Revision Number: 005.0 **Issue date:** 08/21/2014

1. PRODUCT AND COMPANY IDENTIFICATION

Product name: **LOCTITE 660 RETAINING COMPOUND known as Loctite(R) 660 Quick Metal(R)**
IDH number: 209765
Product type: Anaerobic Adhesive
Item number: 66010
Restriction of Use: None identified
Region: United States

Company address:
Henkel Corporation
One Henkel Way
Rocky Hill, Connecticut 06067

Contact information:
Telephone: (860) 571-5100
MEDICAL EMERGENCY Phone: Poison Control Center
1-877-671-4608 (toll free) or 1-303-592-1711
TRANSPORT EMERGENCY Phone: CHEMTREC
1-800-424-9300 (toll free) or 1-703-527-3887
Internet: www.henkelna.com

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

DANGER**:** CAUSES SKIN IRRITATION.
MAY CAUSE AN ALLERGIC SKIN REACTION.
CAUSES SERIOUS EYE DAMAGE.
MAY CAUSE ALLERGY OR ASTHMA SYMPTOMS OR BREATHING DIFFICULTIES IF INHALED.

HAZARD CLASS	HAZARD CATEGORY
SKIN IRRITATION	2
SERIOUS EYE DAMAGE	1
RESPIRATORY SENSITIZATION	1
SKIN SENSITIZATION	1

PICTOGRAM(S)

Precautionary Statements

Prevention: Avoid breathing vapors, mist, or spray. Wash thoroughly after handling. Contaminated work clothing should not be allowed out of the workplace. Wear eye and face protection. Wear protective gloves. In case of inadequate ventilation wear respiratory protection.

Response: IF ON SKIN: Wash with plenty of soap and water. IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to remove. Continue rinsing. Immediately call a poison control center or physician. If skin irritation or rash occurs: Get medical attention. If experiencing respiratory symptoms: Call a poison center or physician. Take off contaminated clothing.

Storage: Not prescribed

Disposal: Dispose of contents and/or container according to Federal, State/Provincial and local governmental regulations.

Classification complies with OSHA Hazard Communication Standard (29 CFR 1910.1200) and is consistent with the provisions of the United Nations Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

See Section 11 for additional toxicological information.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous Component(s)	CAS Number	Percentage*
Dimethacrylate ester	Proprietary	30 - 60
Hydroxyalkyl methacrylate	27813-02-1	30 - 60
Silica, amorphous, fumed, crystal-free	112945-52-5	5 - 10
Cumene hydroperoxide	80-15-9	1 - 5
Mica	12001-26-2	0.1 - 1
2,5-Furandione, telomer with ethenylbenzene and (1-methylethyl)benzene	26762-29-8	0.1 - 1
Adhesion Promoter	Proprietary	0.1 - 1
Cumene	98-82-8	0.1 - 1
1-Acetyl-2-phenylhydrazine	114-83-0	0.1 - 1
Titanium dioxide	13463-67-7	0.1 - 1

* Exact percentage is a trade secret. Concentration range is provided to assist users in providing appropriate protections.

4. FIRST AID MEASURES

Inhalation: Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.

Skin contact: Immediately flush skin with plenty of water (using soap, if available). Remove contaminated clothing and footwear. Wash clothing before reuse. Get medical attention.

Eye contact: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Ingestion: DO NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.

Symptoms: See Section 11.

5. FIRE FIGHTING MEASURES

Extinguishing media: Water spray (fog), foam, dry chemical or carbon dioxide.

Special firefighting procedures: Wear self-contained breathing apparatus and full protective clothing, such as turn-out gear. In case of fire, keep containers cool with water spray.

Unusual fire or explosion hazards: Uncontrolled polymerization may occur at high temperatures resulting in explosions or rupture of storage containers.

Hazardous combustion products: Oxides of carbon. Oxides of sulfur. Oxides of nitrogen. Irritating organic vapours.

6. ACCIDENTAL RELEASE MEASURES

Use personal protection recommended in Section 8, isolate the hazard area and deny entry to unnecessary and unprotected personnel.

Environmental precautions: Do not allow product to enter sewer or waterways.

Clean-up methods: Remove all sources of ignition. Evacuate and ventilate spill area; dike spill to prevent entry into water system; wear full protective equipment during clean-up. Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Scrape up as much material as possible. Store in a partly filled, closed container until disposal. Refer to Section 8 "Exposure Controls / Personal Protection" prior to clean up.

7. HANDLING AND STORAGE

Handling: Use only with adequate ventilation. Prevent contact with eyes, skin and clothing. Do not breathe vapor and mist. Wash thoroughly after handling. Keep container closed. Refer to Section 8.

Storage: For safe storage, store at or below 38 °C (100.4 °F)
Keep in a cool, well ventilated area away from heat, sparks and open flame.
Keep container tightly closed until ready for use.

For information on product shelf life contact Henkel Customer Service at (800) 243-4874.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Employers should complete an assessment of all workplaces to determine the need for, and selection of, proper exposure controls and protective equipment for each task performed.

Hazardous Component(s)	ACGIH TLV	OSHA PEL	AIHA WEEL	OTHER
Dimethacrylate ester	None	None	None	None
Hydroxyalkyl methacrylate	None	None	None	1 ppm TWA 3 ppm STEL
Silica, amorphous, fumed, crystal-free	10 mg/m3 TWA Inhalable dust. 3 mg/m3 TWA Respirable fraction.	20 MPPCF TWA 0.8 mg/m3 TWA	None	None
Cumene hydroperoxide	None	None	1 ppm (6 mg/m3) TWA (SKIN)	None
Mica	3 mg/m3 TWA Respirable fraction.	20 MPPCF TWA	None	None
2,5-Furandione, telomer with ethenylbenzene and (1-methylethyl)benzene	None	None	None	None
Adhesion Promoter	20 ppm TWA	None	None	None
Cumene	50 ppm TWA	50 ppm (245 mg/m3) PEL (SKIN)	None	None
1-Acetyl-2-phenylhydrazine	None	None	None	None
Titanium dioxide	10 mg/m3 TWA	15 mg/m3 PEL Total dust.	None	None

Engineering controls: Provide adequate local exhaust ventilation to maintain worker exposure below exposure limits.

Respiratory protection: Use NIOSH approved respirator if there is potential to exceed exposure limit(s).

Eye/face protection: Safety goggles or safety glasses with side shields. Full face protection should be used if the potential for splashing or spraying of product exists. Safety showers and eye wash stations should be available.

Skin protection: Use chemical resistant, impermeable clothing including gloves and either an apron or body suit to prevent skin contact. Butyl rubber gloves. Neoprene gloves. Natural rubber gloves.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Paste, Liquid
Color:	Silver
Odor:	Mild
Odor threshold:	Not available.
pH:	Not applicable
Vapor pressure:	< 5 mm hg (27 °C (80.6 °F))
Boiling point/range:	> 149 °C (> 300.2 °F)
Melting point/ range:	Not available.
Specific gravity:	1.1
Vapor density:	Not available.
Flash point:	> 93 °C (> 199.4 °F) Tagliabue closed cup
Flammable/Explosive limits - lower:	Not available.
Flammable/Explosive limits - upper:	Not available.
Autoignition temperature:	Not available.
Evaporation rate:	Not available.
Solubility in water:	Slight
Partition coefficient (n-octanol/water):	Not available.
VOC content:	1.16 %; 12.75 g/l
Viscosity:	Not available.
Decomposition temperature:	Not available.

10. STABILITY AND REACTIVITY

Stability:	Stable under normal conditions of storage and use.
Hazardous reactions:	None under normal processing. Polymerization may occur at elevated temperature or in the presence of incompatible materials.
Hazardous decomposition products:	Oxides of carbon. Oxides of sulfur. Oxides of nitrogen. Irritating organic vapours.
Incompatible materials:	Strong oxidizing agents.
Reactivity:	Not available.
Conditions to avoid:	Elevated temperatures. Heat, flames, sparks and other sources of ignition. Store away from incompatible materials.

11. TOXICOLOGICAL INFORMATION

Relevant routes of exposure: Skin, Inhalation, Eyes, Ingestion

Potential Health Effects/Symptoms

Inhalation: May cause allergic respiratory reaction. These symptoms, which can include chest tightness, wheezing, cough, shortness of breath or asthma attack, could be immediate or delayed (up to several hours after exposure). Inhalation of vapors or mists of the product may be irritating to the respiratory system.

Skin contact: Causes skin irritation. May cause allergic skin reaction.

Eye contact: Causes serious eye damage.

Ingestion: May cause gastrointestinal disturbances.

Hazardous Component(s)	LD50s and LC50s	Immediate and Delayed Health Effects
Dimethacrylate ester	None	Irritant, Allergen
Hydroxyalkyl methacrylate	None	Irritant, Allergen
Silica, amorphous, fumed, crystal-free	None	Nuisance dust
Cumene hydroperoxide	None	Allergen, Central nervous system, Corrosive, Irritant, Mutagen
Mica	None	Lung
2,5-Furandione, telomer with ethenylbenzene and (1-methylethyl)benzene	None	Irritant, Allergen, Respiratory, Corrosive, Eyes
Adhesion Promoter	Oral LD50 (RABBIT) = 1,200 mg/kg Oral LD50 (RAT) = 1,060 mg/kg Oral LD50 (RAT) = 2,224 mg/kg Dermal LD50 (RABBIT) = 500 mg/kg Inhalation LC50 (RAT, 4 h) = 7.1 mg/l	Corrosive, Irritant, Allergen
Cumene	Oral LD50 (RAT) = 2.91 g/kg Oral LD50 (RAT) = 1,400 mg/kg Inhalation LC50 (RAT, 4 h) = 8000 ppm	Central nervous system, Irritant, Lung
1-Acetyl-2-phenylhydrazine	None	Allergen, Blood, Kidney, Mutagen, Some evidence of carcinogenicity
Titanium dioxide	None	Irritant, Respiratory, Some evidence of carcinogenicity

Hazardous Component(s)	NTP Carcinogen	IARC Carcinogen	OSHA Carcinogen (Specifically Regulated)
Dimethacrylate ester	No	No	No
Hydroxyalkyl methacrylate	No	No	No
Silica, amorphous, fumed, crystal-free	No	No	No
Cumene hydroperoxide	No	No	No
Mica	No	No	No
2,5-Furandione, telomer with ethenylbenzene and (1-methylethyl)benzene	No	No	No
Adhesion Promoter	No	No	No
Cumene	No	Group 2B	No
1-Acetyl-2-phenylhydrazine	No	No	No
Titanium dioxide	No	Group 2B	No

12. ECOLOGICAL INFORMATION

Ecological information: Not available.

13. DISPOSAL CONSIDERATIONS

Information provided is for unused product only.

Recommended method of disposal: Follow all local, state, federal and provincial regulations for disposal.

Hazardous waste number: Not a RCRA hazardous waste.

14. TRANSPORT INFORMATION

The transport information provided in this section only applies to the material/formulation itself, and is not specific to any package/configuration.

U.S. Department of Transportation Ground (49 CFR)

Proper shipping name: RQ, Environmentally hazardous substances, liquid, n.o.s.
Hazard class or division: 9
Identification number: UN 3082
Packing group: III
DOT Hazardous Substance(s): alpha,alpha-Dimethylbenzylhydroperoxide

International Air Transportation (ICAO/IATA)

Proper shipping name: Environmentally hazardous substance, liquid, n.o.s.
Hazard class or division: 9
Identification number: UN 3082
Packing group: III

Water Transportation (IMO/IMDG)

Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
Hazard class or division: 9
Identification number: UN 3082
Packing group: III

15. REGULATORY INFORMATION

United States Regulatory Information

TSCA 8 (b) Inventory Status: All components are listed or are exempt from listing on the Toxic Substances Control Act Inventory.
TSCA 12 (b) Export Notification: None above reporting de minimis

CERCLA/SARA Section 302 EHS: None above reporting de minimis
CERCLA/SARA Section 311/312: Immediate Health, Delayed Health
CERCLA/SARA Section 313: This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 (40 CFR 372). Cumene hydroperoxide (CAS# 80-15-9).
CERCLA Reportable quantity: Cumene hydroperoxide (CAS# 80-15-9) 10 lbs. (4.54 kg)

California Proposition 65: This product contains a chemical known in the State of California to cause cancer. This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

Canada Regulatory Information

CEPA DSL/NDSL Status: All components are listed on or are exempt from listing on the Canadian Domestic Substances List.

16. OTHER INFORMATION

This safety data sheet contains changes from the previous version in sections: New Safety Data Sheet format.

Prepared by: Sheila Gines, Regulatory Affairs Specialist

Issue date: 08/21/2014

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LOCTITE® 660

May 2004

PRODUCT DESCRIPTION

LOCTITE® 660 provides the following product characteristics:

Technology	Acrylic
Chemical Type	Urethane methacrylate
Appearance (uncured)	Metallic Grey Paste[LMS]
Fluorescence	No
Components	One component - requires no mixing
Viscosity	High
Cure	Anaerobic
Secondary Cure	Activator
Application	Retaining
Strength	High

LOCTITE® 660 is designed for the bonding of cylindrical fitting parts, particularly where bond gaps can approach 0.50 mm (0.02 in.). The product cures when confined in the absence of air between close fitting metal surfaces and prevents loosening and leakage from shock and vibration. This product possesses excellent gap cure characteristics. Typical applications include restoring correct fits on worn shafts, spun beraings, and damaged keyways.

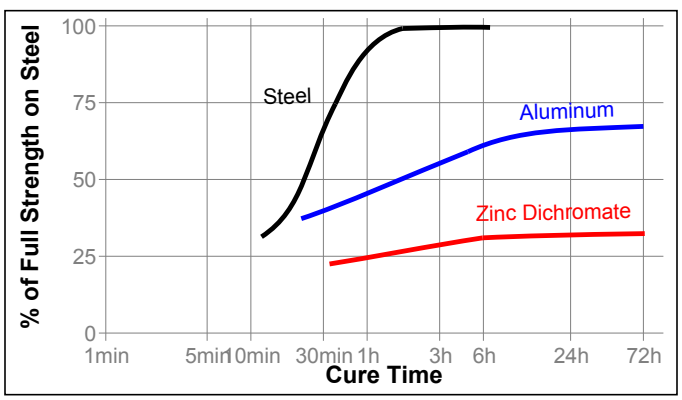
TYPICAL PROPERTIES OF UNCURED MATERIAL

Specific Gravity @ 25 °C	1.13
Flash Point - See MSDS	
Viscosity, Brookfield - HBT, 25 °C, mPa·s (cP):	
Spindle TB, speed 0.50 rpm, Helipath	1,000,000 to 2,000,000[LMS]
Spindle TB, speed 5.00 rpm, Helipath	150,000 to 350,000[LMS]

TYPICAL CURING PERFORMANCE

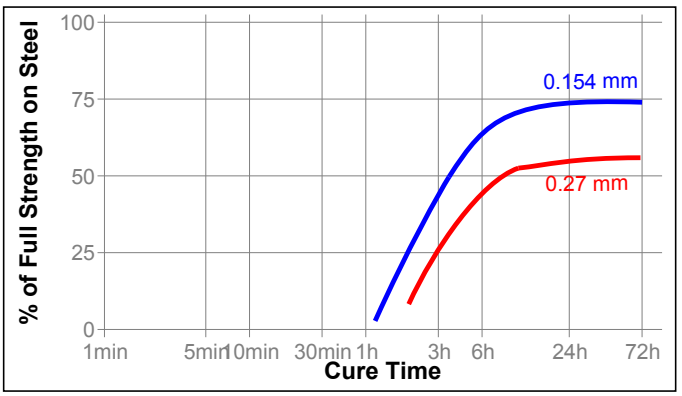
Cure Speed vs. Substrate

The rate of cure will depend on the substrate used. The graph below shows the shear strength developed with time on steel pins and collars compared to different materials and tested according to ISO 10123.



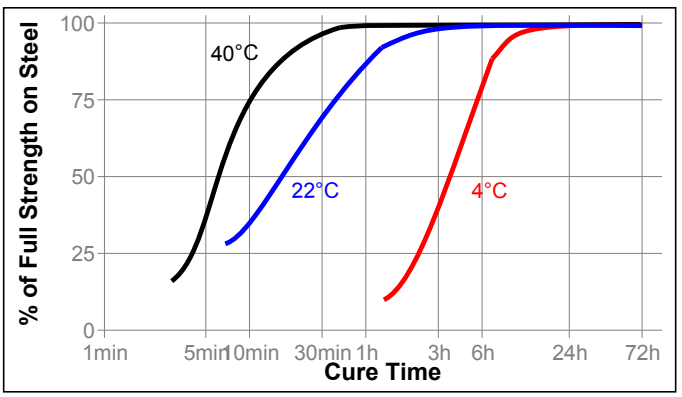
Cure Speed vs. Bond Gap

The rate of cure will depend on the bondline gap. The following graph shows shear strength developed with time on steel pins and collars at different controlled gaps and tested according to ISO 10123.



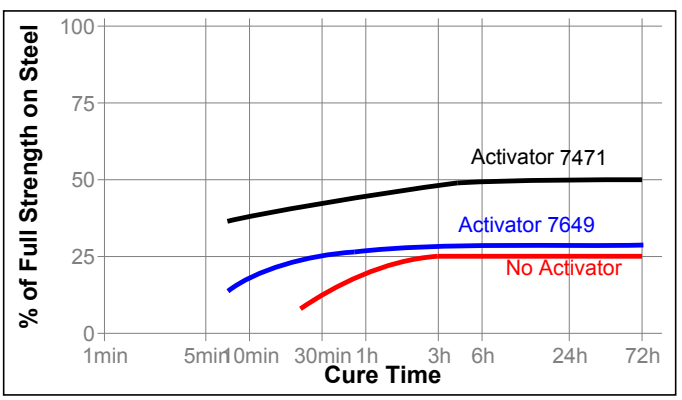
Cure Speed vs. Temperature

The rate of cure will depend on the temperature. The graph below shows the shear strength developed with time at different temperatures on steel pins and collars and tested according to ISO 10123.



Cure Speed vs. Activator

Where cure speed is unacceptably long, or large gaps are present, applying activator to the surface will improve cure speed. The graph below shows shear strength developed with time using Activator 7471 and 7649 on zinc dichromate steel pins and collars and tested according to ISO 10123.



TYPICAL PROPERTIES OF CURED MATERIAL

Physical Properties:

Coefficient of Thermal Expansion, ASTM D 696, K^{-1}	80×10^{-6}
Coefficient of Thermal Conductivity, ASTM C 177, W/(m·K)	0.10
Specific Heat, kJ/(kg·K)	0.30
Elongation, at break, ASTM D 412, %	<2

TYPICAL PERFORMANCE OF CURED MATERIAL

Adhesive Properties

After 24 hours @ 22 °C

Compressive Shear Strength, ISO 10123:

Steel pins and collars	N/mm²	≥17.20[LMS]
	(psi)	(2,490)

TYPICAL ENVIRONMENTAL RESISTANCE

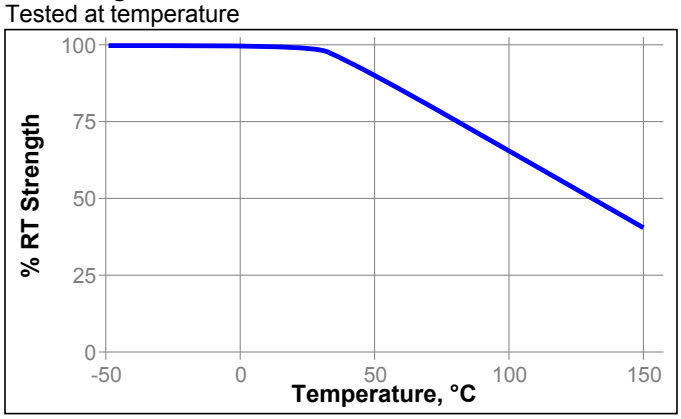
Cured for 1 week @ 22 °C

Compressive Shear Strength, ISO 10123:

Steel pins and collars

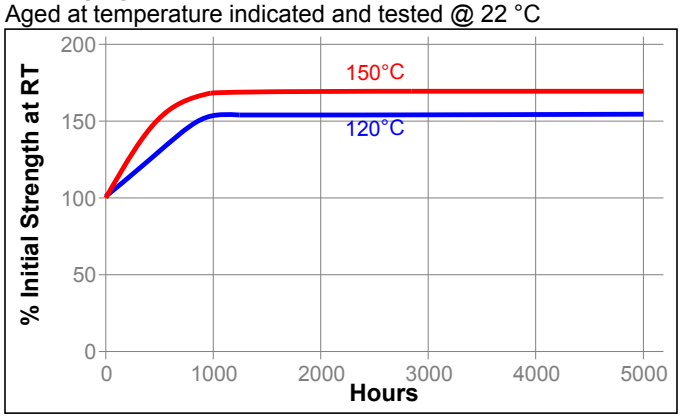
Hot Strength

Tested at temperature



Heat Aging

Aged at temperature indicated and tested @ 22 °C



Chemical/Solvent Resistance

Aged under conditions indicated and tested @ 22 °C.

		% of initial strength		
Environment	**°C**	**100 hr**	**500 hr**	**1000 hr**
Motor Oil	125	100	100	100
Unleaded Gasoline	22	100	100	100
Brake fluid	22	80	75	75
Water Glycol 50/50	87	100	90	80
Ethanol	22	95	95	95
Acetone	22	80	80	80

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 Material Safety Data Sheet (MSDS).

Where aqueous washing systems are used to clean the surfaces before bonding, it is important to check for compatibility of the washing solution with the adhesive. In some cases these aqueous washes can affect the cure and performance of the adhesive.

This product is not normally recommended for use on plastics (particularly thermoplastic materials where stress cracking of the plastic could result). Users are recommended to confirm compatibility of the product with such substrates.

Directions for use

For Assembly

1. For best results, clean all surfaces (external and internal) with a Loctite cleaning solvent and allow to dry.
2. If the material is an inactive metal or the cure speed is to slow, spray with Activator 7471 or 7649 and allow to dry.
3. **For Slip Fitted Assemblies**, apply adhesive around the leading edge of the pin and the inside of the collar and use a rotating motion during assembly to ensure good coverage.
4. **For Press Fitted Assemblies**, apply adhesive thoroughly to both bond surfaces and assemble at high press on rates.
5. **For Shrink Fitted Assemblies** the adhesive should be coated onto the pin, the collar should then be heated to create sufficient clearance for free assembly.
6. Parts should not be disturbed until sufficient handling strength is achieved.

For Disassembly

1. Apply localized heat to the assembly to approximately 250 °C. Disassemble while hot.

For Cleanup

1. Cured product can be removed with a combination of soaking in a Loctite solvent and mechanical abrasion such as a wire brush.

Loctite Material Specification[LMS]
LMS dated September 1, 1995. 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 Loctite Quality.

Storage
Store product in the unopened container in a dry location. Storage information may be indicated on the product container labeling.
Optimal Storage: 8 °C to 21 °C. Storage below 8 °C or greater than 28 °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
(°C x 1.8) + 32 = °F
kV/mm x 25.4 = V/mil
mm / 25.4 = inches
N x 0.225 = lb
N/mm x 5.71 = lb/in
N/mm² x 145 = psi
MPa x 145 = psi
N·m x 8.851 = lb.in
N·mm x 0.142 = oz.in
mPa·s = cP

Note
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Reference 0.3