THRU-KOTE™ U.B.I. SLEEVES
THRU-KOTE®-U.B.I. SLEEVES
BASIC INFORMATION

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1. General

The Thru-Kote U.B.I. system utilizes a patented insert sleeve designed to protect the international coating during welding. It offers an economical and flexible method of field construction while eliminating expensive custom fabrication:

Advantages:

- Applicable to onshore/offshore pipelines as well as plant/municipal piping systems worldwide
- Accommodates all pipe sizes and grades
- Compatible with Tube-Kote liquid or powder coatings
- Field-applied, heat-cured mastic forms a smooth surface at sleeve edge which provides a continuous barrier
- Full penetration, 100% x-rayable welds to API 1104 and ASME 31. Chap. 9
- Utilized with pipe field cuts to achieve exact length requirements
- Fast assembly; easy fabrication

Features:

- Sleeves are internally coated 100% Holiday-free, add. externally coated if required
- A two layer heat shield consisting of a high heat resistant ceramic wrap and a wide steel backing ring prevents coating damage on I.D. of the insert sleeve during welding.
- O-rings wipe field-applied mastic to sleeve ends.
- Sleeve tabs establish the recommended distance between pipe ends and blend into the weld bead. Tabs ensure longitudinal stability of inst. sleeve.
- Tuboscope Vetco International certified technician available for contractor training and quality control of installation.
- Based on Thru-Kote patent with over 30 years field experience.
2. Design

The Thru-Kote U.B.I. Sleeve consists basically of a cylindrical case made of carbon steel fitted with grooves and upsets for installation of o-rings, heat wrap and Backing ring. The plain internal surface as well as the nose up to the o-ring groove is coated with high performance coating material. Around the external center section rectangular tabs (spacer) are welded to the backing ring. When the sleeve is positioned in the pipe these spacers are placed against the pipe end. The tabs define the proper longitudinal position of the sleeve and will be welded into the rootpass while welding the pipe together. Finally the tabs ensure a fixed position of the sleeve in the pipe string. Even serious longitudinal force cannot move the sleeve from position. The number of tabs variates with the diameter of sleeves, f. examp. a 4" sleeve is fitted with three, a 30" sleeve is fitted with ten tabs. To prevent an excessive heat transfer during pipe welding a two layer heat shield is installed which protects the internal coating from burnout. The first layer is formed by a wide metal made backing ring which prevents an easy heat transfer to the sleeve body as well as to the external coated sleeve area. It protects also the second layer from being touched and damaged by an electrode during welding. The second layer forms tape of high insulating heat wrap which is able to withstand temperatures up to 1000 °C. This heat protecting system proves itself as perfect for field installation and provides high quality results not depending on welders grade of ability and qualification. Two or four o-rings are placed on sleeve ends to perform as an additional barrier and as support elements during sleeve installation. These o-rings are made of high performance 'Viton' material. This shows high UV-resistance too which keeps the material quality during storage and handling especially in desert climate.
General design components
Tab, view from top

Tab, view from side
Basic design, example TK-U.B.I.- Sleeves for 4" Std Line Pipe
Standard Sleeves (uncoated) for 32" and 48" Line Pipe
3. Installation

Insure that pipe ends are clean and damage free. Gauge inside diameter with field gauge or sleeve with no O-rings in place. No resistance should occur. Inspect Thru-Kote U.B.I. sleeve for coating damage or other harmful defects making sure that o-rings and heat tape are in place. Heat tape should be dry and undamaged.

In all applications TK® epoxy system 'Blue Mastic' must be used. Give both parts into a suitable container (mixing ratio 1:1 by volume) and then stir homogeneously. The well mixed compound shows a regular blue color without visible blue or white parts of the components. After mixing, pot life depends on ambient temperature, however at 80°F (26°C) it is approximately 30 to 60 minutes. At a point 3/4" (20 mm) inward from the bevel apply a 1" (25 mm) wide and 1/10" (2-3 mm) thick band of epoxy mastic by using a non metallic spatula and the TK- Mastic Applicator stick which ensures an easy, uniform film and prevents starving or excessive mastic application.

Residues of mastic at the pipe end and at the pipe bevel has to be wiped off.

Caution: Protective gloves should be worn during epoxy mixing and application to pipe ends.

Insert the Thru-Kote U.B.I. sleeve into the prepared pipe end until the weld tabs are against the weld bevel. A slight resistance may be encountered, however, the sleeve must be inserted by hand and never hammered.
Check the mastic formation behind the sleeve by using a inspection mirror. Position the next prepared pipe end over the protruding sleeve until the weld tabs contact the bevel as above. The sleeve helps alignment of the ends for welding.

API Standard 1104 or ASME 31.3, Section IX, or other customer approved weld procedures are applicable to this process. Use lowest possible heat setting for the welding machine to achieve this goal. Area where welding is done must be well ventilated and protected from inclement weather. Pipe coatings and epoxy system may burn and give off harmful fumes during welding.

If preheating is desired it can be done on the OD surface after application of epoxy and sleeve installed, not to exceed 250°F (121°C). The ground lead should be attached mechanically to either pipe end. It should never be tack welded or attached to the center of the pipe. An external pipe clamp may be used to assist in alignment and securing ends against weld tabs. If clamps are used, do not yield the pipe. When tack welding, never tack on top of a weld tab.

Tuboscope recommend welding downhill with the highest possible welding speed. If required, other welding techniques can be discussed, always keeping lowest heat setting and highest possible welding speed in consideration.

A weep hole of 1/4" to 1/2" (6 - 12 mm) must be left to allow expanding gasses to escape. When crossing the weld tab a weaving motion of electrode must be made to insure melting in the root pass. Only a part of the vertical spacer must be fused within the root pass, always achieving an acceptable weld in accordance with customer specification.

Do not start intermediate passes until the weld has cooled down to 250°F (120°C) or less, measured approx. 1.5" (40 mm) beside the weld. The weep hole can be closed at the completion of the hot pass or the beginning of the first filler pass. Apply as many passes as necessary to complete the weld, removing slag and other weld products between passes. Maintain 250°F (120°C) or less intermediate pass temperature. Never exceed 360°F (180 °C) measured approx. 1.5" (40 mm) beside the weld to prevent any damage on coating, mastic and o-rings.

Please consult your Tuboscope representative if deviations from above procedure are necessary.
Applied Mastic before Sleeve installation

Sleeve in place before final installation
Cross section of an installed Sleeve

- Backing Ring
- Welding Seam
- Heat Wrap
- O-Ring
- Mastic
- Tab
X-Ray inspection showing Tab welded in root pass
4. Performance

A proper installed Sleeve provides a perfect protection of the highly sensitive area of the welding seam during the whole lifetime of the pipeline. Because the Sleeve is coated with the same material as the pipe and the coating is applied with the same technology as the pipe coating (including high temperature baking) the whole pipeline is fitted with a uniform coating film of the same high quality and performance.

Any other coating applied at the welding seam area after pipe welding which is cured at ambient temperature creates a pipeline with serious problematic zones. Cold cured epoxies films are of a low level cross linked microstructure which allows aggressive media to diffuse easily through the coating layer resulting in serious corrosion effects.

The installed Sleeve shows two barriers against media flow into the slot between Sleeve and pipe. First the epoxy mastic which is applied 12 to 15 mm deep and finally the o-ring. Next photograph shows the perfect condition of the bare metal pipe surface after a long term service of an installed Sleeve.
Cut off sleeve after one year service in high corrosive environment
5. Pigging

Pig cleaning of internally coated pipe should be done with plastic or polyurethane pigs that will not damage the coating. The potential damage to thin-film coatings during a smart pig survey, due to the weight of the tool, should be considered. A partially disbonded coating could make interpretation of an ultrasonic pig survey difficult, although a well-bonded, thin-film coating up to about 20 mils thick should not present problems, according to discussions held with inspection companies.

Cleaning Pig with polyurethan cups and plastic brushes
6. Attachments