

INSTALLATION GUIDE

WARNING

1. Personnel working on lined products must be trained on proper storage and handling procedures
2. Lined piping systems may contain corrosive and hazardous chemicals and must be completely de-contaminated prior to dismantling of pipes and fittings. A certificate of decontamination should be issued
3. Existing piping systems may still contain residue chemicals hence proper PPE must be worn in dismantling works
4. Gaskets must not be used in connecting lined products. Gaskets are to be used only when connecting a lined product to a non-lined flange
5. Internal lining may become brittle when operating at very low temperatures, heat tracing may be necessary

FLANGE PROTECTION COVER

1. PTFE lined pipes and fittings are delivered with wooden protection covers. These must not be removed while in storage. When the covers are removed, the pipe or fitting must be installed and bolted immediately to the correct tightening torque

HOT WORKS

1. Hot works such as welding, flame cutting, brazing, etc. must not be performed on lined products as damage to the internal lining may occur
2. Minor hot works may be performed by experienced personnel limited to small 'spot' areas of lined products. The internal lining material must be protected from the heat generated. Visual and holiday test should be performed after such works

BOLTING

1. Clean and where necessary lubricate stud and nut threads
2. Hand tighten all studs and nuts in proper alignment
3. Tighten with a spanner to a light hand torque to bring the mating flanges squared together
4. Stud and bolts are to be tightened in the proper criss-cross sequence
5. The final tightening sequence must be done to the appropriate torque using a torque wrench
6. The torque value can vary depending on stud type, ambient and operating conditions.
7. Start with the lowest torque and work upwards to the max torque
8. Stud bolts should be re-torque after 24 hours or more and during regular shut-down and maintenance
9. If a leak occurs, loosen the stud bolt opposite the leak slightly then tighten the stud bolt on the leaking side. This prevents over tightening problems
10. If the leak persists, disconnect the flange and inspect for damage on the lining flare face. Slight scratches can be repaired with sanding using a fine abrasive paper
11. For plants operating at elevated temperature, re-torque after the first one or two thermal cycles. The re-torque should be performed when the pipes and fittings are at ambient temperature

BOLT TORQUE TABLE FOR ANSI 150 (MIN - Max in Nm)

1/2"	3/4"	1"	1 1/2"	2"	3"	4"	5"	6"	8"	10"	12"
7 - 14	7 - 16	19 - 28	23 - 35	33 - 50	54 - 73	39 - 42	60 - 63	80 - 84	101 - 105	96 - 100	120 - 125

PERMEATION

1. This is the molecular penetration of the chemical fluid through the lining material
2. Permeation can be reduced by; Increasing liner thickness or using superior liner material
3. Permeation increases with temperature and pressure

VENT HOLES

1. These are essential for the relieve of pressure between the steel and liner due to permeation
2. Vent holes must not be closed off or clogged up by paint or atmospheric contaminants. If permeating gas are not relieved the internal liner will start to blister and damage can result over time
3. For insulated pipes and fittings, vent boss extensions must be provided to extend the vent beyond the insulation
4. Vent boss extensions can also be used if the permeating gas reacts with moisture in the atmosphere causing corrosion of the steel around the vent
5. The vent holes serve also as indicators of leakage due to liner failure during hydro-test and in service

CREEP

1. PTFE can deform under applied load over time and increases with temperature
2. This can result in leakage and can be avoided using cup spring washers to take up the creep