Scotch-Weld™

Threadlocker Anaerobic Adhesives

TL22 • TL42 • TL43 • TL62 • TL71 • TL72 • TL77 • TL90

Technical Data **March, 2010**

Product Description

3M™ Scotch-Weld™ Threadlocker Anaerobic Adhesives are one-component anaerobic adhesives that cure and seal threaded assemblies that meet a wide range of applications to prevent vibration loosening and/or leakage. All products provide excellent vibration, corrosion, and shock resistance. Engineered to provide different strengths, temperatures, nut/bolt sizes, and other requirements, some threadlockers allow removal and meet various selections depending on the specific application.

Specific Features

- 3M™ Scotch-Weld™ Threadlocker TL22 is removable with hand tools. It is a low strength (low torque removal) threadlocker for small diameter, fine threaded screws, set screws, nuts, bolts, and hex and slot driven components such as keyed fasteners.
- 3M™ Scotch-Weld™ Threadlocker TL42 is a general purpose, removable with hand tools, medium strength threadlocker ideal for machine tool access bolts, and hydraulic system bolts. It can also be used on gear box/driveshaft bolts, bearing cover cap screws, countersunk screws, and conveyor roller bolts.
- 3M™ Scotch-Weld™ Threadlocker TL43 is a general purpose, removable with hand tools, medium strength threadlocker for most medium and coarse-threaded screws, nuts and bolts. It is oil tolerant to help secure as-received parts and its thixotropic property prevents run-off, dripping, or migration of the adhesive product when applied on parts.
- 3M™ Scotch-Weld™ Threadlocker TL62 is a medium to high strength threadlocker that is especially developed to secure assemblies with high strength retention. It allows disassembly with heat and will perform on lightly oily parts with only approximately 10% strength reduction.
- 3M™ Scotch-Weld™ Threadlocker TL71 is a general purpose, permanent, high strength threadlocker that locks bolts and studs up to 1" in diameter as it seals against leakage and corrosion.
- 3M™ Scotch-Weld™ Threadlocker TL72 is a permanent, high strength threadlocker formulated to lock bolts and studs up to 1" in diameter. It can be used for high temperature threadlocking (intermittently up to 450°F) and its thixotropic nature prevents dripping or migration of the liquid adhesive after assembly.
- 3M™ Scotch-Weld™ Threadlocker TL77 is a permanent, high strength, high viscosity threadlocker designed to work well with larger diameter (up to $1^{1}/_{2}$") and coarse threaded parts.
- 3M™ Scotch-Weld™ Threadlocker TL90 is low viscosity to provide a wicking action, medium strength threadlocker that locks and seals small compression and ferrule fittings with service temperature up to 400°F. It is useful for pre-assembled parts.

Common Threadlocker Features

- Prevent corrosion
- Fluorescence
- Shock and vibration resistant
- Fast setting

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Typical Uncured Physical Properties

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

	3M™ Scotch-Weld™ Threadlocker Anaerobic Adhesives							
	TL22	**TL42**	**TL43**	**TL62**	**TL71**	**TL72**	**TL77**	**TL90**
Color	Purple	Blue	Blue	Red	Red	Red	Red	Green
Strength	Low	Medium	Medium - High	Medium - High	High	High	High	Medium, Wicking Grade
Chemistry Type	Dimethacrylate	Dimethacrylate	Dimethacrylate	Dimethacrylate	Dimethacrylate	Dimethacrylate	Dimethacrylate	Dimethacrylate
Appearance	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid
Viscosity (cps)	800 - 1,600[1]	800 - 1,600[2]	2,500 - 4,000[1]	800 - 1,600[2]	400 - 600[2]	4,000 - 15,000[3]	6,000 - 8,000[3]	10 - 30[4]
Fixture Time (min)	≤ 20	≤ 20	≤ 20	≤ 20	≤ 20	≤ 20	≤ 20	≤ 20
Fixture Time with Activator (min)	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Full Cure Time (hr)	24	24	24	24	24	24	24	24

[1] Brookfield RVT #3 spindle @ 20 rpm and 25°C.
[2] Brookfield RVT #2 spindle @ 20 rpm and 25°C.
[3] Brookfield RVT #4 spindle @ 20 rpm and 25°C.
[4] Brookfield LVF #1 spindle @ 30 rpm and 25°C.

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	TL22	**TL42**	**TL43**	**TL62**	**TL71**	**TL72**	**TL77**	**TL90**
Color	Purple	Blue	Blue	Red	Red	Red	Red	Green
Strength	Low	Medium	Medium - High	Medium - High	High	High	High	Medium, Wicking Grade
Fastener Size Range	< 5/16"	1/4" - 3/4"	1/2" - 1"	1/2" - 1"	1/2" - 1"	1/2" - 1"	Up to 1 1/2"	Up to 1/2"
Breakaway Torque Range (in.lbs)[5,6]	40 - 100	70 - 160	110 - 220	180 - 290	180 - 410	180 - 330	220 - 350	60 - 190
Prevail Torque Range (in.lbs)[5,6]	10 - 40	20 - 90	40 - 130	180 - 300	180 - 410	130 - 350	220 - 350	220 - 390
Temperature Range (°F)	-65 to 300	-65 to 300	-65 to 300	-65 to 300	-65 to 300	-65 to 450	-65 to 300	-65 to 300

[5] Reference ISO 10964.
[6] To convert to N.m divide in.lbs value by 8.851.

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Handling Information

Directions for Use

3M™ Scotch-Weld™ Threadlocker Anaerobic Adhesives are not recommended for use on most plastics due to potential cracking of plastic parts. Also, they are not recommended for use in piping systems that contain pure oxygen or an oxygen-rich environment, chlorine, or strong oxidizing substances.

For Assembly

1. Ensure parts are clean, dry and free from oil, grease and dirt. For best results, clean and dry parts with solvent or 3M™ Scotch-Weld™ Activator. (Activator can also be used on inactive surfaces or to accelerate the cure on active surfaces.)
2. If not sure of surface type, always use activator. Refer to Material Surface Activity and Cure Speed section for more information.
3. Shake the adhesive bottle well before use.
4. Avoid touching the metal surfaces with the bottle tip since the metal ions may react with the adhesive upon contact and eventually may clog the bottle tip.
5. Apply adhesive onto the threaded part where the contact area will be in the final assembly. For larger parts, use more adhesive and rotate the threaded part to spread adhesive evenly around contact area.
6. For through holes, apply several drops of adhesive onto the bolt at the nut engagement area. For blind holes, apply several drops of the adhesive down the internal threads to the bottom of the hole.
7. Assemble the nut/fastener and tighten as required.
8. Allow assemblies to set for sufficient time so that handling strength or full cure will occur before further processing or testing.

For Disassembly

1. Loosen or remove with regular hand tools.
2. If hand tools do not work due to the assembled parts being well tightened, apply localized heat (approximately 490°F) to the nut or bolt and disassemble while parts are still hot. Use extreme caution when working with heat sources (e.g. heat gun, flames, etc.

Material Surface Activity and Cure Speed

Active (Fast) ⟷ Inactive (Slow)

- Brass
- Bronze
- Commercial aluminum
- Copper
- Iron
- Kovar®
- Manganese
- Monel®
- Nickel
- Anodized aluminum
- Cadmium
- Chemical black oxide
- Galvanized steel
- Gold
- Inconel®
- Magnesium
- Magnetite steel
- Plated parts
- Pure aluminum
- Silver
- Stainless steel
- Zinc

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Military Specification S-46163A

3M™ Scotch-Weld™ Threadlocker Anaerobic Adhesives TL22, TL42, TL62, TL71, TL72, TL77, and TL90 have been tested and passed the requirements of MIL-S-46163A.

Storage

Store product in cool, dry area out of direct sunlight.

Shelf Life

3M™ Scotch-Weld™ Threadlocker Anaerobic Adhesives have a shelf life of twelve months when stored at 60° to 80°F (16° to 27°C) in the original unopened container.

Precautionary Information

Refer to Product Label and Material Safety Data Sheet for health and safety information before using this product. For additional health and safety information, call 1-800-364-3577 or (651) 737-6501.

Technical Information

The technical information, recommendations and other statements contained in this document are based upon tests or experience that 3M believes are reliable, but the accuracy or completeness of such information is not guaranteed.

Product Use

Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. Given the variety of factors that can affect the use and performance of a 3M product, user is solely responsible for evaluating the 3M product and determining whether it is fit for a particular purpose and suitable for user's method of application.

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ISO 9001:2000

This product was manufactured under a quality system registered to ISO 9001:2000 standards.

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Industrial Adhesives and Tapes Division
3M Center, Building 225-3S-06
St. Paul, MN 55144-1000
800-362-3550 • 877-369-2923 (Fax)
www.3M.com/industrial

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