This safety data sheet has been prepared in accordance with the requirements of EC Directive 88/379/EEC and 91/155/EEC (and other related directives) and provides information relating to the safe handling and use of the product.

1. PRODUCT AND COMPANY INFORMATION

Product Code	0190103c
Trade Name	Super Attak Gel
Manufacturer/Supplier	Loctite UK
Address	Watchmead, Welwyn Garden City, Herts., AL7IJB.
Phone Number	01 707 358800
Fax Number	01 707 358900
Emergency Phone Number	+353-1-4599301/+353-1-87-2629625/+353-1-4046444

2. COMPOSITION / INFORMATION ON INGREDIENTS

Nature Cyanoacrylate adhesive.

Hazardous Components in Product for EC

Component Name	Concentration	R Phrases	Classification
Ethyl cyanoacrylate	60.00 - 90.00	R36/37/38	Xi

3. HAZARD IDENTIFICATION

Irritating to eyes, respiratory system and skin. Bonds skin and eyes in seconds. Highly reactive to water. (See Section 4 on first aid).

4. FIRST AID MEASURES

First Aid - Inhalation

Remove affected person to fresh air, and if still feeling unwell seek medical attention.

First Aid - 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.

First Aid - Eyes

If the eye is bonded closed, release eyelashes with warm water by covering with wet pad. Cyanoacrylate will bond to eye protein causing lachrymatory effect which will help to debond 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.

First Aid - 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).

5. FIRE FIGHTING MEASURES

Non flammable product (flash point is greater than 80°C (CC)). If product is involved in fire extinguish with dry powder, foam or carbon dioxide. Trace amounts of toxic fumes may be released

5. FIRE FIGHTING MEASURES

on incineration and the use of breathing apparatus is recommended.

6. ACCIDENTAL RELEASE MEASURES

Ventilate area. Do not use cloths for mopping up. Polymerise with water and scrape off floor.

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°C to 8°C.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational exposure limits

Ethyl cyanoacrylate	ACGIH: TLV 0ppm 8h TWA. HSA (1999) C.O.P : OEL 2ppm (8mg/m3) 8h TWA. HSA (1999) C.O.P : OEL 4ppm (16mg/m3) 15 min exposure limit.

Polyethylene or polypropylene gloves are recommended when using large volumes. Do not use PVC, rubber, nylon or cotton gloves. Eye protection should be used where there is any risk of splashing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Liquid.
Colour	Clear Colourless.
Odour	Sharp. Characteristic.
pH	Not applicable.
Boiling Range/Point (°C)	Boils above 100.
Flash Point (CC) (°C)	Exceeds 80.
Specific Gravity	1.1 at 20 °C.
Solubility in Water (kg/m³)	Immiscible.
Solubility in Acetone	Not applicable.
Vapour Pressure (mmHg @25°C)	Less than 0.5 at 25 °C.
Explosion Limits (%)	Not applicable.

10. STABILITY AND REACTIVITY

Polymerisation will occur in the presence of moisture.

11. TOXICOLOGICAL INFORMATION

Inhalation

Irritating to respiratory system. In dry atmosphere with < 50% humidity, vapours may irritate the eyes and respiratory system. Prolonged exposure to high concentrations of vapours may lead to chronic effects in sensitive individuals.

Skin

This product is classified as a skin irritant. Bonds skin in seconds. Considered to be of low toxicity: acute dermal LD50 (rabbit)>2000mg/kg. Due to polymerisation at the skin surface

11. TOXICOLOGICAL INFORMATION

allergic reaction is not considered possible.

Eyes

This product is an irritant to the eyes. Liquid product will bond eyelids. In a dry atmosphere (RH<50%) vapours may cause irritation and lachrymatory effect.

Ingestion

Cyanoacrylates are considered to have relatively low toxicity. Acute oral LD50 is >5000mg/kg (rat). It is almost impossible to swallow as it rapidly polymerises in the mouth.

12. ECOLOGICAL INFORMATION

Biodegradable product of low ecotoxicity. Does not contain and is not manufactured with any of the substances listed on the Montreal protocol.

13. DISPOSAL CONSIDERATIONS

Dispose of in accordance with local and national regulations. Polymerise by adding slowly to water (10:1). Dispose of as water insoluble non-toxic solid chemical in authorised landfill or incinerate under controlled conditions.

14. TRANSPORT INFORMATION

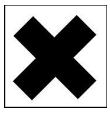
UN Number	None
Air (IATA)	Not classified.
Sea (IMO)	Not classified.
Road (ADR)/Rail (RID)	Not classified.

15. REGULATORY INFORMATION

Contains

Cyanoacrylate.
Danger.
Bonds skin and eyes in seconds.
Keep out of the reach of children.

Labelling Information



Irritant

R phrases

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

S 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.

Voluntary Labelling

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16. OTHER INFORMATION

MSDS first issued	17 September 1996
MSDS data revised	8 November 1999

Prepared by:

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Health & Regulatory Affairs - Europe

Further Information may be obtained from:-

Loctite Corporation,

16. OTHER INFORMATION

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Fax: +353-1-4510806.

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LOCTITE®

Technical Data Sheet
Product 454

Worldwide Version, February 1996

PRODUCT DESCRIPTION

LOCTITE® Product 454 is fast curing, single component gel cyanoacrylate adhesive. It is specifically formulated for difficult to bond substrates. The gel consistency prevents adhesive flow even on vertical surfaces.

TYPICAL APPLICATIONS

Rapid bonding of a wide range of metal, plastic or elastomeric materials, particularly suited for bonding porous or absorbent materials such as wood, paper, leather or fabric.

PROPERTIES OF UNCURED MATERIAL

	Typical Value	Range
Chemical Type	Ethyl cyanoacrylate	
Appearance	Clear, translucent	
Specific Gravity @ 25°C	1.1	
Viscosity @ 25°C, mPa.s (cP)	Gel	
Flash Point (TCC), °C	>80	

TYPICAL CURING PERFORMANCE

Under normal conditions, the surface moisture initiates the hardening 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 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 (14.5 psi) tested according to ASTM D1002.

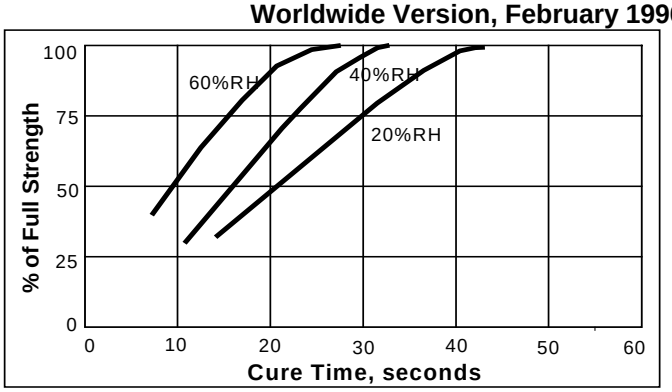
Substrate	Fixture Time, seconds
Steel (degreased)	5 to 20
Aluminium	2 to 10
Zinc dichromate	10 to 20
Neoprene	<5
Nitrile rubber	<5
ABS	2 to 10
PVC	2 to 10
Polycarbonate	10 to 40
Phenolic materials	2 to 10

Cure speed vs. bond gap

The rate of cure will depend on the bondline gap. High cure speed is favoured by thin bond lines. Increasing the bond gap will slow down 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 or low relative humidity applying activator to the surface will improve cure speed. However , this can reduce the ultimate strength of the bond, therefore testing is recommended to confirm effect.

TYPICAL PROPERTIES OF CURED MATERIAL

Physical Properties

Coefficient of thermal expansion, ASTM D696, K^{-1}	80×10^{-6}
Coefficient of thermal conductivity, ASTM C177, $W.m^{-1}K^{-1}$	0.1
Glass transition temperature, ASTM, E228, °C	120

Electrical Properties

		Constant	Loss
Dielectric constant & loss, 25°C, ASTM D150			
measured at	100Hz	2.65	<0.02
	1kHz	2.75	<0.02
	10kHz	2.65	<0.02
Volume resistivity, ASTM D257, Ω.cm			1×10^{16}
Surface resistivity, ASTM D257, Ω			1×10^{16}
Dielectric strength, ASTM D149, kV/mm			25

PERFORMANCE OF CURED MATERIAL

(After 24 hr at 22°C)

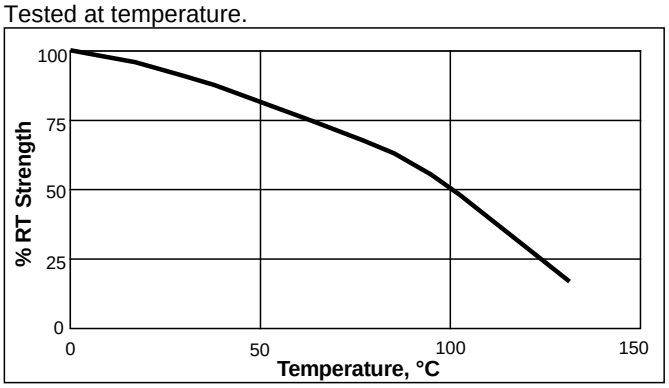
	Typical Value	Range
Shear Strength, ASTM D1002/DIN 53283		
Grit Blasted Steel, N/mm²	22	18 to 26
(psi)	(3200)	(2600 to 3800)
Etched Aluminium, N/mm²	15	11 to 19
(psi)	(2200)	(1600 to 2800)
Zinc dichromate, N/mm²	7	4 to 10
(psi)	(1000)	(600 to 1450)
ABS, N/mm²	13	6 to 20
(psi)	(1900)	(900 to 3000)
PVC, N/mm²	13	6 to 20
(psi)	(1900)	(900 to 3000)
Polycarbonate, N/mm²	12.5	5 to 20
(psi)	(1800)	(700 to 3000)
Phenolic, N/mm²	10	5 to 15
(psi)	(1450)	(700 to 2200)
Neoprene rubber, N/mm²	10	5 to 15
(psi)	(1450)	(700 to 2200)
Nitrile rubber, N/mm²	10	5 to 15
(psi)	(1450)	(700 to 2200)
Tensile Strength, ASTM D2095, DIN 53282		
Grit Blasted Steel, N/mm²	18.5	12 to 25
(psi)	(2700)	(1700 to 3600)
Buna N rubber, N/mm²	10	5 to 15
(psi)	(1450)	(700 to 2200)

TYPICAL ENVIRONMENTAL RESISTANCE

Test Procedure : Shear Strength ASTM D1002/DIN 53283
Substrate: Grit blasted mild steel laps
Cure procedure: 1 week at 22°C

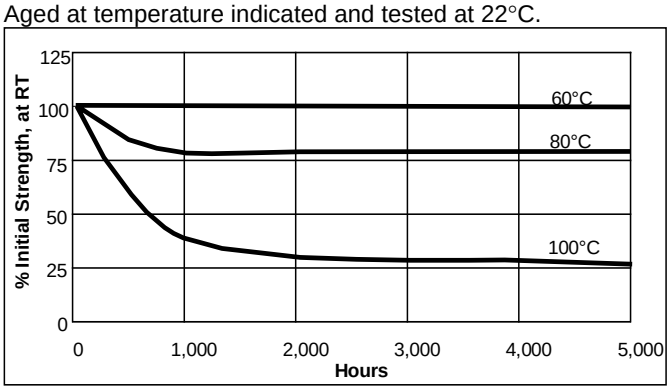
Hot Strength

Tested at temperature.



Heat Ageing

Aged at temperature indicated and tested at 22°C.



Chemical / Solvent Resistance

Aged under conditions indicated and tested at 22°C.

Solvent	Temp.	%Initial strength retained at		
		100 hr	500 hr	1000 hr
Motor Oil	40°C	85	85	75
Leaded Petrol	22°C	100	100	100
Ethanol	22°C	100	100	100
Isopropanol	22°C	100	100	100
Freon T.A.	22°C	100	100	100
Humidity 95% RH	40°C	65	55	50
Humidity 95% RH polycarbonate	40°C	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 oxidising materials.

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

Directions for use

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

Storage

Product shall be ideally stored in a cool, dry location in unopened containers at a temperature between 8°C to 21°C (46°F to 70°F) unless otherwise labelled. Optimal storage conditions for unopened containers of cyanoacrylate products are achieved with refrigeration: 2°C to 8°C (36°F to 46°F). Refrigerated packages shall be allowed to return to room temperature prior to opening and use. To prevent contamination of unused product, do not return any material to its original container. For specific shelf life information contact your local Technical Service Centre.

Data Ranges

The data contained herein may be reported as a typical value and/or range (based on the mean value ±2 standard deviations). Values are based on actual test data and are verified on a periodic basis.

Note

The data contained herein are furnished for information only and are believed to be reliable. We cannot assume responsibility for the results obtained by others over whose methods we have no control. It is the user's responsibility to determine suitability for the user's purpose of any production methods mentioned herein and to adopt such precautions as may be advisable for the protection of property and of persons against any hazards that may be involved in the handling and use thereof. In light of the foregoing, Loctite Corporation specifically disclaims all warranties expressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from sale or use of Loctite Corporation's products. Loctite Corporation specifically disclaims any liability for consequential or incidental damages of any kind, including lost profits. The discussion herein of various processes or compositions is not to be interpreted as representation that they are free from domination of patents owned by others or as a licence under any Loctite Corporation patents that may cover such processes or compositions. We recommend that each prospective user test his proposed application before repetitive use, using this data as a guide. This product may be covered by one or more United States or foreign patents or patent applications.