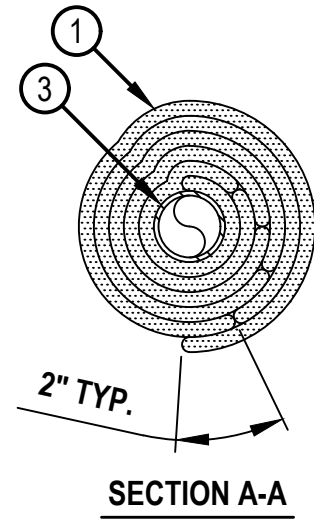
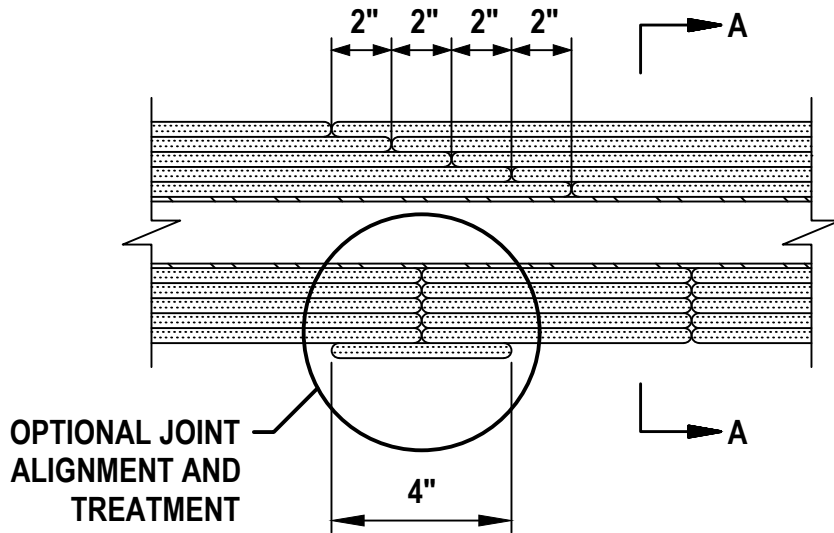


Hilti Corporation
 Design Number HI/AF 120-02
 Applied Fireproofing
 Hilti CPF-ES Endo-Shield
 UL 1489

HI/AF 120-02

Min. 1 in. Tubing, 5 Layers of Hilti Endo-Shield: 2 Hour
 Min. 4 in. Tubing, 4 Layers of Hilti Endo-Shield: 2 Hour

METHOD 1



METHOD 2

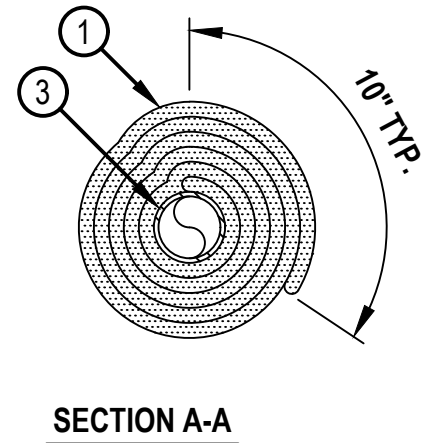
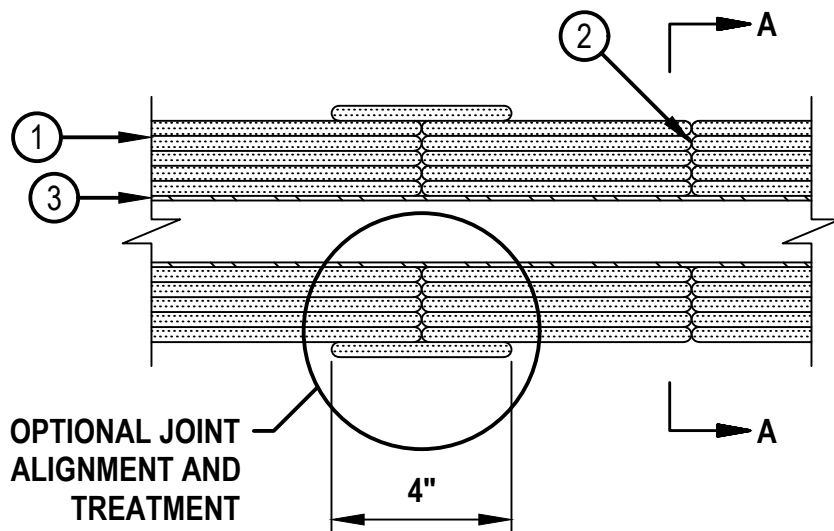


Figure 1. Min. 1 in. Pipe, 5 Layers of Hilti Endo-Shield Specifications

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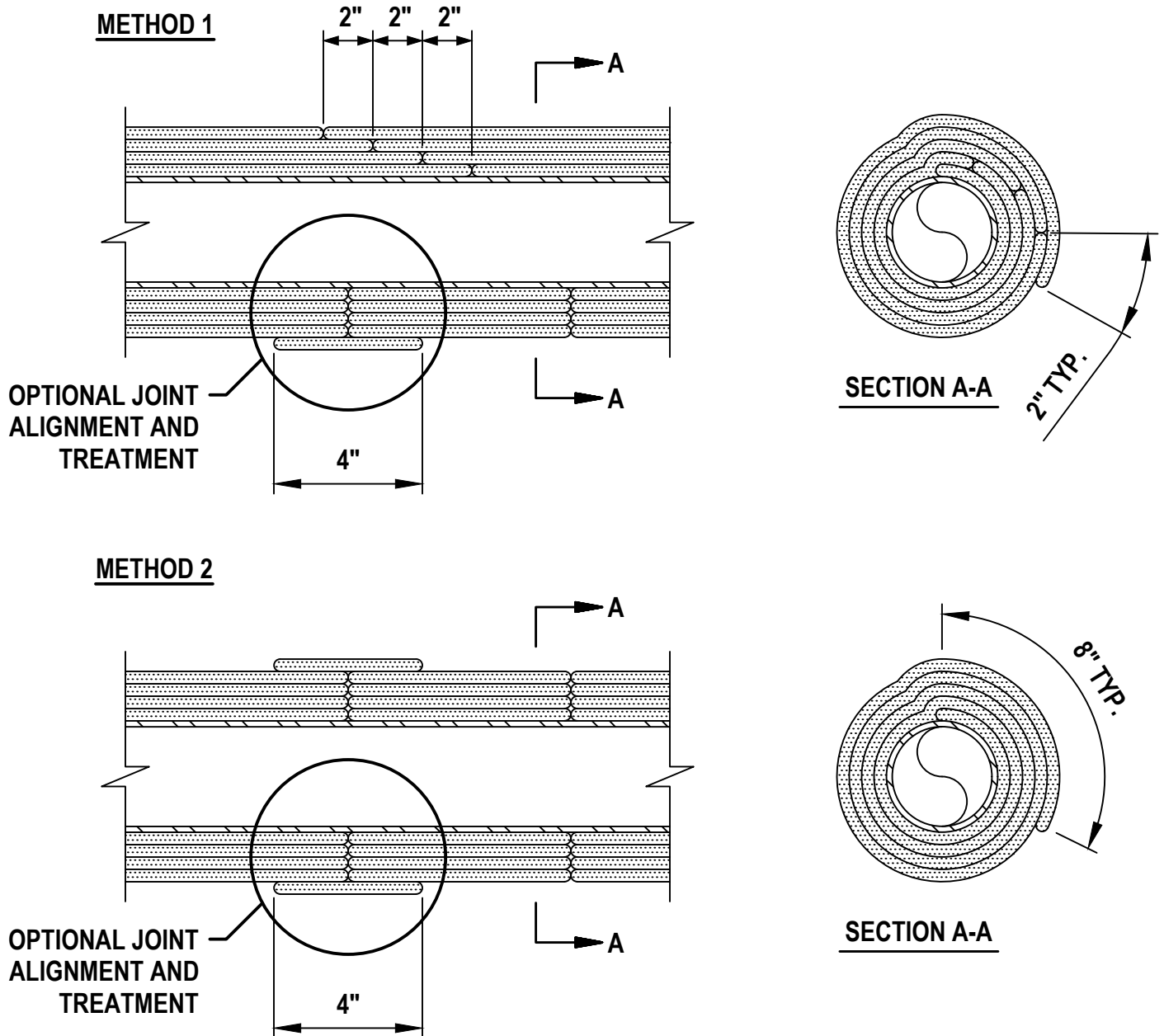


Figure 2. Min. 4 in. Pipe, 4 Layers of Hilti Endo-Shield Specifications

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1. FIRE-RESISTANT PIPE PROTECTION SYSTEM

CERTIFIED MANUFACTURER: Hilti Corporation

CERTIFIED PRODUCT: Applied Fireproofing

CERTIFIED MODEL: Hilti CPF-ES Endo-Shield

Install Hilti Endo-Shield layers to achieve the desired fire resistance rating.

METHOD 1 - INDIVIDUALLY WRAPPED

LAYER 1 - Using 1/2 in. wide filament tape, aluminum foil tape, or FSK tape, attach leading edge of Hilti Endo-Shield onto the tubing (Item 3). Wrap Hilti Endo-Shield tightly around the tubing and overlapping 2 in. at the longitudinal seam. For the longitudinal seam, apply 3 in. wide aluminum foil tape or FSK tape centered for the full length of the seam. Additional wrap sections are added to insulate all straight runs of tubing. The radial seams are butted end-to-end without an overlap.

For the radial seams, apply 3 in. wide aluminum foil tape or FSK tape over the seam and overlap 2 in. back onto itself.

The elbows are each fitted with a gore segment cut to accommodate the elbow radius that occurs as the Hilti Endo-Shield is wrapped radially around the elbow. Using min. 1/2 in. wide filament tape, aluminum foil tape, or FSK tape, attach edge of gore segment to tubing and wrap segment tightly around tubing overlapping 2 in. at the longitudinal seam which shall be located at the long radius of the elbow. Apply 3 in. wide aluminum foil tape or FSK tape centered for the full length of the longitudinal seam. The radial seam butted between the gore end segment and adjoining straight section is filled with Hilti CP 606 or FS-ONE MAX Firestop Sealant (Item 2). Apply 3 in. wide aluminum foil tape or FSK tape over the radial seam and overlap 2 in. back onto itself.

LAYER 2 - Wrap a second layer of Hilti Endo-Shield in the same manner as Layer 1. The start of Layer 2 begins at the longitudinal seam of Layer 1, secured with 3 in. wide aluminum foil tape or FSK tape covering the full length of the seam. Offset the Layer 2 radial seam 2 in. from the radial seam of Layer 1. Tightly wrap Layer 2 over Layer 1 and overlap the longitudinal seam by 2 in. Cover the full length of the longitudinal and radial seam with 3 in. wide aluminum foil tape or FSK tape.

The elbows are each fitted with a gore segment cut to accommodate the elbow radius that occurs as the Hilti Endo-Shield is wrapped radially around the elbow in the same manner as Layer 1. The gore segment is attached to Layer 1 with 3 in. wide aluminum foil tape or FSK tape and wrapped tightly around Layer 1, overlapping 2 in. at the longitudinal seam. The longitudinal seam of Layer 2 is located at the short radius of the elbow. Apply 3 in. wide aluminum foil tape or FSK tape centered for the full length of the longitudinal seam. The radial seam butted between the gore end segment and adjoining straight Layer 2 section is filled with Hilti CP 606 or FS-ONE MAX Firestop Sealant (Item 2). The elbow and straight section butt joints of Layer 1 and Layer 2 are in alignment and not offset. Apply 3 in. wide aluminum foil tape or FSK tape over the seams and overlap 2 in. back onto itself.

LAYER 3, 4, AND 5 - As required, wrap a third, fourth, or fifth layer of Hilti Endo-Shield in the same manner as Layer 2 to obtain desired rating.

The elbow longitudinal seam for Layer 3 is located at the middle radius of the elbow, rotated 90 degrees from the longitudinal seam of Layer 2. The elbow longitudinal seam for Layer 4 is located at the middle radius of the elbow, rotated 180 degrees from the longitudinal seam of Layer 3. The elbow longitudinal seam for Layer 5 is located at the long radius of the elbow.



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OPTIONAL JOINT ALIGNMENT AND TREATMENT (METHOD 1) - Alternatively, the radial seams of Layer 1 and subsequent layers can be aligned. When the radial seams are aligned, apply Hilti CP 606 or FS-ONE MAX Firestop Sealant (Item 2) over the entire edge of the of Hilti Endo-Shield prior to installing the adjacent section.

METHOD 2 - CONTINUOUSLY WRAPPED

Hilti Endo-Shield may be continuously wrapped around the tubing. Using min. ½ in. wide filament tape, aluminum foil tape, or FSK tape, attach leading edge of Hilti Endo-Shield onto the tubing (Item 3) and wrap continuously. Prior to installing the adjacent continuously wrapped section, apply 1/8 in. thick of CP 606 or FS-ONE MAX Firestop Sealant (Item 2) over the entire edge of the Hilti Endo-Shield. A 2 in. overlap of longitudinal seam shall be included for each layer required. For example, a 4 layer system requires an 8 in. overlap on final layer. Apply 3 in. wide aluminum foil tape or FSK tape over the full length of the longitudinal seam.

For elbow sections, follow details for Method 1, Layer 1, and Layer 2, and subsequent layers.

The outer layer for Method 1 and 2 is secured with min. 18 GA steel tie wire or 1/2 in. wide stainless steel banding located 1 in. from each radial seam. Space the steel tie wire 6 in. on center (oc) between the seams or the 1/2 in. wide stainless steel banding 12 in. oc. At the elbows, space the steel wire 2 in. oc or the stainless steel banding 2 in. oc, both at the short interior radius.

OPTIONAL JOINT ALIGNMENT AND TREATMENT (METHOD 1 AND 2) - As an alternative to applying sealant at radial seams and seams between the gore end segment and adjoining straight section, an additional 4 in. wide section of Hilti Endo-Shield may be centered over the radial seam of the final layer overlapping 2 in. at the longitudinal seam. Apply 3 in. wide aluminum foil or FSK tape over the longitudinal seam of the 4 in. wide section of Hilti Endo-Shield. Further secure section with min. 18 GA steel wire or ½ in. wide stainless steel banding located 1 in. from each edge.

When Hilti CPF-ES Endo-Shield is installed on a 4-in. pipe assembly where the radial seams are aligned, sealant (Item 2) and an additional 4 in. wide section of Hilti Endo-Shield are required in combination and must be installed as detailed in Optional Joint Alignment and Treatment. Refer to Figure 2.

OPTIONAL ELBOW TREATMENT (METHOD 1 AND 2) - As an alternative to gore segments Hilti Endo-Shield may be wrapped around the straight sections of pipe adjacent to the elbow per Method 1 or 2 above except material shall not be taped permanently to pipe. Each section to be cut to provide a 45° surface on the side of Hilti Endo-Shield closest to the elbow. Hilti CP 606 or FS-ONE MAX to be applied 1/8 in. thick to cover cut edges on one section. Both sections of Hilti Endo-Shield shall be slid together while aligning the 45° angled cuts. Apply 3 in. wide aluminum or FSK tape over the seam of the adjoining pieces of Hilti Endo-Shield. Further secure elbow treatment with min. 18 GA steel wire located 1 in. from interior radius of elbow treatment on both sections of Hilti Endo-Shield. Tie an additional 3 pieces of min. 18 GA steel wire, to existing wires, centered horizontally and vertically to form a basket around elbow protection.



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2. CERTIFIED MANUFACTURER: Hilti Corporation

CERTIFIED PRODUCT: Sealant

CERTIFIED MODEL: CP 606 or FS-ONE MAX Firestop Sealant

Install CP 606 or FS-ONE MAX Firestop Sealant at seams of elbow gore segments and for any gap greater than 1/8 in. at a butted seam. Use only Hilti CP 606 Sealant bearing an UL Certified Mark and only FS-ONE MAX Firestop Sealant bearing an Intertek Certified Label.

3. FUEL PIPE ASSEMBLY: Min. nominal 1 in. diameter and max. 4 in. diameter Schedule 40 steel pipe. All fittings shall be welded. Pipe shall be supported by steel pipe hangers in conjunction with min. 3/8 in. diameter threaded steel rod. A minimum of two layers of wrap are required for the pipe support system. Refer to manufacturer's installation instructions regarding pipe support assembly.



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