilation/extraction.

Hygienic measures:

Good industrial hygiene practices should be observed. Do not eat, drink or smoke while working. Wash hands before work breaks and after finishing work.

Section 9. Physical and chemical properties

Appearance:	Colorless, Straw Liquid
Odor:	Irritating
Odor threshold (CA):	No data available.
pH:	No data available.
Melting point / freezing point:	No data available.
Specific gravity:	1.1
Boiling point:	> 149 °C (> 300.2 °F)
Flash point:	80 - 93 °C (176 - 199.4 °F)
(None)	
Evaporation rate:	No data available.
Flammability (solid, gas):	No data available.
Lower explosive limit:	No data available.
Upper explosive limit:	No data available.
Vapor pressure:	0.3 mbar
Vapor density:	No data available.
Density:	1.1 g/cm ³
Solubility:	No data available.
Partition coefficient: n-octanol/water:	No data available.
Auto ignition:	No data available.
Decomposition temperature:	No data available.
Viscosity:	No data available.
VOC content:	< 3.00 %
(2010/75/EC)	

Section 10. Stability and reactivity

Reactivity/Incompatible materials:	Rapid exothermic polymerization will occur in the presence of water, amines, alkalis and alcohols.
Chemical stability:	Stable under recommended storage conditions.
Conditions to avoid:	Stable under normal conditions of storage and use.
Hazardous decomposition products:	None if used for intended purpose.

Section 11. Toxicological information

Symptoms of Overexposure:	EYE: Irritation, conjunctivitis. SKIN: Redness, inflammation. RESPIRATORY: Irritation, coughing, shortness of breath, chest tightness.
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Acute oral toxicity:

Mecrilate 137-05-3	Value type	LD50
	Value	> 4,440 mg/kg
	Species	rat
	Method	OECD Guideline 423 (Acute Oral toxicity)
Hydroquinone 123-31-9	Value type	LD50
	Value	367 mg/kg
	Species	rat
	Method	OECD Guideline 401 (Acute Oral Toxicity)

Acute dermal toxicity:

Mecrilate 137-05-3	Value type	LD50
	Value	> 2,000 mg/kg
	Species	rabbit
	Method	OECD Guideline 402 (Acute Dermal Toxicity)

Skin corrosion/irritation:

Mecrilate 137-05-3	Result	irritating
	Exposure time	24 h
	Species	rabbit
	Method	

Serious eye damage/irritation:

Mecrilate 137-05-3	Result	irritating
	Exposure time	
	Species	rabbit
	Method	

Respiratory or skin sensitization:

Mecrilate 137-05-3	Result	not sensitising
	Test type	
	Species	guinea pig
	Method	Not specified
Hydroquinone 123-31-9	Result	sensitising
	Test type	Guinea pig maximisation test
	Species	guinea pig
	Method	

Germ cell mutagenicity:

Hydroquinone 123-31-9	Result	negative
	Type of study / Route of administration	bacterial reverse mutation assay (e.g Ames test)
	Metabolic activation / Exposure time	with and without
	Method	EU Method B.13/14 (Mutagenicity)

Repeated dose toxicity:

Mecrilate 137-05-3	Result	NOAEL=> 200 mg/kg
	Route of application	oral: feed
	Exposure time / Frequency of treatment	90 ddaily
	Species	rat
	Method	OECD Guideline 408 (Repeated Dose 90-Day Oral Toxicity in Rodents)
Hydroquinone 123-31-9	Result	NOAEL=>= 250 mg/kg
	Route of application	oral: gavage
	Exposure time / Frequency of treatment	14 days5 days/week. 12 doses
	Species	rat
	Method	OECD Guideline 407 (Repeated Dose 28-Day Oral Toxicity in Rodents)
Hydroquinone 123-31-9	Result	LOAEL=<= 500 mg/kg
	Route of application	oral: gavage
	Exposure time / Frequency of treatment	14 days5 days/week. 12 doses
	Species	rat
	Method	OECD Guideline 407 (Repeated Dose 28-Day Oral Toxicity in Rodents)

Section 12. Ecological information

General ecological information:

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

Ecotoxicity:

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

Toxicity:

Hydroquinone 123-31-9	Value type	LC50
	Value	0.638 mg/l
	Acute Toxicity Study	Fish
	Exposure time	96 h
	Species	Oncorhynchus mykiss
	Method	OECD Guideline 203 (Fish, Acute Toxicity Test)
Hydroquinone 123-31-9	Value type	EC50
	Value	0.134 mg/l
	Acute Toxicity Study	Daphnia
	Exposure time	48 h
	Species	Daphnia magna
	Method	OECD Guideline 202 (Daphnia sp. Acute Immobilisation Test)
Hydroquinone 123-31-9	Value type	EC50
	Value	0.335 mg/l
	Acute Toxicity Study	Algae
	Exposure time	72 h
	Species	Selenastrum capricornutum (new name: Pseudokirchnerella subcapitata)
	Method	OECD Guideline 201 (Alga, Growth Inhibition Test)
Hydroquinone 123-31-9	Value type	EC 50
	Value	0.038 mg/l
	Acute Toxicity Study	Bacteria
	Exposure time	30 min
	Species	
	Method	

Persistence and degradability:

Mecrilate 137-05-3	Result	readily biodegradable
	Route of application	aerobic
	Degradability	0 %
	Method	OECD Guideline 301 A (new version) (Ready Biodegradability: DOC Die Away Test)
Hydroquinone 123-31-9	Result	readily biodegradable
	Route of application	aerobic
	Degradability	75 - 81 %
	Method	EU Method C.4-E (Determination of the "Ready" Biodegradability Closed Bottle Test)

Bioaccumulative potential / Mobility in soil:

Hydroquinone 123-31-9	LogKow	0.59
	Temperature	
	Method	EU Method A.8 (Partition Coefficient)

Section 13. Disposal considerations**Product****Method of disposal:**

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

Packaging

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.

Section 14. Transport information

Road transport ADR:

Not dangerous goods

Railroad transport RID:

Not dangerous goods

Inland water transport ADN:

Not dangerous goods

Marine transport IMDG:

Not dangerous goods

Air transport IATA:

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

Section 15. Regulatory information

Regulatory Information: Workplace Safety And Health Act (Chapter 354A) Workplace Safety And Health (Approved Codes of Practice) Notification 2013 SS586 Specification for Hazard Communication for hazardous chemicals and dangerous good Part 1,2,3

Global inventory status:

Regulatory list	Notification
EINECS	yes
TSCA	yes
AICS	yes
DSL	yes
ENCS (JP)	yes
PICCS (PH)	yes
IECSC	yes
ISHL (JP)	yes

Section 16. Other information

Disclaimer:

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.

LOCTITE® 493

November 2010

PRODUCT DESCRIPTION

LOCTITE® 493 provides the following product characteristics:

Technology	Cyanoacrylate
Chemical Type	Methyl cyanoacrylate
Appearance (uncured)	Clear to slightly hazy, colorless liquid <small>LMS</small>
Components	One part - requires no mixing
Viscosity	Very low
Cure	Humidity
Application	Bonding
Key Substrates	Metals, Rubbers and Plastics

LOCTITE® 493 is a general purpose adhesive and is particularly suited to bonding of metal substrates.

Commercial Item Description A-A-3097:

LOCTITE® 493 has been qualified to Commercial Item Description A-A-3097. **Note:** This is a regional approval. Please contact your local Technical Service Center for more information and clarification.

TYPICAL PROPERTIES OF UNCURED MATERIAL

Specific Gravity @ 25 °C	1.1
Viscosity, Cone & Plate, mPa·s (cP):	
Temperature: 25 °C, Shear Rate: 3,000 s ⁻¹	1 to 4 ^{LMS}
Viscosity, Brookfield - LVF, 25 °C, mPa·s (cP):	
Spindle 1, speed 60 rpm,	1 to 10
Vapour Pressure, hPa	<1
Flash Point - See SDS	

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.

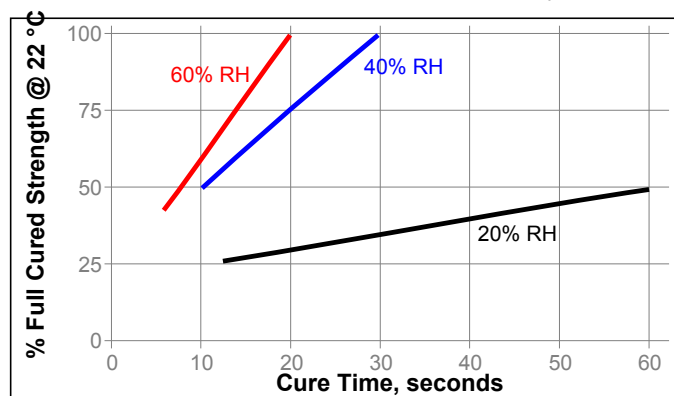
Fixture Time, seconds:	
Mild Steel (degreased)	20 to 40
Aluminum (degreased)	30 to 60
Zinc dichromate	30 to 60
Neoprene	<10
Rubber, nitrile	<10
ABS	10 to 30
PVC	30 to 70
Polycarbonate	20 to 70
Phenolic	10 to 30

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. Humidity

The rate of cure will depend on the ambient relative humidity. The following graph shows the tensile strength developed with time on Buna N rubber at different levels of humidity.



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.

TYPICAL PROPERTIES OF CURED MATERIAL

After 24 hours @ 22 °C

Physical Properties:

Coefficient of Thermal Expansion, ISO 11359-2, K ⁻¹	100×10 ⁻⁶
Coefficient of Thermal Conductivity, ISO 8302, W/(m·K)	0.1

Electrical Properties:

Dielectric Constant / Dissipation Factor, IEC 60250:	
0.1 kHz	2 to 3.3 / <0.02
1 kHz	2 to 3.5 / <0.02
10 kHz	2 to 3.5 / <0.02
Volume Resistivity, IEC 60093, Ω·cm	
Surface Resistivity, IEC 60093, Ω	2×10 ¹⁵ to 10×10 ¹⁵
Dielectric Breakdown Strength, IEC 60243-1, kV/mm	10×10 ¹⁵ to 80×10 ¹⁵
	25

TYPICAL PERFORMANCE OF CURED MATERIAL**Adhesive Properties**

Cured for 24 hours @ 22 °C

Lap Shear Strength, ISO 4587:

Steel (grit blasted)	N/mm ²	20 to 30
	(psi)	(2,900 to 4,350)
Aluminum (grit blasted)	N/mm ²	15 to 22
	(psi)	(2,175 to 3,190)
Zinc dichromate	N/mm ²	4 to 12
	(psi)	(580 to 1,740)
ABS	N/mm ²	6 to 20
	(psi)	(870 to 2,900)
PVC	N/mm ²	6 to 20
	(psi)	(870 to 2,900)
Polycarbonate	N/mm ²	5 to 20
	(psi)	(725 to 2,900)
Phenolic	N/mm ²	5 to 15
	(psi)	(725 to 2,175)
Neoprene	N/mm ²	5 to 15
	(psi)	(725 to 2,175)
Nitrile	N/mm ²	5 to 15
	(psi)	(725 to 2,175)

Tensile Strength, ISO 6922:

Steel (grit blasted)	N/mm ²	12 to 25
	(psi)	(1,740 to 3,625)
Buna-N	N/mm ²	5 to 15
	(psi)	(725 to 2,175)

"T" Peel Strength, ISO 11339:

Steel (degreased)	N/mm	<0.5
	(lb/in)	(<2.8)

Cured for 30 seconds @ 22 °C

Tensile Strength, ISO 6922:

Buna-N	N/mm ²	≥6.0 ^{LMS}
	(psi)	(≥870)

TYPICAL ENVIRONMENTAL RESISTANCE

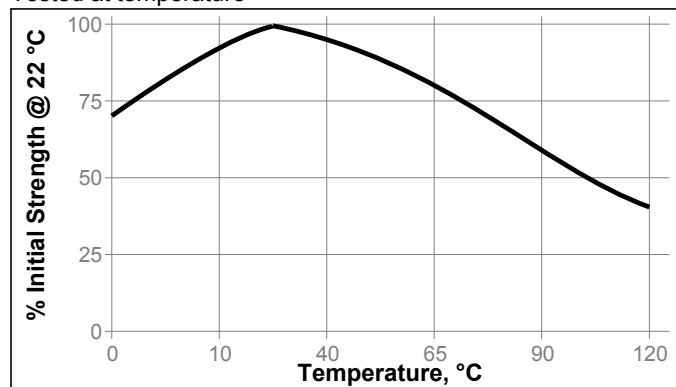
After 1 week @ 22 °C

Lap Shear Strength, ISO 4587:

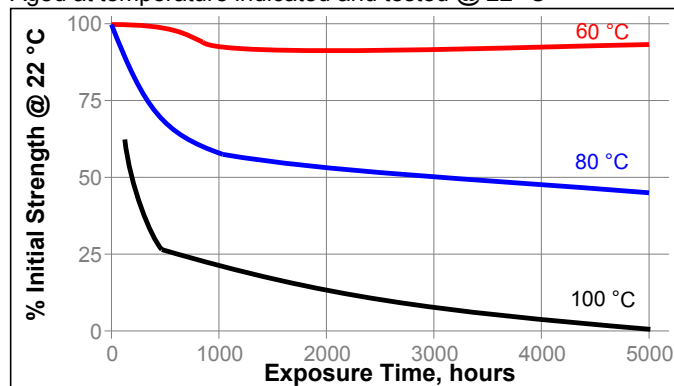
Mild steel (grit blasted)

Hot Strength

Tested at temperature

**Heat Aging**

Aged at temperature indicated and tested @ 22 °C

**Chemical/Solvent Resistance**

Aged under conditions indicated and tested @ 22 °C.

Environment	°C	% of initial strength		
		100 h	500 h	1000 h
Motor oil (MIL-L-46152)	40	100	100	100
Gasoline	22	95	95	95
Isopropanol	22	95	95	95
Ethanol	22	100	100	100
Freon TA	22	95	95	95
1,1,1 Trichloroethane	22	95	95	95
Heat/humidity 95% RH	40	70	50	40
Heat/humidity 95% RH on polycarbonate	40	95	95	95

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 June 06, 2002. 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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Reference 1.3