

LOCTITE®

THREADLOCKING SOLUTIONS GUIDE

What you need to know to ensure reliable threaded assemblies



Henkel

Henkel Adhesive Technologies

RELIABILITY
BEGINS HERE

A LEGACY OF PERFORMANCE

LOCTITE threadlockers have been synonymous with reliability since 1953. Today they continue to be an indispensable solution for millions of customers across every industry, constantly innovating and adapting to new challenges and applications.



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REDEFINING *RELIABILITY*

The demand for reliable operations is universal. Whether you are manufacturing products, maintaining machines and equipment, or repairing vehicles, a single loose bolt can lead to breakdowns, safety risks, increased warranty claims, and/or loss of brand reputation.

LOCTITE threadlockers are relied on throughout Original Equipment Manufacturing, Industrial Maintenance, Repair & Overhaul, and automotive aftermarket repair.

They ensure consistent performance and reduce failures by locking fasteners in place against vibration, stress and thermal expansion, extending equipment life, minimising unplanned downtime, and increasing safety, sustainability and operator confidence.

Wherever there's a bolt under stress, proven reliability is needed – and it all starts with LOCTITE threadlockers. No matter the challenge, no matter the industry: RELIABILITY BEGINS HERE.



PIONEERING *BETTER SOLUTIONS*

THE WAY IT WAS

Mechanical locking devices
Mechanical locking devices (e.g., split-ring washers, nylon nuts) were invented to solve the common problem of loosening that occurs in most threaded assemblies. Although they were made for this purpose, they have several shortcomings:

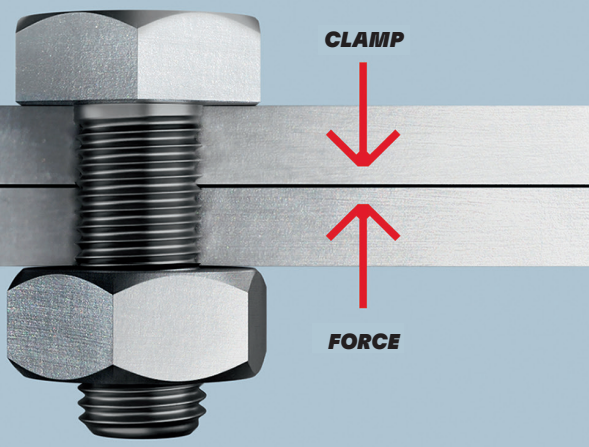
- They loosen under vibration, thermal expansion and improper torque
- They're prone to corrosion
- They require an extensive inventory of several shapes and sizes

THE WAY FORWARD

LOCTITE threadlockers
LOCTITE threadlockers are designed to lock and seal threaded fasteners with liquid anaerobic adhesives. Suited and trusted for a wide range of applications, from delicate electronic components to heavy industrial equipment, LOCTITE threadlockers have dramatically increased the reliability of threaded assemblies:

- They lock nuts and bolts against vibration and thermal expansion
- They seal against corrosion and leakage
- They're suitable for all shapes and sizes of fasteners, thus reducing inventory costs

THREADED FASTENERS



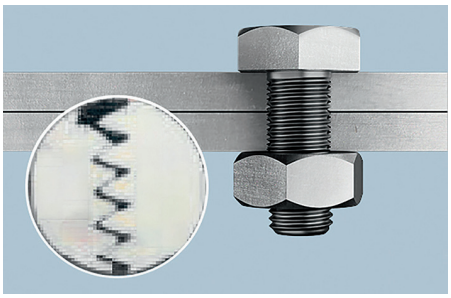
FUNCTIONS OF A THREADED ASSEMBLY

1. CREATE CLAMP FORCE
2. MAINTAIN CLAMP FORCE
3. ALLOW DISASSEMBLY

WHY DO THREADED ASSEMBLIES FAIL?

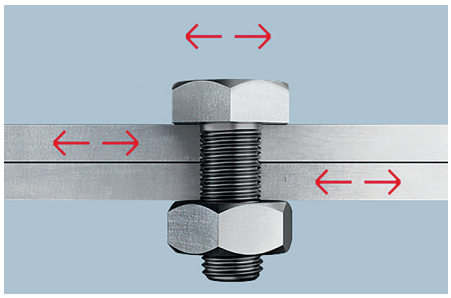
CLAMP FORCE IS NOT MAINTAINED

A. Gaps



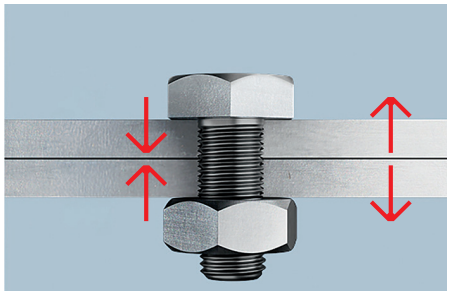
In order to make the assembly possible, nuts and bolts must have some tolerance, which creates gaps between the threads.

B. Vibration & side-to-side movement



The same gaps that allow for assembly also create space for fasteners to loosen when exposed to vibration and side-to-side movement.

C. Expansion/contraction & loosening

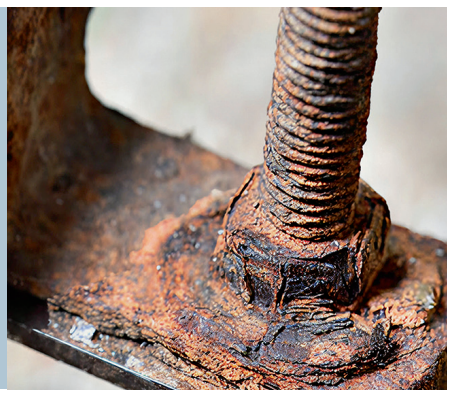


As parts heat up and cool down they expand and contract, and the gaps in the threads cause the threaded assembly to self-loosen.

DISASSEMBLY IS NOT ALWAYS POSSIBLE

Corroded assemblies can be difficult to take apart, which can lead to broken bolts. This failure is caused by a nut and bolt seizing together, which can be caused by:

- Corrosion (humidity, high temperatures, assembly of different metals/ galvanic corrosion)
- Galling (friction welding)



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LOCKING METHODS

SHORTCOMINGS OF LOCKING DEVICES

SPLIT RING OR SPRING WASHERS

Don't ensure reliable threadlocking under dynamic loads, and increased friction reduces clamp load.



NUT WITH NYLON INSERT

More expensive than a standard nut, and provides minimal vibration resistance and increased friction, resulting in inaccurate torque.



TAB WASHERS, SPLIT PINS, CASTLE NUTS

Expensive and time-consuming, and it is often challenging to line up their components appropriately (i.e., tabs, cotter pins).



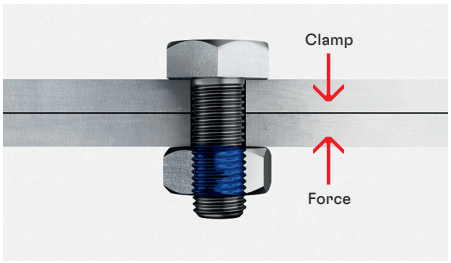
TOOTH OR RIBBED FLANGED BOLTS

Prevent self-loosening, but expensive and may damage surfaces.



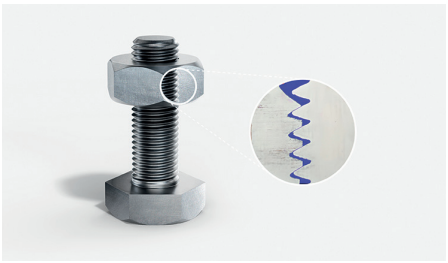
WHY USE LOCTITE THREADLOCKERS?

MOST RELIABLE VS. BEST



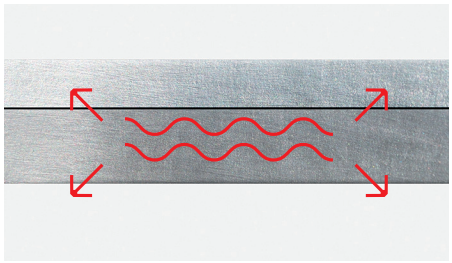
Best clamp load retention compared to all mechanical locking devices.

VIBRATION RESISTANCE



Fills 100% of the gap between threads of nut and bolt, which eliminates the root cause of vibrational loosening (see test chart below).

ENDURES THERMAL EXPANSION



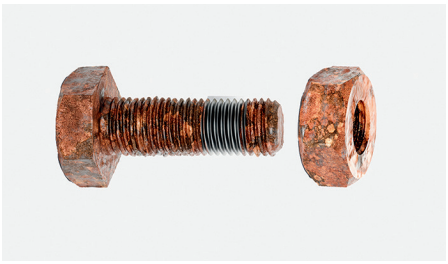
Prevents movement that can lead to loosening when materials expand and contract with temperature changes.

ALLOWS DISASSEMBLY



Low and medium grades allow disassembly with standard hand tools.

CORROSION PREVENTION



By sealing the threads, threadlockers prevent the ingress of moisture, chemicals, and other corrosive agents.

ONE SIZE FITS ALL

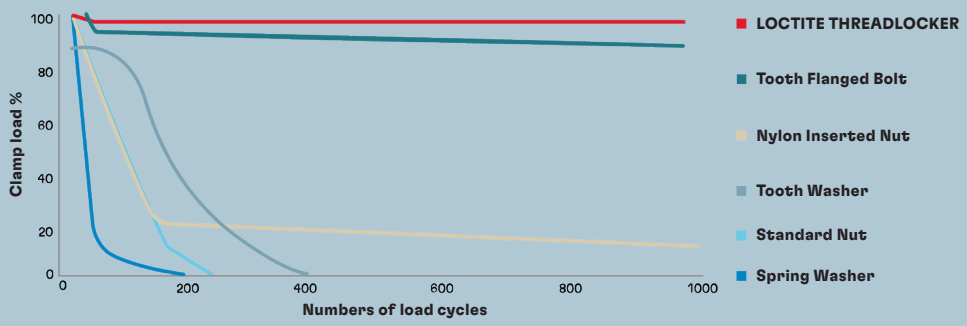


One size fits all – applicable for a wide range of fastener sizes.

LOCTITE KEEPS ASSEMBLIES SECURE WHEN VIBRATION PUTS EVERYTHING TO THE TEST

A vibration loosening test such as the Junker Machine test is a crucial part of evaluating performance in real-world applications where threaded assemblies are exposed to vibration.

The test assesses fasteners' resistance to vibration loosening, and simulates the conditions that can cause fasteners to loosen, such as those found in engines, machinery, or other vibrating equipment.

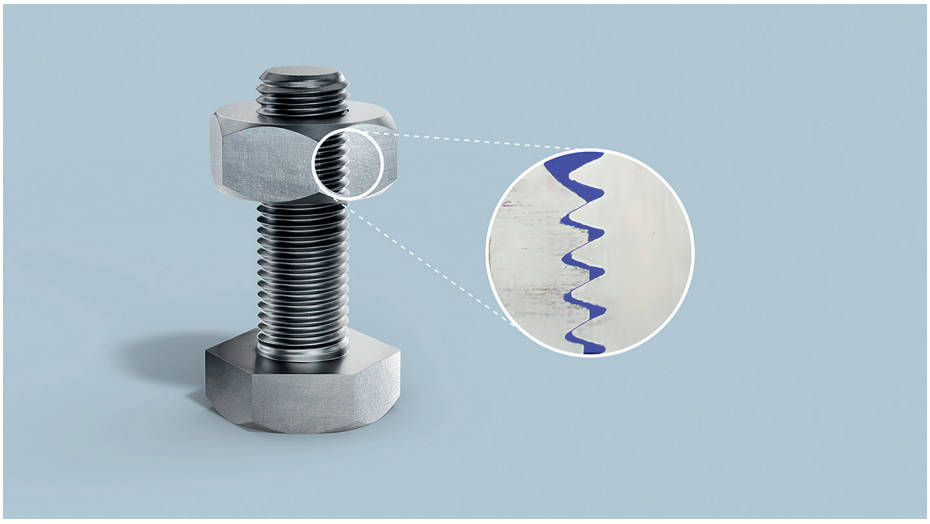


LOCTITE®

THREADLOCKING SOLUTIONS



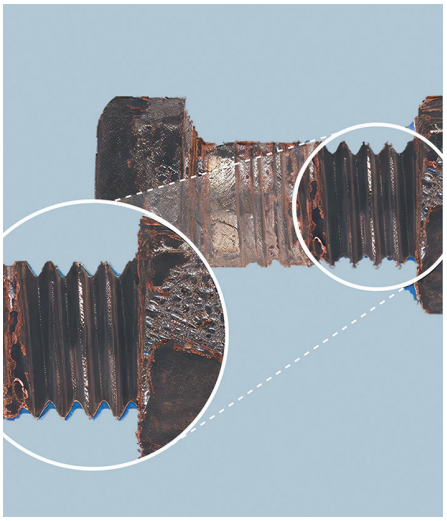
HOW DO LOCTITE THREADLOCKERS WORK?



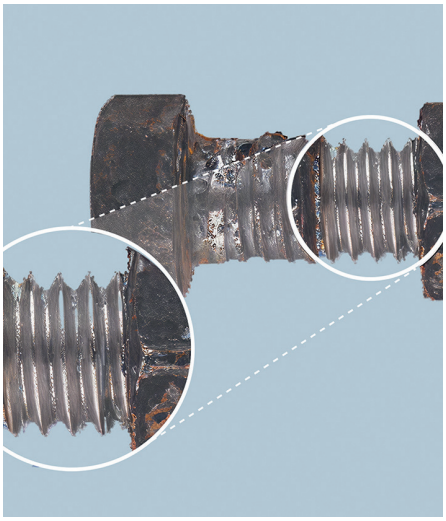
LOCTITE threadlocker between the interfacing threads.

FILL GAPS

LOCTITE threadlockers are 1-part adhesives that cure in the absence of air and in contact with active metal to form a tough thermoset plastic. They completely fill all voids between the interfacing threads, which makes the assembly a unitised component and ultimately prevents loosening.



Engagement area of rusty bolt that did NOT have LOCTITE threadlocker applied.



Engagement area of rusty bolt that DID have LOCTITE threadlocker applied.

SEAL THREADS

Another property of LOCTITE threadlockers is thread sealing. This is especially important when assembling through-bolts in an oil reservoir or cooling jacket in order to keep the fluids in and corrosion out.



HOW DO I USE A LOCTITE THREADLOCKER?

APPLICATION OPTIONS



Through-holes



Blind holes



Post-assembly

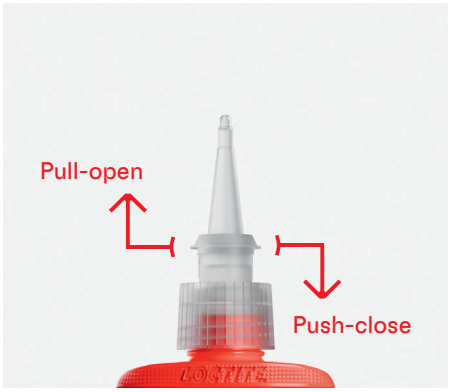


Overhead

Note: To achieve optimum performance, all parts must be clean and free of contaminants (e.g., oil, grease)

DISPENSING OPTIONS

For maximum convenience and productivity, LOCTITE threadlockers can be dispensed using LOCTITE dispensing systems.



50 ml and 250 ml push-pull nozzle for manual applications



50 ml and 250 ml hand pumps for manual applications



Integrated dispensers and valves for semi-automated applications



SURFACE PREPARATION

CLEANING

Before applying LOCTITE threadlocker, make sure your surfaces are properly cleaned and ready for application.

Here's how:

1. Apply a fast-evaporating cleaner and wipe with a lint-free cloth.
2. Wipe the cloth in one direction only, not back and forth.
3. For through holes or blind holes, apply cleaner and clear the hole with clean, dry, compressed air.
4. For nuts and bolts, wrap the cloth around the threads and turn the fastener. Clean the part until it no longer discolours the cloth.

ACTIVATING

WHEN SHOULD I USE LOCTITE ACTIVATORS?

LOCTITE threadlockers cure in the absence of air and in the presence of metal ions. When assembling metal parts with inactive surfaces, which are low in metal ions, LOCTITE activators are recommended to ensure proper performance of LOCTITE threadlockers (not required for activatorless products).



INACTIVE METALS (ACTIVATOR RECOMMENDED)			ACTIVE METALS (ACTIVATOR OPTIONAL)	
Plated parts	Galvanized steel	Black	Iron	Brass
Stainless steel	Zinc	Magnetite	Steel	Bronze
Titanium	Pure aluminium	Silver	Copper	Manganese
Anodized aluminium	Cadmium	Gold		

SPEED UP CURE

LOCTITE activators significantly speed up the cure time of LOCTITE threadlockers when assembling metal parts that are cold, or have large gaps or deep threads.

INACTIVE METAL ASSEMBLIES

When assembling metal parts with inactive surfaces, LOCTITE activators are recommended to ensure proper performance of LOCTITE threadlockers. Not required for activatorless products.

KEY SELECTION FACTORS

STRENGTH

Low strength: Ideal for small fasteners. Easy disassembly using hand tools

Medium strength: Designed to be removable with standard hand tools

High strength: Designed to deliver high strength on fasteners. Removal may require localised heat ~260°C and disassembly with hand tools while hot



VISCOSITY

Liquid formulas: Everyday assembly, ideal for fine threads and blind holes

Semi-solid formulas: Pocket-friendly, ideal for overhead applications



APPLICATION METHODS

Pre-assembly: Most LOCTITE liquid threadlockers are designed to be applied at the moment parts are assembled

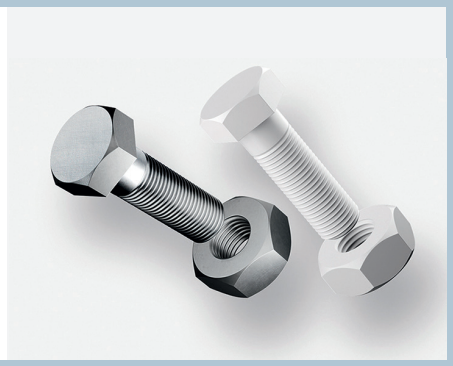
Post-assembly: Wicking-grade formula can be applied on parts that are already assembled



MATERIAL BEING ASSEMBLED

Metal-to-metal: All LOCTITE threadlockers are designed for metal-to-metal applications

Plastic-to-plastic or plastic-to-metal: For plastic (parts), solutions may be available: contact technical information services



HOW TO SELECT THE RIGHT LOCTITE THREADLOCKER

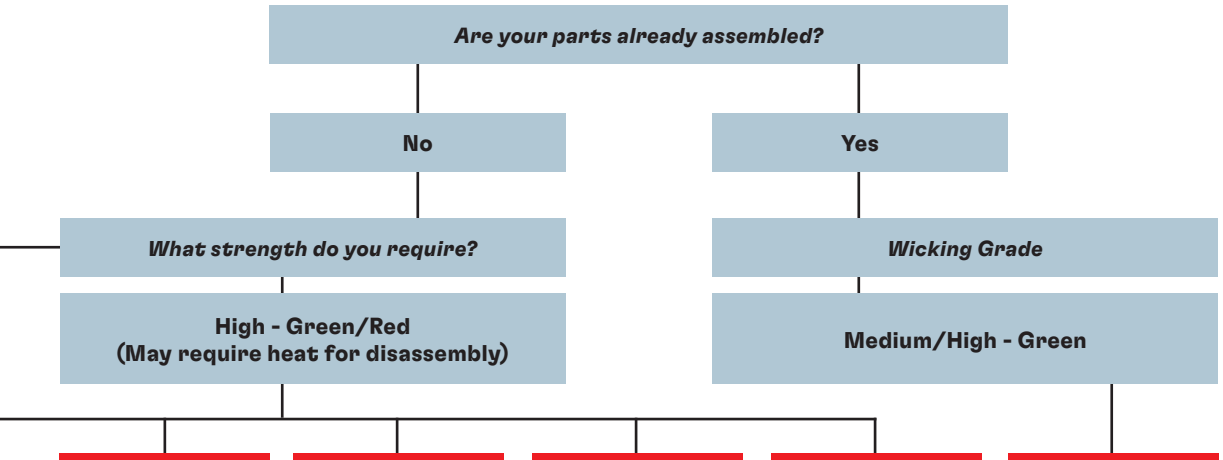
Low – Purple

Medium - Blue (Disassemble without heat)

Typical properties	LOCTITE® 222	LOCTITE® 243	LOCTITE® 248	LOCTITE® 2400	LOCTITE® 268
Chemistry	Liquid Anaerobic	Liquid Anaerobic	Semisolid Anaerobic	Liquid Anaerobic	Semisolid Anaerobic
Colour	Purple	Blue	Blue	Blue	Red
Viscosity /(mPa·s)	1200	3000	Semisolid	3100	Semisolid
Fastener size[1]	M2-M36	M2-M36	M3-M52	M3-M36	M3-M52
Torque Nm (Break/ Prevail)	6/2	22/9	8*/5	25/3	17*/1
Fixture time[2]	15 min.	10 min.	5 min.	10 min.	5 min.
Cure time[3]	24 hrs.	24 hrs.	24 hrs.	24 hrs.	24 hrs.
Temperature resistance[4]	–55 °C to 150 °C	–55 °C to 180 °C	–55 °C to 150 °C	–55 °C to 150 °C	–55 °C to 150 °C
Product details	 Low strength threadlocker for adjustment screws, countersunk head screws, and set screws. Ideal for low-strength metals which can break during disassembly, such as aluminium or brass.	 Medium strength, liquid threadlocker. Reliably locks and seals metal fasteners up to M36 diameter. Allows for disassembly with normal hand tools - no heat required.	 Medium strength, semisolid stick threadlocker for fasteners up to M52. Ideal for vertical and overhead applications. Allows for disassembly with normal hand tools - no heat required.	 Medium strength liquid threadlocker that carries no hazard symbols, risk or safety phrases. Reliably locks and seals metal fasteners. Allows for disassembly with normal hand tools - no heat required.	 High strength, semisolid stick threadlocker for heavy-duty applications up to M52 fasteners. Ideal for vertical and overhead applications. Heat required for removal.

[1] Typical fastener size range based on common applications and performance characteristics. Actual performance may vary depending on materials, environmental conditions, and joint design.

[2] Fixture time measured using steel M10 bolts at 23 °C.



LOCTITE® 270	LOCTITE® 2700	LOCTITE® 272	LOCTITE® 277	LOCTITE® 290
Liquid Anaerobic	Liquid Anaerobic	Liquid Anaerobic	Liquid Anaerobic	Liquid Anaerobic
Green	Green	Red/Orange	Red	Green
500	450	9500	7000	12
M2-M36	M2-M36	M6-M36	M6-M50	M2-M20
33/33	37/45	23/25	32/32	10/29
10 min.	5 min.	40 min.	30 min.	20 min.
24 hrs.	24 hrs.	24 hrs.	24 hrs.	24 hrs.
–55 °C to 180 °C	–55 °C to 150 °C	–55 °C to 230 °C	–55 °C to 150 °C	–55 °C to 150 °C
				
High strength, liquid threadlocker. Reliably locks and seals all metal fasteners. Tolerates slight contamination of industrial oils, i.e. engine oils, corrosion prevention oils and cutting fluids. Heat required for removal.	High strength, liquid threadlocker that carries no hazard symbols, risk or safety phrases. Reliably locks and seals metal fasteners. Heat required for removal.	High temperature resistant, high strength liquid threadlocker. Reliably locks and seals large metal fasteners up to M50 diameter. Heat required for removal.	High strength, high-viscosity liquid threadlocker. Reliably locks and seals large metal fasteners up to M52 diameter. Heat required for removal.	Medium/high strength, low viscosity, wicking grade threadlocker recommended for locking pre-assembled fasteners. Also seals porosities in welds and metal parts.

[3] Typical cure time will vary depending on application conditions. For more precise information, refer to the product's Technical Data Sheet (TDS).

[4] Temperature resistance range reflects typical application limits. Refer to the TDS for substrate-specific performance.

NOW AVAILABLE

NEW LOCTITE THREAD-LOCKER BOTTLES MADE WITH 50% RECYCLED PLASTIC

To reduce virgin plastic usage and carbon emissions, the LOCTITE 50 ml & 250 ml bottles now contain 50% post-consumer recycled (PCR) plastic. Same trusted performance – more sustainable footprint.



INTRODUCING A SMARTER WAY TO RELIABILITY

Check out the new LOCTITE Product Selector Tool - your digital guide to finding the right prouct, every time. Scan QR code to explore.



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THREADLOCKERS – TYPICAL PROPERTIES

KEY FEATURES	PRODUCT	IDH NUMBER	POPULAR PACK SIZES	COLOUR	TYPICAL USE	VISCOSITY (mPa.s)†	Torque Nm (BREAK/ PREVAIL)	TEMP. RANGE	CURE SPEED M10 STEEL@23°C	APPROVALS
LOW STRENGTH										
Small fasteners	221	231473 135331 142444	10 ml bottle 50 ml bottle 250 ml bottle	Purple	Small screws, low strength for easy disassembly	100-150	8/5	-55°C to 150 °C	25 min.	
Low strength, general purpose	**222** ✓	**267358 195743 142486**	**10 ml bottle 50 ml bottle 250 ml bottle**	**Purple**	**Small screws, low strength and thixotropic**	**900-1500 Thixotropic**	**6/4**	**-55°C to 150°C**	**15 min.**	**P1 NSF Reg. No 123002**
MEDIUM STRENGTH										
Medium strength, medium viscosity	242	195770 142504 142505	10 ml bottle 50 ml bottle 250 ml bottle	Blue	Medium strength	800-1600 Thixotropic	12/7	-55°C to 150°C	5 min.	
Medium strength, general purpose	**243** ✓	**1918246 1335884 1335868**	**10 ml bottle 50 ml bottle 250 ml bottle**	**Blue**	**General purpose, thixotropic, torque tension control**	**1300-3000 Thixotropic**	**26/5**	**-55°C to 180°C**	**10 min.**	**P1 NSF Reg. No 123000**
Medium strength, high viscosity, large threads	245	231547 231549	10 ml tottle 250 ml tottle	Blue	Large threads	5600-10000	13/9	-55°C to 150°C	20 min.	BAM oxygen
Medium strength, gel stick	248	1715105 1714937	9 g stick 19 g stick	Blue	Overhead, difficult-to-apply	Semi-solid	26/4	-55°C to 150°C	5 min.	
HIGH STRENGTH										
Medium/high strength, high prevail strength, general purpose	262	135376 88396	50 ml bottle 250 ml bottle	Red	Torque tension control	1200-2400 Thixotropic	22/32	-55°C to 150°C	15 min.	
High strength, gel stick	268	1709314	19 g stick	Red	Overhead, difficult-to-apply	Semi-solid	30/90	-55°C to 150°C	5 min.	
High strength, general pupose	**270** ✓	**1918245 1335897 1335906**	**10 ml bottle 50 ml bottle 250 ml bottle**	**Green**	**High strength applications that don't require disassembly**	**500**	**33/33**	**-55°C to 180°C**	**10 min.**	**P1 NSF Reg. No 123006**
Higher temperature resistance	272	1008095 1008096	50 ml bottle 250 ml bottle	Red/ Orange	Highest temperature resistance	10000	28/25	-55°C to 230°C	40 min.	
High viscosity, large threads	275	231551 231553	50 ml tottle 250 ml tottle	Green	High strength, large threads	5000-10000	25/35	-55°C to 150°C	15 min.	
High strength, high viscosity, large threads	277	2596560 1014352	50 ml bottle 250 ml bottle	Red	Large threads that don't require disassembly	7000	32/32	-55°C to 150°C	30 min.	
High strength, high temperature resistance	278	1117477 1103419	50 ml bottle 250 ml bottle	Red	Temperature resistance	2400-3600	42/23	-55°C to 200°C	20 min.	
WICKING										
Medium/high strength, wicking grade	**290** ✓	**142567 142568 233758**	**10 ml bottle 50 ml bottle 250 ml bottle**	**Green**	**Wicking grade for preassembled parts**	**20-55**	**10/29**	**-55°C to 150°C**	**20 min.**	

*Breakloose value ‡ M10 steel fasteners † See TDS for spindle and speed test measurement ✓ Engineered choice

KEY FEATURES	PRODUCT	IDH NUMBER	POPULAR PACK SIZES	COLOUR	TYPICAL USE	VISCOSITY (mPa.s)†	Torque Nm (BREAK/ PREVAIL)	TEMP. RANGE	CURE SPEED M10 (STEEL@23°C)	APPROVALS
HEALTH & SAFETY										
Medium strength, no hazard labels	**2400** ✓	**1960969 1947402 1947403**	**5 ml bottle 50 ml bottle 250 ml bottle**	**Blue**	**Suitable for applications on zinc flake coated surfaces**	**3100 Thixotropic**	**25/3**	**-55°C to 150°C**	**10 min.**	**WRAS potable drinking water, NSF Food**
High strength, no hazard labels	**2700** ✓	**1960972 1948763 1948765**	**5 ml bottle 50 ml bottle 250 ml bottle**	**Green**	**Suitable for applications on zinc flake coated surfaces**	**450**	**37/45**	**-55°C to 150°C**	**5 min.**	**WRAS potable drinking water, NSF Food**
LOW HALOGEN/ LOW SULPHUR										
For use in the nuclear industry	2432	219998	50 ml bottle	Blue	For use on sensitive metals, i.e. titanium	150-450 Thixotropic	20/7	-55°C to 150°C	10 min.	EDF, F, Cl, S content

ACTIVATORS - TYPICAL PROPERTIES

KEY FEATURE	PRODUCT	IDH	PACKSIZE	COLOUR	SOLVENT	ON PART LIFE	DRY TIME	APPLICATION
Passive metals, fast cure	**SF 7649 Activator** ✓	**142479 135252**	**150ml Aerosol 500ml Can**	**Clear-Green**	**Acetone**	**30 days**	**30-70 s**	**Anaerobics**
Solvent free	SF 7240 Activator	333369	90 ml can	Blue-Green	None	6 hours	30-70 s	Anaerobics
Passive metals, low temperature	SF 7471 Activator	142474 399521	150ml Aerosol 500ml Can	Amber	Acetone/IPA	7 days	30-70 s	Anaerobics



TRAINING & SERVICES

LOCTITE offers a wide range of customised services to help you uncover potential cost savings, process improvements, chronic maintenance issues, and overall increased reliability.

MANUFACTURING

LINE SURVEY

An audit of your design and assembly process
The OEM Line Survey is a detailed manufacturing process evaluation designed to discover and document potential cost savings and process improvements. It includes recommendations for hands-on implementation and a full cost analysis for each recommendation.

IN-PLANT SEMINAR

In-depth design and assembly training
Based on the Line Survey, LOCTITE customises full- or half-day on-site product training sessions that fit your specific wants and needs.

CUSTOMER TRAINING SCHOOL

Upskill your adhesives experts
Full- or half-day off-site training designed specifically for design, process, material and manufacturing engineers responsible for assemblies involving the use of adhesives.

DESIGNING PUMPS WITH ADHESIVES SEMINAR

Dedicated training session for pump manufacturers
Two- to four-hour training on adhesives, coatings, lubricants and the performance improvements that their implementation provides.



MAINTENANCE

PLANT SURVEY

An audit of your plant and maintenance operations
The Maintenance Plant Survey is a detailed review of your current maintenance processes, needs, challenges, and tools in use. It is used to develop a customised LOCTITE Maintenance Reliability Workshop to optimise processes and meet requirements.

MAINTENANCE RELIABILITY WORKSHOP

Hands-on training covering all skilled trades
Based on your Maintenance Plant Survey, the Maintenance Reliability Workshop reviews common failure causes, prevention options, and application recommendations for maintenance professionals.





CUSTOMER TRAINING SCHOOL

Thorough deep-dive into common challenges and solutions. Full- or half-day product training with review of common maintenance challenges and the appropriate LOCTITE product solutions.

MODULAR TRAINING

In-depth Maintenance Workshop training sessions over several visits, focusing on Threadlocking, Thread Sealing, Gasketing, and Retaining.

YOUR PARTNER IN RELIABILITY

Every day professionals rely on threaded assemblies to do their job. To hold fast. To keep machines running and engines humming in the industries that keep the world turning. Where reliability, efficiency and safety are non-negotiable.

LOCTITE threadlockers deliver peace of mind with proven, consistent performance, as they have for decades. So you can be confident that every application is backed by industry-leading innovation and a proven track record of success. And while our legacy speaks for itself, we also look to the future.

We are constantly searching for the smarter, the more efficient - helping our customers to innovate the next generation of solutions to tomorrow's most pressing challenges.

As you move forward, LOCTITE is there at every step, helping to simplify processes, improve performance, and reduce costs. And ensuring that your operations run smoothly and safely, whatever the future holds.

Starting with reliable, world-class solutions, we are your trusted partner, enabling superior performance, product innovation, and sustainable growth across multiple industries.

