



MATERIAL SAFETY DATA SHEET

SECTION 1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Product name: LOCTITE 241

Product-Code: 269067

Intended use: Adhesive

Supplier:

HENKEL AUSTRALIA PTY. LIMITED
ADHESIVE TECHNOLOGIES
135-141 Canterbury Road
3137 Kilsyth, Victoria

Australia

Phone: +61 (3) 9724 6444

Emergency information: 24 HOUR EMERGENCY CONTACT NUMBER: 1800 032 379

SECTION 2. HAZARDS IDENTIFICATION

STATEMENT OF HAZARDOUS NATURE:

Hazardous according to the criteria of ASCC.

Classification of material Xn - Harmful N - Dangerous for the environment

Risk phrases:

R20 Harmful by inhalation.

R36/37 Irritating to eyes and respiratory system.

R52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety phrases:

S23 Do not breathe vapour.

S25 Avoid contact with eyes.

S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S51 Use only in well-ventilated areas.

S61 Avoid release to the environment. Refer to special instructions/Safety data sheets.

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).

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Identity of ingredients:

Chemical ingredients	CAS-No.	Proportion
Polyethylene glycol 200 dimethacrylate	25852-47-5	> 60 %
Cumene hydroperoxide	80-15-9	< 3 %
Cumene	98-82-8	< 1 %
non hazardous ingredients~		10 - 30 %



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SECTION 4. FIRST AID MEASURES

Ingestion:	Rinse out mouth, drink 1-2 glasses of water, do not induce vomiting. In case of adverse health effects seek medical advice.
Skin:	Rinse with running water and soap. If adverse health effects develop seek medical attention.
Eyes:	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. If adverse health effects develop seek medical attention.
Inhalation:	Move to fresh air. If symptoms persist, seek medical advice.
First Aid facilities:	Eye wash and safety shower

SECTION 5. FIRE FIGHTING MEASURES

Suitable extinguishing media:	Foam, extinguishing powder, carbon dioxide.
Combustion behaviour:	Non flammable product (flash point is greater than 100°C (CC))
Decomposition products in case of fire:	Trace amounts of toxic and/or irritating fumes may be released and the use of breathing apparatus is recommended. Oxides of carbon.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions and emergency procedures:	Ensure adequate ventilation. Avoid skin and eye contact.
Environmental precautions:	Do not let product enter drains.
Clean-up methods:	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.

SECTION 7. HANDLING AND STORAGE

Precautions for safe handling:	Use only in well-ventilated areas. Prolonged or repeated skin contact should be avoided to minimise any risk of sensitisation. Avoid skin and eye contact.
Conditions for safe storage:	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.



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SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

National exposure standards:

Ingredient	form of exposure	TWA (ppm)	TWA (mg/m3)	Peak Limit. (mg/m3)	STEL (ppm)	STEL (mg/m3)
CUMENE 98-82-8		25	125	-	-	-
		-	-	-	75	375

Engineering controls: Ensure good ventilation/suction at the workplace.

Eye protection: Wear protective glasses.

Skin 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.

Respiratory protection: Ensure adequate ventilation.
Do not inhale vapors and fumes.
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: Blue
Odor: Liquid
pH: characteristic
3.00 - 6.00
Flash point: > 100 °C (> 212 °F)
Vapor pressure: 0.1330000 mbar
Density: 1.0800 g/cm3
Solubility: Solvent: Water, Not miscible
Solvent: Acetone, Miscible

SECTION 10. STABILITY AND REACTIVITY

Conditions to avoid: Stable under normal conditions of storage and use.
No decomposition if stored and applied as directed.



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Incompatible materials: Peroxides.
Reaction with strong bases
Reaction with strong acids.
Reaction with strong oxidants.

Hazardous polymerization: Will not occur.

SECTION 11. TOXICOLOGICAL INFORMATION

HEALTH EFFECTS:

Ingestion: Ingestion of large quantities may cause gastrointestinal irritation with nausea, vomiting and diarrhea.

Skin: This product may cause irritation to the skin.

Eyes: This product is irritating to the eyes.

Inhalation: This product is irritating to the respiratory system.
Harmful: danger of serious damage to health by prolonged exposure through inhalation.

Chronic effects: None known

Acute oral toxicity:	Cumene hydroperoxide	LD L0 (Mouse) = 5,000 mg/kg
	80-15-9	
	Cumene	LD 50 (Rat) = 1,400 mg/kg
	98-82-8	LD 50 (Rat) = 2.91 g/kg

SECTION 12. ECOLOGICAL INFORMATION

General ecological information: Harmful to aquatic organisms.
May cause long-term adverse effects in the aquatic environment.
Do not empty into drains / surface water / ground water.

SECTION 13. DISPOSAL CONSIDERATIONS

Waste disposal of product: 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: Packaging that cannot be cleaned are to be disposed of in the same manner as the product.

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).

General information:
Not hazardous according to RID, ADR, ADN, IMDG, IATA-DGR.



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SECTION 15. REGULATORY INFORMATION

SUSDP 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
ASCC - Australian Safety and Compensation Council
SUSDP - Standard for the Uniform Scheduling of Drugs and Poisons
STEL - Short term exposure limit
TWA - Time weighted average

Date of previous issue:

20.02.2006

Disclaimer:

The percentage weight (% w/w) of ingredients is not to be taken as a specification guaranteed by Henkel Australia Pty. Limited, but only as an approximate guide to the content of hazardous ingredients in the material. The information contained herein does not constitute a guarantee by Henkel Australia Pty. Limited concerning the properties of the material. The information contained in this Material Safety Data Sheet is offered in good faith and has been developed from what is believed to be accurate and reliable sources. The information is offered without warranty, representation, inducement or licence and Henkel Australia Pty. Limited assumes no legal responsibility for reliance upon same. Henkel Australia Pty. Limited disclaims any liability for loss, injury or damage incurred in connection with the use of the material or its associated Material Safety Data Sheet. This information is not to be construed as a representation that the material is suitable for any particular purpose or use except those conditions and warranties implied by either Commonwealth or State statutes. Customers are encouraged to make their own enquiries as to the material's characteristics and, where appropriate, to conduct their own tests in the specific context of the material's intended use.

LOCTITE® 241

December 2003

PRODUCT DESCRIPTION

LOCTITE® 241 provides the following product characteristics:

Technology	Acrylic
Chemical Type	Methacrylate ester
Appearance (uncured)	Blue opaque liquid ^{LMS}
Fluorescence	Positive under UV light ^{LMS}
Components	One component - requires no mixing
Cure	Anaerobic
Secondary Cure	Activator
Application	Threadlocking
Strength	Medium

LOCTITE® 241 is designed for the locking and sealing of threaded fasteners which require normal disassembly with standard hand tools. The product cures when confined in the absence of air between close fitting metal surfaces and prevents loosening and leakage from shock and vibration. Particularly suitable for applications on less active substrates such as stainless steel and plated surfaces, where disassembly with hand tools is required for servicing.

Mil-S-46163A

LOCTITE® 241 is tested to the lot requirements of Military Specification Mil-S-46163A. **Note:** This is a regional approval. Please contact your local Technical Service Center for more information and clarification.

ASTM D5363

Each lot of adhesive produced in North America is tested to the general requirements defined in paragraphs 5.1.1 and 5.1.2 and to the Detail Requirements defined in section 5.2.

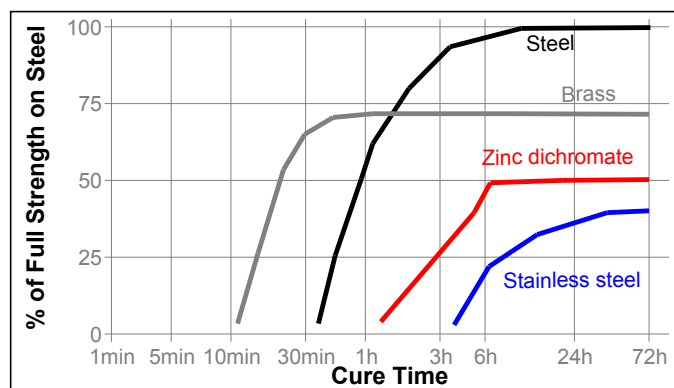
TYPICAL PROPERTIES OF UNCURED MATERIAL

Specific Gravity @ 25 °C	1.06
Flash Point - See SDS	>93
Viscosity @ 25°C, mPa·s (cP):	
Cannon Fenske:	
Cannon Fenske #300	110 to 150 ^{LMS}

TYPICAL CURING PERFORMANCE

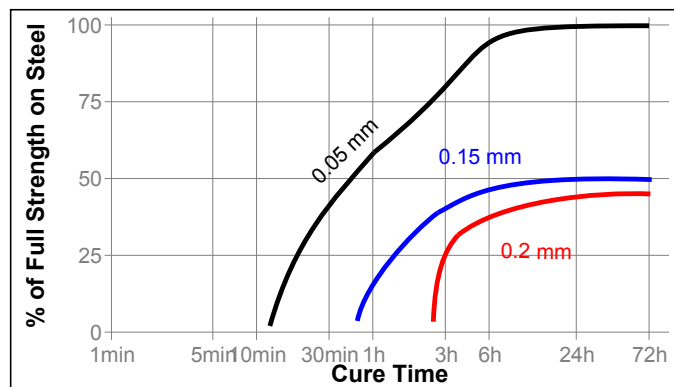
Cure Speed vs. Substrate

The rate of cure will depend on the substrate used. The graph below shows the breakaway strength developed with time on M10 black oxide nuts and bolts compared to different materials and tested according to MIL-S-46163.



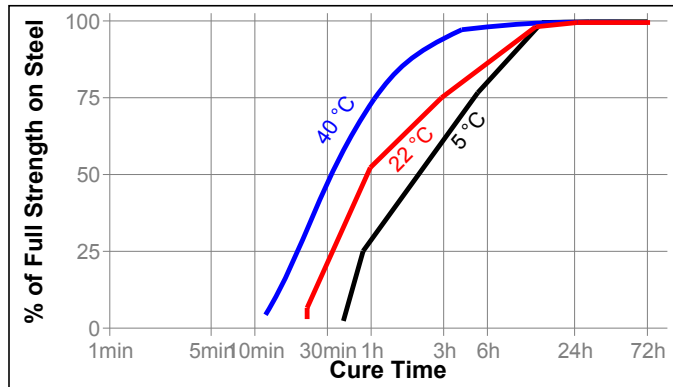
Cure Speed vs. Bond Gap

The rate of cure will depend on the bondline gap. Gaps in threaded fasteners depends on thread type, quality and size. The following graph shows shear strength developed with time on steel pins and collars at different controlled gaps and tested according to MIL-R-46082.



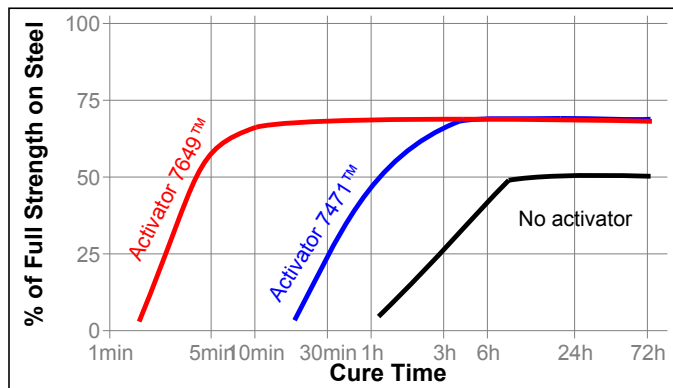
Cure Speed vs. Temperature

The rate of cure will depend on the temperature. The graph below shows the breakaway strength developed with time at different temperatures on M10 black oxide nuts and bolts and tested according to MIL-S-46163.



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 the breakaway strength developed with time on M10 zinc dichromate steel nuts and bolts using Activator 7471™ and 7649™ and tested according to MIL-S-46163.



TYPICAL PROPERTIES OF CURED MATERIAL

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
Specific Heat, kJ.kg ⁻¹ K ⁻¹	0.3

TYPICAL PERFORMANCE OF CURED MATERIAL

After 24 hours @ 22°C

Adhesive Properties:

Breakaway Torque, MIL-S-46163, N·m:	
M10 steel nuts and bolts	11.5
Prevail Torque:	
MIL-S-46163, N·m:	
M10 steel nuts and bolts	10
N·m:	
3/8 x 16 steel GR 2 nuts & GR 5 bolts	5.6 to 16.9 ^{LMS}
3/8 x 16 cadmium nuts & bolts	2.3 to 22.6 ^{LMS}
3/8 x 16 zinc nuts & bolts	2.3 to 22.6 ^{LMS}
Break Torque, N·m:	
3/8 x 16 steel GR 2 nuts & GR 5 bolts	11.3 to 22.6 ^{LMS}
3/8 x 16 cadmium nuts & bolts	3.4 to 22.6 ^{LMS}
3/8 x 16 zinc nuts & bolts	3.4 to 22.6 ^{LMS}
Static Shear Strength, MIL-R-46082, Mpa:	
Steel pins and collars	10

After 90 minutes @ 22°C

Adhesive Properties:

Break Torque, N·m:	
3/8 x 16 steel GR 2 nuts & GR 5 bolts	5.6 to 22.6 ^{LMS}
Prevail Torque, N·m:	
3/8 x 16 steel GR 2 nuts & GR 5 bolts	2.8 to 16.9 ^{LMS}

TYPICAL ENVIRONMENTAL RESISTANCE

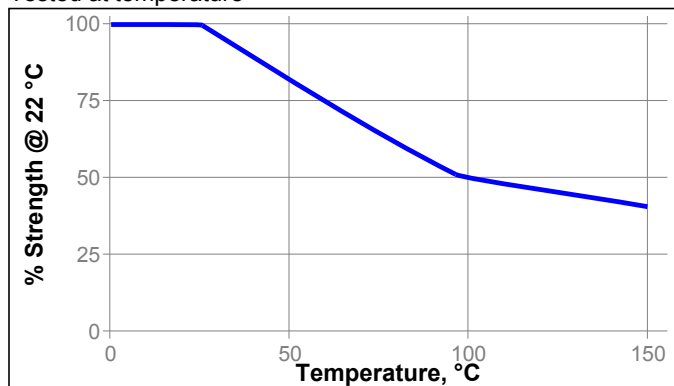
Cured 1 week @ 22°C.

Adhesive Properties:

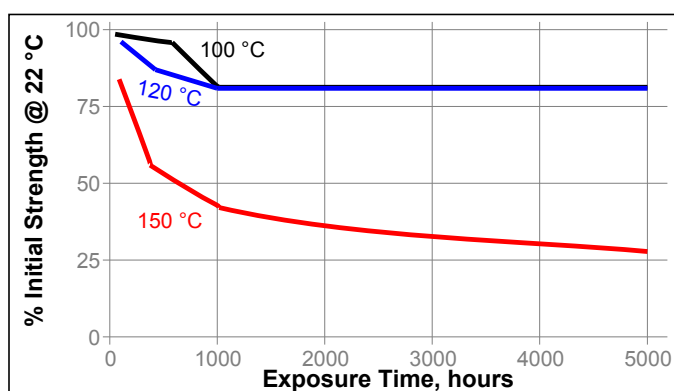
Break Torque, DIN 54454, N·m:	
M10 zinc phosphate steel nuts & bolts	

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)	125	95	90	90
Unleaded gasoline	22	95	90	90
Ethanol	22	100	100	95
Brake fluid	22	95	95	95
1,1,1 Trichloroethane	22	100	100	100
Water/glycol 50/50	87	85	85	85

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).

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 too slow, spray all threads with and allow to dry.
3. To prevent the product from clogging in the nozzle, do not allow the tip to touch metal surfaces during application.
4. **For Thru Holes**, apply several drops of the product onto the bolt at the nut engagement area.
5. **For Blind Holes**, apply several drops of the product down the internal threads to the bottom of the hole.
6. **For Sealing Applications**, apply a 360° bead of product to the leading threads of the male fitting, leaving the first thread free. Force the material into the threads to thoroughly fill the voids. For bigger threads and voids, adjust product amount accordingly and apply a 360° bead of product on the female threads also.
7. Assemble and tighten as required.

For Disassembly

1. Remove with standard hand tools.
2. In rare instances where hand tools do not work because of excessive engagement length, apply localized heat to nut or bolt 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 December 13, 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 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

$(^{\circ}\text{C} \times 1.8) + 32 = ^{\circ}\text{F}$
 $\text{kV/mm} \times 25.4 = \text{V/mil}$
 $\text{mm} / 25.4 = \text{inches}$
 $\mu\text{m} / 25.4 = \text{mil}$
 $\text{N} \times 0.225 = \text{lb}$
 $\text{N/mm} \times 5.71 = \text{lb/in}$
 $\text{N/mm}^2 \times 145 = \text{psi}$
 $\text{MPa} \times 145 = \text{psi}$
 $\text{N}\cdot\text{m} \times 8.851 = \text{lb}\cdot\text{in}$
 $\text{N}\cdot\text{m} \times 0.738 = \text{lb}\cdot\text{ft}$
 $\text{N}\cdot\text{mm} \times 0.142 = \text{oz}\cdot\text{in}$
 $\text{mPa}\cdot\text{s} = \text{cP}$

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 0.1