LOCTITE®
BONDERITE®
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Product Selector

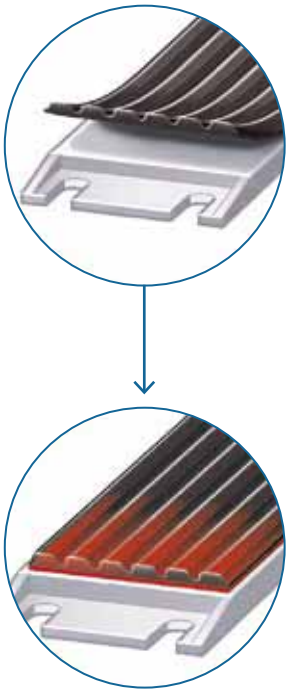
Industrial Adhesive, Sealant and
Functional Coating Solutions

Henkel

Issue 3

Instant Adhesives

From Small Size Parts to Structural Applications



Why Use a LOCTITE Instant Adhesive?

Instant adhesives, or cyanoacrylates, cure very quickly when confined between surfaces. Surface humidity on the substrates triggers the cure reaction, which moves from the substrate surfaces towards the middle of the adhesive joint. Cyanoacrylates are typically chosen for bonding small to medium-size parts to achieve extremely fast curing. Due to their limited gap-filling capacity they require close-fitting surfaces. Their adhesion to most substrates is excellent and the bonding strength in shear and tensile mode is very good. They should not be used on float glass or glazed ceramics, but can be used on GRP. Bonds continuously exposed to water need proper adhesive selection and ageing evaluation.

Advantages of LOCTITE Instant Adhesives

- Clean and easy to apply
- Very fast positioning and fixturing of parts
- Join a wide variety of dissimilar materials
- Excellent adhesion on a wide range of substrates, especially plastics and rubbers. Special formulations are available for bonding metals or porous substrates. Primer LOCTITE SF 770 is offered to improve adhesion on difficult-to-bond materials such as PP, PE, POM, PTFE or silicone
- High strength on very small bond faces
- Free of solvents
- Do not require complex part geometries, e.g. for snap-fits

Choosing the right LOCTITE Instant Adhesive

LOCTITE instant adhesives come in a variety of types optimised for specific application requirements, e.g. the parts to be bonded, the loads to be resisted, the joint geometry, the process parameters etc.

The following explanations should help you identify which technology is best suited for any particular application.

Bonding Porous or Acidic Substrates

These formulations are specially tailored for porous and acidic substrates, e.g. paper or galvanised metals, to achieve fast cure and fixturing.

Shock and Impact Resistant

Elastomer-modified instant adhesives achieve very good shock and impact resistance. In addition, they offer improved thermal performance and resistance on metal bonds in humid environments.

Flexible Instant Adhesives

Where bonded components are subjected to bending loads, flexible instant adhesives will reduce localised stress concentrations or encourage a more homogeneous deformation.

NEW - LOCTITE 4090 - A New Generation of Hybrid Instant Adhesives for Structural Bonding

The new hybrid technology of LOCTITE 4090 opens completely new application areas for cyanoacrylates in structural bonding – for the very first time combining instant adhesive properties with more striking benefits. For optimal processing of structural parts, the fast fixture time and excellent adhesion on various substrates have been enriched by:

- High moisture resistance
- Impact resistance
- Temperature resistance up to 150°C
- Gap filling up to 5mm
- UV resistance, allowing outdoor applications

Surface Preparation

Correct surface preparation is a key factor in assuring the total success of any adhesive performance.

- The surfaces to be bonded should be clean, dry and free of grease. If necessary, clean the parts with LOCTITE SF 7063 or LOCTITE SF 7070 and allow to dry (see Cleaning on page 110)
- For faster fixture time, apply LOCTITE activator to one of the mating surfaces (see Surface Preparation on page 128)
- To improve adhesion to difficult-to-bond materials (PP, PE, PTFE etc.), coat these bond faces completely with primer LOCTITE SF 770 (see Surface Preparation on page 132)

Low Bloom, Low Odour, Health and Safety

Specially formulated low-bloom low odour instant adhesives are recommended for cosmetically sensitive applications. Additionally, these products do not carry any hazard symbol or Health & Safety related risk phrases.

Gap Filling

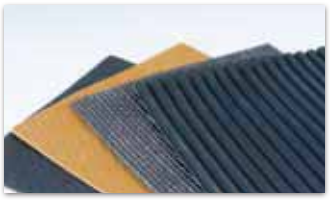
Innovative, 2K technology provides fast cure independent of gap. This applies especially for assemblies which are not a perfect fit, or where excess adhesive may be present.

Structural

Innovative, hybrid technology allows the combination of classic cyanoacrylate benefits with high temperature and moisture resistance, impact resistance and gap filling, allowing optimal processing of structural parts, even in outdoor environments.

Light Curing

Light curing formulations are recommended for bonding clear and transparent substrates with a good aesthetic finish, or for curing of excess fillets (see Light Cure Adhesives on page 38).



For information on dispensing equipment, see pages 152 – 163.

Instant Adhesives
Product Table

What type of materials are you bonding?

	"Difficult-to-bond" rubbers or plastics, e.g. PE, PP, PTFE, silicones?			
	Defined small gaps < 0.15mm	Universal	Impact resistant	
Solution	**LOCTITE 406** (with primer SF 770)	**LOCTITE 401**	**LOCTITE 435**	**LOCTITE 480**
				
Fixture time	2 – 10 sec.	3 – 10 sec.	10 – 20 sec.	20 – 50 sec.
Viscosity	20 mPa·s	100 mPa·s	200 mPa·s	150 mPa·s
Colour	Colourless	Colourless	Colourless	Black
Service temperature range	-40°C to +120°C	-40°C to +120°C	-40°C to +100°C	-40°C to +100°C
Pack sizes	20g, 50g, 500g, 2kg	3g, 20g, 50g, 500g	20g, 500g	20g, 500g

Handy Hints

- In combination with LOCTITE instant adhesives: a) to improve adhesion of difficult-to-bond materials, use primer LOCTITE SF 770 b) to increase cure speed, use activator LOCTITE SF 7458, SF 7452 or SF 7457 (see Surface Preparation on page 132)
- For difficult-to-bond plastics (PE and PP) see also LOCTITE AA 3038 on page 61

LOCTITE 406
- Rapid bonding of plastics, rubbers, including EPDM, and elastomers
- LOCTITE SF 770 Polyolefin primer improves bonding on difficult-to-bond substrates

LOCTITE 401
- General purpose
- For acidic surfaces such as chromated or galvanised surfaces
- For porous substrates such as wood, paper, leather, cork and fabric

P1 NSF Reg. No.: 123011

LOCTITE 435
- High resistance to impact and shock loads, high peel strength
- Bonding of plastics, rubbers, metals, porous and absorbent substrates and acidic surfaces
- Good resistance in humid environments

LOCTITE 480
- For applications where shock resistance is required or shock or peel loads are present
- Ideal for bonding metal to metal, rubber or magnets
- Good resistance in humid environments

All other materials (except glass)

Defined small gaps < 0.15mm

Gaps up to 5mm

Bendable joints	Gel / Non-drip	Low bloom, low odour	Gap filling	Structural applications / Impact resistant
LOCTITE 4850	**LOCTITE 454**	**LOCTITE 460**	**LOCTITE 3090**	**LOCTITE 4090**
				
3 – 10 sec.	5 – 10 sec.	5 – 20 sec.	90 – 120 sec.	90 – 150 sec.
400 mPa·s	Gel	40 mPa·s	Gel	High-viscosity/Non-drip
Colourless	Colourless	Colourless	Colourless	Off-white to light yellow
-40°C to +80°C	-40°C to +120°C	-40°C to +80°C	-40°C to +80°C	-40°C to +150°C
20g, 500g	10g, 20g, 300g	20g, 50g, 500g	10g	50g

LOCTITE 4850
- For bonding materials subjected to bending or distortion, as well as flexible components
- For porous and absorbent substrates and acidic surfaces

LOCTITE 454
- General-purpose gel
- Ideal use on vertical or overhead surfaces
- Bonding paper, wood, cork, foam, leather, card, metals and plastics

P1 NSF Reg. No.: 123009

LOCTITE 460
- For applications where cosmetic appearance and low bloom are required
- For low odour during use
- For porous substrates such as wood, paper, leather, cork and fabric

LOCTITE 3090
- For applications with gaps up to 5mm
- For applications where cosmetic appearance and low bloom are required
- For porous substrates such as wood, paper, leather, cork and fabric

LOCTITE 4090
- For structural applications where speed, gap filling and high temperature resistance are required
- For outdoor applications and environments where excellent humidity resistance is required
- For bonding materials subjected to impact, vibrations and shock loads

Instant Adhesives

Product List

Product	Chemical basis	Viscosity	Colour	Fixture time	Substrates			
					Plastics / Polyolefins	Rubbers	Metals	
LOCTITE 382	Ethyl	5,000 mPa·s	Colourless transparent	20 – 40 sec.	● / ●*	●	●	
LOCTITE 401	Ethyl	100 mPa·s	Colourless transparent	3 – 10 sec.	● / ●*	●	●	
LOCTITE 403	Alkoxy ethyl	1,200 mPa·s	Colourless transparent	5 – 20 sec.	● / ●*	●	●	
LOCTITE 406	Ethyl	20 mPa·s	Colourless transparent	2 – 10 sec.	●● / ●●*	●●	●	
LOCTITE 407	Ethyl	30 mPa·s	Colourless transparent	5 – 20 sec.	● / ●*	●	●●	
LOCTITE 408	Alkoxy ethyl	5 mPa·s	Colourless transparent	5 – 10 sec.	● / ●*	●	●	
LOCTITE 409	Ethyl	Gel	Colourless transparent	20 – 60 sec.	● / ●*	●	●	
LOCTITE 410	Ethyl	3,000 mPa·s	Black	30 – 60 sec.	● / ●*	●	●	
LOCTITE 414	Ethyl	90 mPa·s	Colourless transparent	2 – 10 sec.	● / ●*	●	●	
LOCTITE 415	Methyl	1,200 mPa·s	Colourless transparent	20 – 40 sec.	● / ●*	●	●●	
LOCTITE 416	Ethyl	1,200 mPa·s	Colourless transparent	20 – 40 sec.	● / ●*	●	●	
LOCTITE 420	Ethyl	2 mPa·s	Colourless transparent	5 – 20 sec.	●● / ●*	●	●	
LOCTITE 422	Ethyl	2,300 mPa·s	Colourless transparent	20 – 40 sec.	● / ●*	●	●	
LOCTITE 424	Ethyl	100 mPa·s	Colourless transparent	2 – 10 sec.	●● / ●●*	●●	●	
LOCTITE 431	Ethyl	1,000 mPa·s	Colourless transparent	5 – 10 sec.	● / ●*	●	●	
LOCTITE 435	Ethyl	200 mPa·s	Colourless transparent	10 – 20 sec.	●● / ●*	●●	●●	
LOCTITE 438	Ethyl	200 mPa·s	Black	10 – 20 sec.	● / ●*	●	●●	
LOCTITE 454	Ethyl	Gel	Colourless transparent	5 – 10 sec.	● / ●*	●	●	
LOCTITE 460	Alkoxy ethyl	40 mPa·s	Colourless transparent	5 – 20 sec.	● / ●*	●	●	
LOCTITE 480	Ethyl	200 mPa·s	Black	20 – 50 sec.	● / ●*	●●	●●	
LOCTITE 493	Methyl	3 mPa·s	Colourless transparent	10 – 30 sec.	● / ●*	●	●●	
LOCTITE 495	Ethyl	30 mPa·s	Colourless transparent	5 – 20 sec.	● / ●*	●	●	
LOCTITE 496	Methyl	125 mPa·s	Colourless transparent	10 – 30 sec.	● / ●*	●	●●	
LOCTITE 3090	Ethyl	Gel	Colourless transparent	90 – 150 sec.	● / ●*	●●	●	
LOCTITE 4090	Cyanoacrylate -epoxy hybrid	High	Off-white to light yellow	180 sec.	●● / –	●	●●	

●● Well suited for ● Suited for * In combination with primer LOCTITE SF 770

	Porous and / or acidic surfaces	Service temperature range	Properties: Low odour / cosmetic appearance	Properties: Flexible / impact resistance	Pack sizes	Comments
		-40°C to +80°C		– / ●	20g, 500g	General purpose, gel
	● ●	-40°C to +120°C			3g, 20g, 50g, 500g	Universal, low viscosity
	● ●	-40°C to +80°C	● ● / ● ●		50g, 500g	Low bloom, low odour, medium viscosity, Health and Safety labelling free
		-40°C to +120°C			20g, 50g, 500g, 2kg	Plastics and rubber, low viscosity
		-40°C to +100°C			50g	High temperature, low viscosity
	● ●	-40°C to +80°C	● ● / ● ●		20g, 500g	Low bloom, low odour, capillary, Health and Safety labelling free
		-40°C to +80°C			20g	General purpose, gel
		-40°C to +80°C		● / ● ●	20g	Toughened, black, high viscosity
		-40°C to +80°C			20g	General purpose, high viscosity
		-40°C to +80°C			20g, 50g, 500g	Metals, high viscosity
		-40°C to +80°C			20g, 50g, 500g	General purpose, high viscosity
		-40°C to +80°C			20g, 50g, 2kg	General purpose, capillary
		-40°C to +80°C			20g, 50g	General purpose, high viscosity
		-40°C to +80°C			20g, 500g	Plastics and rubber, low viscosity
	● ●	-40°C to +80°C			20g, 500g	Universal, medium viscosity
	● ●	-40°C to +100°C		● / ● ●	20g, 500g	Toughened, clear
	● ●	-40°C to +100°C		● / ● ●	20g	Toughened, black, fast
	● ●	-40°C to +120°C			10g, 20g, 300g	Universal, gel
	● ●	-40°C to +80°C	● ● / ● ●		20g, 50g, 500g	Low bloom, low odour, low viscosity, Health and Safety labelling free
		-40°C to +100°C		● / ● ●	20g, 500g	Toughened, black, slow
		-40°C to +80°C			50g	Metals, capillary
		-40°C to +120°C			20g, 50g, 100g, 500g	General purpose, low viscosity
		-40°C to +80°C			20g, 50g, 500g	Metals, low viscosity
	● ●	-40°C to +80°C	● / ● ●		10g	Gap filling, 2K, low bloom
	–	-40°C to +150°C	● ● / ●	– / ● ●	50g	Structural applications, high temperature and moisture resistance, gap filling

Instant Adhesives

Product List

Product	Chemical basis	Viscosity	Colour	Fixture time	Substrates			
					Plastics / Polyolefins	Rubbers	Metals	
LOCTITE 4011[Med]	Ethyl	100 mPa·s	Colourless transparent	3 – 10 sec.	•• / •*	••	••	
LOCTITE 4014[Med]	Ethyl	2 mPa·s	Colourless transparent	10 – 30 sec.	•• / •• •*	••	••	
LOCTITE 4031[Med]	Alkoxy ethyl	1,200 mPa·s	Colourless transparent	20 – 60 sec.	•• / •*	••	••	
LOCTITE 4061[Med]	Ethyl	20 mPa·s	Colourless transparent	2 – 10 sec.	•• •• / •• •*	•• ••	••	
LOCTITE 4062	Ethyl	2 mPa·s	Colourless transparent	2 – 5 sec.	•• •• / •• •*	•• ••	••	
LOCTITE 4204	Ethyl	4,000 mPa·s	Colourless transparent	10 – 30 sec.	•• / •*	••	•• ••	
LOCTITE 4601[Med]	Alkoxy ethyl	40 mPa·s	Colourless transparent	20 – 60 sec.	•• / •*	••	••	
LOCTITE 4850	Ethyl	400 mPa·s	Colourless transparent	3 – 10 sec.	•• •• / •*	•• ••	••	
LOCTITE 4860	Ethyl	4,000 mPa·s	Colourless transparent	3 – 10 sec.	•• / •*	••	••	

•• Well suited for • Suited for * In combination with primer LOCTITE SF 770

Dispensing Equipment

LOCTITE instant adhesives are used for a wide variety of bonding applications. For some jobs it is sufficient to dispense the product manually from bottles designed specifically for easy and accurate dispensing.

In other cases, however, more precise hand-held or stationary automated dispensing is required. LOCTITE dispensing equipment is designed to make application and use of our products fast, precise, clean and economical:

Manual Hand-Held Applicator LOCTITE 96001
This standard LOCTITE hand gun enables manual application of LOCTITE 4090, as well as other products provided in a 50ml syringe, with the mixing ratio of 1:1 or 2:1.

96001

Volumetric Hand Pump LOCTITE 98810
This hand pump provides repeatable dispensing of cyanoacrylate adhesives. LOCTITE 20 gram bottles can be directly inserted. The sealed bottle design greatly increases the product life of the adhesive in the bottle and reduces waste. This volumetric hand pump has six pre-set shot size settings that can be changed by a simple stroke adjustment mechanism in the range of 0.009 – 0.02 grams.

98810

	Porous and / or acidic surfaces	Service temperature range	Properties: Low odour / cosmetic appearance	Properties: Flexible / impact resistance	Pack sizes	Comments
	● ●	-40°C to +80°C			20g, 454g	Universal, low viscosity
		-40°C to +80°C			20g, 454g	Plastics and rubber, capillary
		-40°C to +80°C	● ● / ● ●		454g	Low bloom, low odour, medium viscosity
		-40°C to +80°C			20g, 454g	Plastics and rubber, low viscosity
		-40°C to +80°C			20g, 50g, 500g	Plastics and rubber, capillary
		-40°C to +120°C		● / ● ●	20g	High temperature, good impact resistance
		-40°C to +80°C	● ● / ● ●		454g	Low bloom, low odour, low viscosity
	● ●	-40°C to +80°C		● ● / –	20g, 500g	Flexible, bendable, low viscosity
	● ●	-40°C to +80°C		● ● / –	20g, 500g	Flexible, bendable, high viscosity

Med = Certified according to ISO 10993 for medical device manufacturing

Peristaltic Dispenser LOCTITE 98548
The peristaltic motion of the rotor assists volumetric dispensing of the adhesive directly from the bottle. The unit is designed mainly for manual workstations but can also be integrated into automatic production lines. A precise amount of product can be set and high repetition accuracy is ensured.

98548

Semi-Automatic Dispensing System LOCTITE 97152 / 97108 / 98013
This system is suitable for dispensing dots or beads of low to medium-viscosity LOCTITE instant adhesives. It is designed for integration into automated assembly lines. The diaphragm valve allows high-resolution stroke adjustment and promotes no-drip dispensing. The controller actuates the valve, reservoir and operation via footswitch, keyboard or higher-level PLC.

97152 / 97108 / 98013

For information on semi- or fully automatic dispensing equipment, available valves, spare parts, accessories and dispensing tips, please refer to pages 152 – 163 or the LOCTITE Equipment Sourcebook.