BFPA

HOW TO... 222

Application of Thread Sealant (tapes, pastes and adhesives)

The purpose of thread sealant

Thread sealant is required in order to provide a pressure tight joint when assembling taper threads in to fixed female ports. It is not required where tapered threads seal on mating male and female cones (e.g. where an NPT or NPTF male mates with an NPSM female).

Thread sealant can also be used as a 'retainer' and/or when male and female threads are assembled having been produced out of materials which have a different coefficient of thermal expansion and are used across a wide temperature range.

This 'How To' covers a range of different types of thread sealant commonly used within the fluid power industry and typical methods for their application.

The importance of using correct thread sealant

Correct selection and application of the chosen sealing medium is vital in order to ensure pressure is held when pressure is applied to the joint which has been sealed.

PTFE tapes and pastes are available in many different types and grades, some of which are not recommended for sealing gas applications.

The choice of sealant depends on factors such as; working pressures, operating temperate range(s), fluid (i.e. which liquid or gas is used) within the system being sealed and the application (e.g. vibration and shock loadings).

Ensure suitably product is used in order to prepare the joint prior to assembly

General problems associated with using thread sealants

Sealing tapered threads (such as NPT/BSPT) can cause problems relating to what type of thread sealant is used. There are benefits and limitations for each type of thread sealant – one common drawback being contamination caused by the sealant.

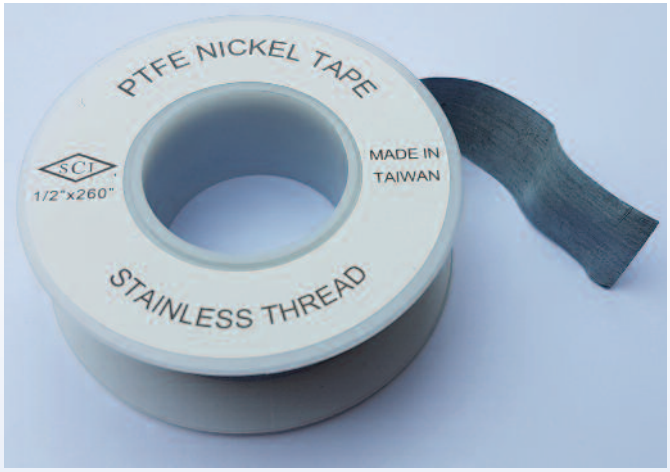
The following information should be used as a guide, the thread sealant supplier should be consulted to the most suitable product for the application along with how it should be correctly applied.

Application of PTFE Sealing Tapes and Cords

The width of tape size must be suitable for the size of the male tapered thread being sealed. It is common to use tape which is 1/4" wide when sealing 1/8", 1/4" and 3/8" taper threads and 1/2" wide when sealing 1/2" and larger diameter taper threads.

Application of PTFE tape can vary depending on the tape being used. For applications identified as high risk class or arduous conditions consult the manufacturer/supplier as assembly instructions/material selection may differ. This could also apply to gas applications. The following is only a guide:

- Ensure that the male and female threads are free from any visual signs of contamination (e.g. from previous applications of thread sealant) and damage.
- Apply the tape in the same direction as the thread form commencing with the 1st full thread (do not apply tape to the thread lead in chamfer).
- Ensure that no tape overhangs the end of the connection.
- For tape apply between 2-3 full revolutions of tape pulling the tape firmly into the threads without causing the tape to break.
- PTFE tapes are available specifically designed for sealing stainless steel components.



- When 'one wrap' PTFE tape is used, a 50% overlap is often specified.
- Cut off surplus tape making sure to press down on the overlap so that the tape is pushed into the male threads form.
- If 'pipe sealing cord' is used consult the menu manufacturer/supplier for assembly instructions

If PTFE tape is not permitted then use an alternative sealing compound.

PTFE thread sealants

Numerous types of PTFE thread sealants are available but it is vital to ensure that only approved types are used. As with PTFE tape for applications identified as high risk class or arduous conditions consult the manufacturer/supplier as assembly instructions/material selection may differ. This could also apply to gas applications. The following is only a guide:

- All the parts must be clean and dry before use.
- kneed the tube before use to blend the sealant.
- Starting at the first full thread apply the sealant all the way around the male thread ensuring full coverage of the first 4 to 5 threads.
- Force the material into the threads to thoroughly fill the thread flanks, crest and root (all areas of the thread).
- Tighten threaded connector.
- Correctly tightened fittings will seal instantly however allow a minimum of 24 hours prior to pressurising to application pressure. Once tightened do not adjust the tightening (loosen or tighten further) as doing so can break the pressure tight seal.

Once fully cured (typically 24 hours at room temperature) PTFE thread sealants provide a bond which is resistant to vibration and shock.

These types of sealants are quick and easy to apply and lubricate the threads to help prevent galling during installation. They also allow a low breakaway torque (even after curing) and are compatible with a wide range of chemicals.

Once fully cured the sealant clings to threads and will not shred or tear. Typical in service temperature ranges being –65 to 350°F (–53 to 176°C).

Anaerobic adhesives

Anaerobic adhesives work by completely filling the gaps between the mating male and female thread form. Using an anaerobic sealant prevents loosening from vibration and also protects the joint from corrosion which can result from the ingress of moisture.

Numerous types of anaerobic adhesives are available but it is vital to ensure that only approved types are used. As with PTFE tape for applications identified as high risk class or arduous conditions consult the manufacturer/supplier as assembly instructions/material selection may differ. This could also apply to gas applications. The following is only a guide:

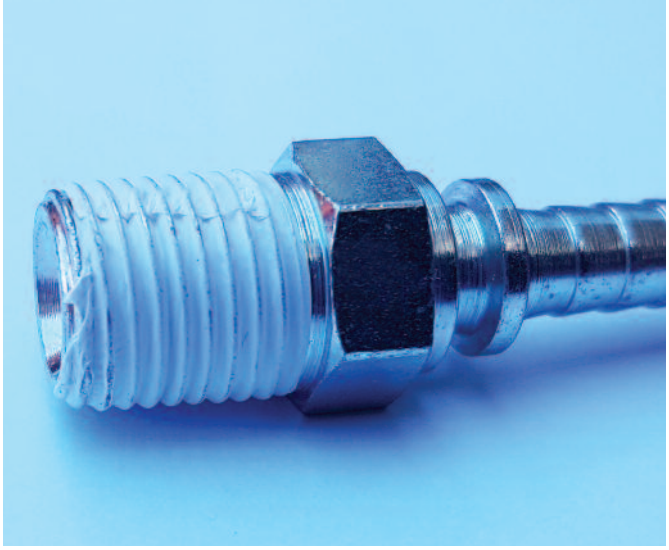
- All the parts must be clean and dry before use.
- New parts should be liberally sprayed with cleaning fluid and this should then be allowed to evaporate for 30-60 seconds before the part is ready for the adhesive to be applied.
- Starting at the first full thread apply the adhesive all the way around the male thread ensuring full coverage of the first few threads.
- If too much is applied it may leak in to the adjoining components.
- Activator must be used as recommended by the product manufacturer.
- At low temperatures the curing process may be affected even when an activator is used.

Once tightened do not adjust the tightening (loosen or tighten further) as doing so can break the pressure tight seal.

222

Quick Thought

Some thread sealants can take up to 24 hours to fully cure at room temperature, this can preclude them for being used in some applications



Irrespective of what sealant is used do not allow sealant to overhang the end of the male thread.

It should be noted that mating parallel stud ends and female threads using a 'soft seal' configuration should be used wherever possible for new designs in hydraulic fluid power applications as they require no thread sealant (which can add to hydraulic/pneumatic system contamination).

ISO Technical Committee 131/SC 4 recommends that the ISO 6149 (metric) series be used because these International Standards specify ports and stud ends with metric threads and O-ring sealing and because the subcommittee would like to help users by recommending one preferred system. It should however be noted that whilst the 'soft seal' method is suitable for the majority of hydraulic applications the pressure ratings for these types of interfaces vary depending upon thread size/series and material(s) of construction. The manufacturer/supplier should be consulted for maximum recommended working pressure(s). For applications requiring a higher working pressure a taper thread, or alternative type of sealing interface will be required.

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26/3/19