

LOCTITE[®] 414

November 2010

PRODUCT DESCRIPTION

LOCTITE[®] 414 provides the following product characteristics:

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

 $\mathsf{LOCTITE}^{^{(\!\!\!\!\)}}$ 414 is a general purpose cyanoacrylate instant adhesive.

Commercial Item Description A-A-3097:

LOCTITE[®] 414 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	1.05
Viscosity, Cone & Plate, mPa·s (cP):	
Temperature: 25 °C, Shear Rate: 3,000 s ⁻¹	70 to 110 ^{LMS}
Viscosity, Brookfield - LVF, 25 °C, mPa·s (cP):	
Spindle 1, speed 30 rpm	100 to 150
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:	
Steel (degreased)	15 to 30
Aluminum	2 to 10
Neoprene	<5
Rubber, nitrile	<5
ABS	2 to 10
PVC	2 to 10
Polycarbonate	15 to 50
Phenolic	5 to 15

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.

TYPICAL PROPERTIES OF CURED MATERIAL

After 24 hours @ 22 °C

hysical Properties:	
Coefficient of Thermal Expansion, ISO 11359-2, K ⁻¹	80×10 ⁻⁶
Coefficient of Thermal Conductivity, ISO 8302, $W/(m \cdot K)$	0.1
Glass Transition Temperature, ASTM E 228, °C	120
leatrical Branartica	

Electrical Properties:

Dielectric Constant / Dissipation Factor, IEC 6	0250:
0.05 kHz	2.3 / <0.02
1 kHz	2.3 / <0.02
10 kHz	2.3 / <0.02
Volume Resistivity, IEC 60093, Ω·cm	10×10 ¹⁵
Dielectric Breakdown Strength, IEC 60243-1, kV/mm	25

TYPICAL PERFORMANCE OF CURED MATERIAL Adhesive Properties

After 24 hours @ 22 °C		
Lap Shear Strength	NI/ 2	404 00
Steel (grit blasted)	N/mm²	18 to 26
	(psi)	(2,610 to 3,770)
Aluminum (etched)	N/mm²	11 to 19
	(psi)	(1,595 to 2,755)
ABS	N/mm²	>6
	(psi)	(>870)
PVC	N/mm ²	>4
	(psi)	(>580)
Polycarbonate	N/mm ²	>5
	(nsi)	(>725)
Phenolic	N/mm ²	5 to 15
Thenolie	(nei)	(725 to 2 175)
Naantana	(psi)	(125 to 2, 115)
Neoprene	IN/11111- (mai)	>10
N 111 11	(psi)	(>1,450)
Nitrile	N/mm ²	>10
	(psi)	(>1,450)
Topsilo Strongth ISO 6022:		
Cteal (with leasted)	N1/ma.ma2	10 40 05
Steel (grit blasted)	N/mm ²	12 10 25
	(psi)	(1,745 to 3,625)



After 10 seconds @ 22 °C Tensile Strength, ISO 6922: Buna-N

N/mm ²	≥6.0 ^{LM8}
(psi)	(≥870)

TYPICAL ENVIRONMENTAL RESISTANCE

Cured for 1 week @ 22 °C Lap Shear Strength : Mild Steel (grit blasted)

Hot Strength



Heat Aging

Aged at temperature indicated and tested @ 23 °C



Chemical/Solvent Resistance

Aged under conditions indicated and tested @ °C

		% o	f initial strer	ngth
Environment	°C	100 h	500 h	1000 h
Motor oil (MIL-L-46152)	40	100	100	95
Gasoline	22	100	100	100
Isopropanol	22	100	100	100
Industrial methylated spirits	22	100	100	100
1,1,1 Trichloroethane	22	100	100	100
Freon TA	22	100	100	100
Heat/humidity 95% RH	40	80	75	65

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 dated August 29, 2003. 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 Henkel representative.

Conversions

 $(^{\circ}C \ge 1.8) + 32 = ^{\circ}F$ kV/mm x 25.4 = V/mil mm / 25.4 = inches μ m / 25.4 = mil 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·m x 0.738 = lb·ft N·mm x 0.142 = oz·in mPa·s = cP

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Reference 1.2





Safety Data Sheet

LOCTITE 414 INSTANT ADHESIVE known as LOCTITE 414 INST ADH 20G AU

SDS No.: 153532 V001.3 Date of issue: 21.04.2020

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

Product name: LOCTITE 414 INSTANT ADHESIVE known as LOCTITE 414 INST ADH 20G AU Intended use: Cy anoacry late 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: 1800 032 379

Section 2. Hazards identification

Classification of the substance or mixture Hazardous according to the criteria of Safe Work Australia.

GHS Classification:

Hazard Class	Hazard Category	Target organ
Flammable liquids	Category 4	
Skin irritation	Category 2	
Serious eye irritation	Category 2A	
Target Organ Systemic Toxicant -	Category 3	respiratory tract irritation
Single exposure		
Hazard pictogram:	\wedge	

Signal word:

Warning

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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 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. 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.

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

General chemical description: Mixture

Identity of ingredients:

Chemical ingredients	CAS-No.	Proportion
Ethyl 2-cyanoacrylate	7085-85-0	60- <= 100 %
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 Normal washroom facilities
Medical attention and special treatment:	Treat symptomatically.
	Surgery is not necessary to separate accidentally bonded tissues. Experience has shown that bonded tissues are best treated by passive, non-surgical first aid. If rapid curing has caused thermal burns they should be treated symptomatically after adhesive is removed.

	Section 5. Fire fighting measures
Suitable extinguishing media:	Foam, extinguishing powder, carbon dioxide. Fine water spray
Improper extinguishing media:	High pressure waterjet
Combustion behaviour:	Combustible Liquid Keep away from heat, spark, and open flames.
Decomposition products in case of fire:	Thermal decomposition can lead to release of irritating gases and vapors. carbon monoxide Carbon dioxide. Oxides of nitrogen.
Special protective equipment for fire-fighters:	Wear full protective clothing. Fire fighters should wear positive pressure self-contained breathing apparatus (SCBA).

Section 6. Accidental release measures

Personal precautions:	Ensure adequate ventilation. Avoid skin and eye contact. Wear protective equipment.
Environmental precautions:	Do not let product enter drains.
Clean-up methods:	Do not use cloths for moppingup. Flood with water to complete polymerization and scrape off the floor. Cured material can be disposed of as non-hazardous waste. Dispose of contaminated material as waste according to Section 13.

Section 7.	Handling	and storage
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Precautions for safe handling:	Prevent contact with eyes, skin and clothing. Do not breathe vapor and mist. Wash thoroughly after handling. Avoid contact with fabric or paper goods. Contact with these materials may cause rapid polymerization which can generate smoke and strong irritating vapors, and cause thermal burns.
Conditions for safe storage:	Store in a cool place in closed original container. 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:

None	
Engineering controls:	Ensure good ventilation/extraction.
Eye protection:	Wear protective glasses.
Skin protection:	Protective clothing that covers arms and legs. 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:	Colorless
	liquid
Odor:	irritating
Odor threshold (CA):	1 - 2 ppm
Specific gravity:	1.06
Boiling point:	> 149 °C (> 300.2 °F)
Flash point:	80 - 93.0 °C (176 - 199.4 °F)
(no method)	
Vapor pressure:	< 60.0000000 Pa
(; 25°C (77°F))	
Density:	1.1 g/cm3
Auto ignition:	485 °C
Decomposition temperature:	

Section 10. Stability and reactivity

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Stable under recommended storage conditions.

Conditions to avoid:

Keep away from sources of ignition and naked flames.

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Incompatible materials:	Rapid exothermic polymerization will occur in the presence of water, amines, alkalis and alcohols.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapors.
-	carbon monoxide
	Carbon dioxide.
	Oxides of nitrogen.

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:	This product is irritating to the skin.
	Bonds skin in seconds.
	Cyanoacry lates 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.

Acute toxicity:

Hazardous components CAS-No.	Value type	Value	Route of application	Exposure time	Species	Method
Ethyl 2-cyanoacrylate	LD50	> 5,000 mg/kg	oral		rat	OECD Guideline 401 (Acute
7085-85-0	LD50	> 2,000 mg/kg			rabbit	Oral Toxicity)
			dermal			OECD Guideline 402 (Acute
						Dermal Toxicity)

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)

Serious eye damage/irritation:

Hazardous components CAS-No.	Result	Exposure time	Species	Method
Ethyl2-cyanoacrylate 7085-85-0	irritating	72 h	rabbit	OECD Guideline 405 (Acute Eye Irritation/Corrosion)

Respiratory or skin sensitization:

Hazardous components	Result	Test type	Species	Method
CAS-No.				
Ethyl 2-cyanoacrylate	not sensitising		guinea pig	not specified
Ethyl 2-cyanoacrylate 7085-85-0	not sensitising		guinea pig	not specified

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)

Section 12. Ecological information

General ecological information:

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

Persistence and degradability:

Hazardous components	Result	Route of	Degradability	Method
CAS-No.		application		
Ethyl 2-cyanoacrylate	not readily biodegradable.	aerobic	57 %	OECD Guideline 301 D (Ready
7085-85-0				Biodegradability: Closed Bottle
				Test)

Bioaccumulative potential / Mobility in soil:

Hazardous components	LogPow	Bioconcentration factor (BCF)	Exposure	Species	Temperature	Method
Ethyl 2-cyanoacrylate 7085-85-0	0.776	fueror (Ber)	time		22 °C	EU Method A.8 (Partition Coefficient)

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

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Air transport IATA:

3334
Aviation regulated liquid, n.o.s. (Cyanoacrylate ester)
9
III
964
964
Primary packs containing less than 500ml are unregulated by this mode of transport and may be shipped unrestricted.

Section 15. Regulatory information

S US MP Poisons S chedule	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 GHS: Globally Harmonized System CAS: Chemical Abstracts Service OECD: Organization for Economic Cooperation and Development LD 50: Lethal Dose 50% IMDG: International Maritime Dangerous Goods code IATA-DGR: International Air Transport Association – Dangerous Goods Regulations	
Reason for issue:	Reviewed SDS. Reissued with new date. involved chapters: 1,2,10,16	
Date of previous issue:	13.04.2015	
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