Chemical Concepts
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Chem-Set CA5
Cyanoacrylate
Technical Datasheet

Features & Benefits

- Ultra-low viscosity
- Suitable for bonding pre-assembled parts
- Ideal for close-fitting plastic components

Approved to MIL-A-46050C Type II Class 1

Description

Chem-Set CA5 is a low viscosity product useful in wicking or penetrating applications or bonding closely fitting parts. It is fast setting and suitable for use on plastics, rubber and metals.

Cyanoacrylate adhesives are single component adhesives that polymerize rapidly when pressed into a thin film between parts. The moisture adsorbed on the surface initiates the curing of the adhesive. Strong bonds are developed extremely fast and on a great variety of materials. These properties make **Chem-Set** cyanoacrylates the ideal adhesives for high speed production lines.

Physical Properties of Uncured Adhesive

Chemical composition	Ethyl cyanoacrylate
Appearance	Colourless
Viscosity @ 25°C	1-3 mPa.s (cP)
Density	1.05

Typical Curing Properties

Maximum gap fill	0.05 mm *0.002 in*
Fixture / handling time*	3-5 seconds (Steel) 2-5 seconds (Buna N Rubber) 5-10 seconds (Phenolic)
Full strength	24 hours

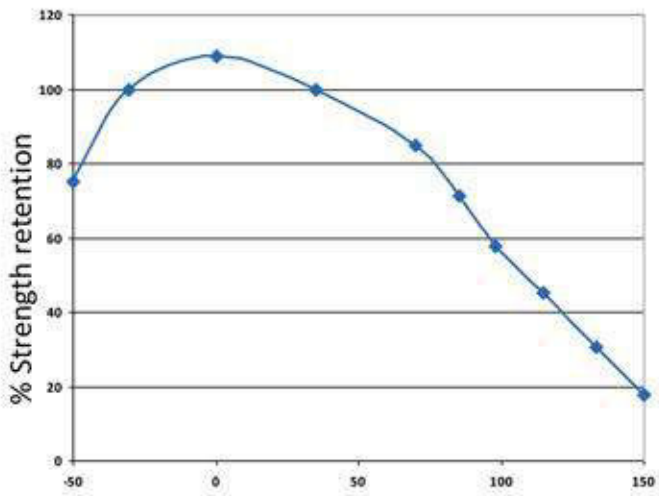
**Handling times can be affected by temperature, humidity and specific surfaces being bonded. Larger gaps or acidic surfaces will also reduce cure speed.*

Typical Performance of Cured Adhesive

Shear strength* ASTM D-1002	Steel	19-23 N/mm² *(2800-3300 psi)*
	Aluminium	7-9 N/mm² *(1000-1300 psi)*
	Zinc	8-10 N/mm² *(1200-1500 psi)*
	ABS	>6 N/mm² *(900psi)* SF
	PVC	>6 N/mm² *(900psi)* SF
	PC	>5 N/mm² *(700 psi)* SF
	Phenolic	12-14N/mm² *(1700-2000 psi)*
Impact Strength (ASTM D-950)	6-14 kJ/m² *(3-7 ft-lb/in²)*	
Shore A hardness	85	
Coefficient of thermal expansion	90 x 10^{-6} mm/mm/°C	
Thermal conductivity	0.1 W/(m.K)	
Glass transition temperature (Tg)	120°C	

**Strength results will vary depending on the level of surface preparation and gap.*
SF = Substrate failure

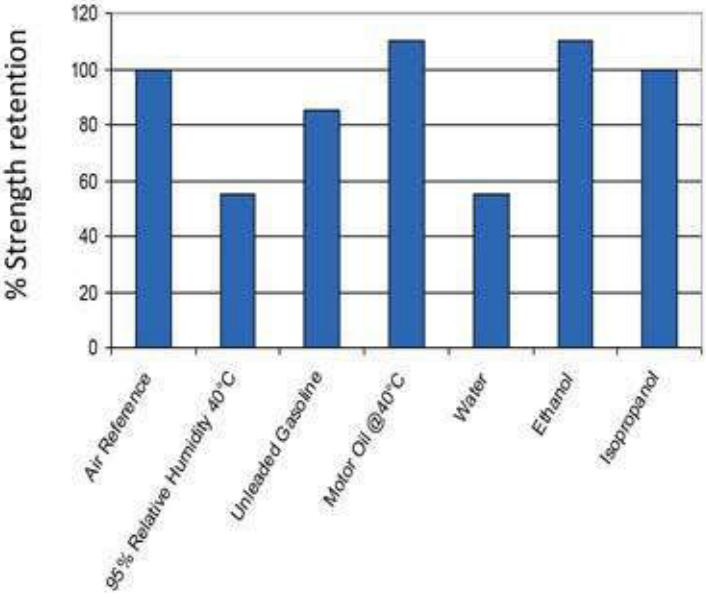
Temperature Resistance



"Hot strength" shear strength tests performed on mild steel. 24hr cure at room temperature and conditioned to pull temperature for 30 minutes before testing.

CA5can withstand higher temperatures for brief periods (such as for paint baking and wave soldering processes) providing the joint is not unduly stressed. The minimum temperature the cured adhesive can be exposed to is -55°C (-65°F) depending on the materials being bonded.

Chemical Resistance



Specimens were immersed for 1000 hours at 22°C (unless otherwise stated)

Surface Preparation

Surfaces should be clean, dry and grease-free before applying the adhesive. Use a suitable solvent (such as acetone or isopropanol) for the degreasing of surfaces. Some metals such as aluminium, copper and its alloys will benefit from light abrasion with emery cloth (or similar), to remove the oxide layer.

Directions for Use

1) Apply the adhesive sparingly to one surface (usually 1 drop is sufficient).
2) Bring the components together quickly and correctly aligned.
3) Apply sufficient pressure to ensure the adhesive spreads into a thin film.
4) Do not disturb or re-align until curing is achieved, normally in a few seconds.
5) Any surplus adhesive can be removed with a suitable solvent.

Additional Information

This product is not recommended for use in contact with strong oxidizing materials and polar solvents although will withstand a solvent wash without any bond strength deterioration. Users are reminded that all materials, whether innocuous or not, should be handled in accordance with the principles of good industrial hygiene. Full information can be obtained from the Material Safety Data Sheet.

Storage & Handling

Storage Temperature	2 to 7°C *(35 to 45°F)*
Shelf Life Stored in original unopened containers	12 months

Allow adhesive to reach room temperature before opening bottle to prevent condensation inside the bottle which can reduce shelf life.

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TECHNICAL DATA SHEET
Chem-Set™ Quick Tac II

Description:

Chem-Set™ Quick Tac II will aid the bonding of porous materials such as fabrics or woods. It is useful when bonding acidic surfaces or in low humidity conditions promoting consistent curing times. Ideal for wire tacking, silk screening, or loudspeaker assembly. Using Chem-Set™ Quick Tac II will enable the adhesive to fill gaps up to 0.20". Chem-Set™ Quick Tac II can be applied by brushing or spraying.

General Properties:

Quick Tac:	2	3	4	5	6
Specific Gravity:	0.79	0.79	0.79	N.D.	0.76
Vapor Density:	N.D.	N.D.	N.D.	43	N.D.
Boiling Point:	133 °F	180-181 °F	>=195 °F	68 °C	347-387 °F
Flash Point:	<0 °F	53 °F	15 °F	NONE	120 °F
Color:	----------CLEAR/AMBER----------				
Viscosity:	3 cps	3 cps	3 cps	3 cps	3 cps
Solvent Base:	Acetone	Isopropanol	Heptane	N-Propyl Bromide	Mineral Spirits
Shelf Life:	-----Twelve months in original sealed container when properly stored.----				

NON-WARRANTY: Information contained herein is based on tests we believe to be reliable and accurate. It is offered in good faith for the benefit of the consumer. Chemical Concepts shall not be liable for any injury, loss, or damage in the use of it's chemical products since the conditions of use are beyond our control. In every case we urge and recommend the user conduct tests to dete rmi ne to their own satisfaction that the product is of acceptable quality and is suitable for their particular purpose under their own operating conditions. Statements concerning the possible use of our products are not intended as recommendations to use our products in the infringement of any patent. Because of changing reporting requirements and other variables it is impossible to guarantee the accuracy of the information contained in this document. It is the responsibility of the user to determine proper personal protection based on the actual condition of use and to comply with all Federal, State, and Local laws and regulations.

Chem-Set CA2400

Cyanoacrylate

Ref. #: 041509PB268

FEATURES & BENEFITS

- Instant Setting
- Improved Gap Filling
- Faster Strength Development
- Improved Bonding to Difficult Surfaces
- High Shear Strength
- Easy to Apply
- One Part System

TYPICAL APPLICATION

Rubber bonding
Bonding of passivated metals

GENERAL DESCRIPTION

Chem-Set CA2400 is a high viscosity cyanoacrylate for large gap fill applications.

Chem-Set CA2400 provides faster set times and improved gap-filling capability compared to conventional cyanoacrylates. The adhesive bonds to a wide range of substrates including metals, ceramics, plastics and elastomers. It is excellent for bonding difficult-to-bond plastics such as polyacetals.

PHYSICAL PROPERTIES OF THE UNCURED ADHESIVE

Chemical Type	Ethyl
Color	Colorless
Viscosity, cP @ 25°C	1800
Specific Gravity	1.05
Flash point, °C (°F)	83 (181)
Shelf Life stored at 2°C – 7°C (35°F – 45°F), months	12
Maximum gap fill; in (mm)	.017 (0.43)

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CURE RATE

The cure rates of cyanoacrylates are dependent on the substrate used, gap, and relative humidity. The table below shows the set time of various substrates. Cyanoacrylate adhesives have limited gap-filling capability. The speed of cure and the ultimate strength might decrease as the gap increases. The cure speed of cyanoacrylates will depend on the ambient relative humidity; the cure rate generally increases with increasing humidity. The cure rate of cyanoacrylates can be increased by applying activator **QFS16.** However, the application of the activator might decrease the ultimate strength of the bond.

CURE RATE at 25°C

Set time, seconds	
Steel	10
Buna N Rubber	10
Phenolic	10
Full cure, hours	24

PHYSICAL PROPERTIES OF THE CURED ADHESIVE

Hardness (Shore A)	85
Dielectric Strength (volts/mil), approx.	250
Operating Temperature, °C, (°F)	-54 (-61°) to 82 (180°)
Soluble In	Nitroethane, Methyl, Ethyl, Ketone, Acetone

TYPICAL PERFORMANCE OF THE CURED ADHESIVE

Cured at 25°C for 24 hours

Shear Strength, psi (N/mm^2)	
Grit blasted steel	3000 (21)
Impact Strength (ASTM D-950), $ft\text{-}lb/in^2$	3-7

CHEMICAL RESISTANCE

Cured Chem-Set adhesives have good resistance to many common solvents. However, the cured resistance is reduced as the polarity of the solvent increases. Non-polar solvents such as gasoline, motor oil, and dioctyl phthalate **(DOP)** have only a minimal effect but polar solvents cause severe bond deterioration. Alcohols will only deteriorate bonds over several months, but acetone is a good solvent for cyanoacrylate. Boiling water will destroy the bonds in less than 24 hours and this process is accelerated when the solution is alkaline. Amines tend to dissolve the bond rapidly. Most solvent washes will not affect the adhesive bonds due to the short exposure time.

THERMAL RESISTANCE

The cured cyanoacrylate is a thermoplastic material that soften at approximately 177°C (350°F), but it can safely be used at temperatures between –54°C (-65°F) and 82°C (180°F). Beyond this temperature, strength loss is relatively rapid. While the product may perform in certain situations, a general recommendation is not made for use above 82°C (180°F). All grades can resist short exposures up to 150°C (300°F).

SURFACE PREPARATION

The surface should be free of gross contamination such as dirt, dust, grease or oil. An alcohol wipe is suitable for cleaning most surfaces. Acetone is recommended for epoxies, polyesters, phenolics, melamine, urea formaldehyde, nylon and polyurethane. Optimum strength is obtained by abrading the surface followed by a solvent wipe to remove any loose particles.

APPLICATION

1. For best results the surface should be properly cleaned.
2. Apply the adhesive sparingly to one surface.
3. Assemble the parts making sure that they are correctly aligned.
4. Apply sufficient pressure to ensure that the adhesive spreads into a thin film.
5. Do not move parts until fixture strength is achieved.
6. When bonding polyethylene, polypropylene, PTFE or silicone, we recommend priming the surfaces with Permabond Polyolefin Primer before using the adhesive.

STORAGE & HANDLING

Cyanoacrylate adhesives are subject to an aging process and have a limited shelf life. When stored in the original unopened container in a refrigerator between 2°C and 7°C (35°F and 45°F), the shelf life is 12 months from the date of shipment from Chemical Concepts. It could be less when stored at ambient environment depending on conditions of temperature and humidity.

A note of caution: Before opening, the containers must be warmed to room temperature; otherwise water might condense into the bottle and cause hardening of the adhesive.

Avoid skin contact. Wear polyethylene gloves and safety glasses. Do not use rubber or cloth gloves. Cyanoacrylates can form strong bonds rapidly to skin. To break the bond, peel and flex the skin carefully. Immersion in soapy water aids in breaking the cyanoacrylate bond. Acetone or nail polish remover may also be used. **If cyanoacrylate should come in contact with the eyes, seek medical attention.**

Cyanoacrylate vapors are lachrymatory and can irritate eyes and mucous membranes. Use these materials with proper ventilation.

VAPOR CONTROL RECOMMENDATIONS

1. Use adequate ventilation. Remove adhesive vapors with suitable exhaust ducting. Since cyanoacrylate vapors are heavier than air, place exhaust intake below work area. Activated charcoal filters using an acidic charcoal have been found effective in removing vapors from effluent air.

2. Avoid use of excess adhesive. Excess adhesive outside of the bond area will increase the level of vapors. Automatic dispensing equipment will prevent excess adhesive.

3. Assemble parts as quickly as possible. Long open times will increase level of vapors.

CLEAN UP OF SPILLED LIQUID

When large quantities of cyanoacrylate adhesives are accidentally spilled, the area should be flooded with water that will cause the liquid cyanoacrylate to cure. The cured material can then be scraped from the surface. **NOTE:** The liquid adhesive should not be wiped up with rags or tissue. The fabric will cause polymerization and large quantities of adhesive will generate heat on cure, causing smoke and strong irritating vapors. **ALWAYS FLOOD WITH EXCESS WATER TO CLEAN UP SPILL CONDITIONS.**

For additional information consult the Material Safety Data Sheet (MSDS).

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