Thermal Ceramics Inc.
Design No. TC/BI 120-05
Fire Resistive Grease Duct Enclosure System
FireMaster® FastWrap® XLS
FireMaster® FastWrap® XL
Pyroscat® Duct Wrap XL
CAN/ULC-S144:
Fire Resistance Rating – 2 Hours

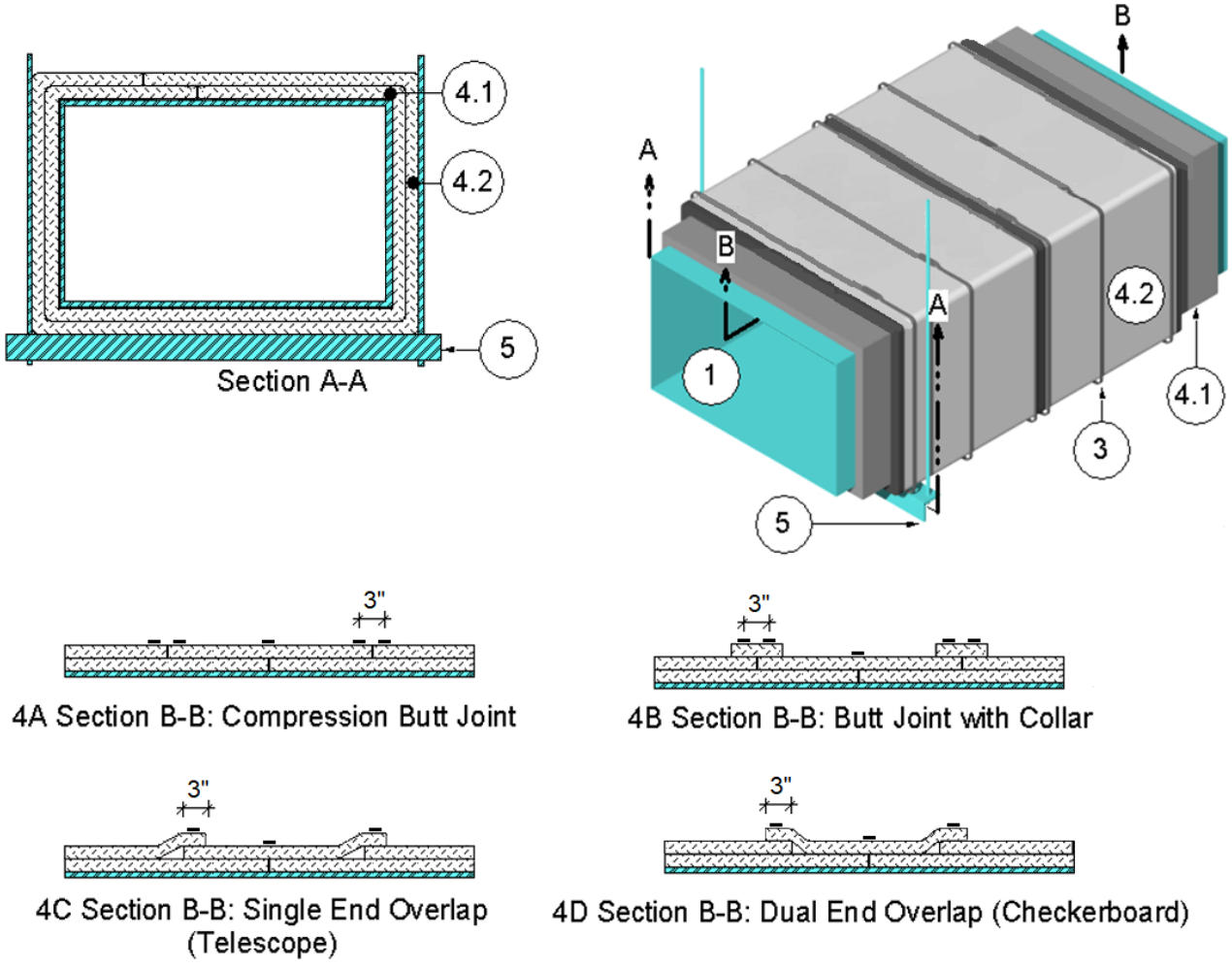

Figure 1. Grease Duct with FireMaster® FastWrap® XLS Duct Insulation

1. **GREASE DUCT:** Use a continuously welded, liquid-tight, rectangular or round duct system with horizontal and vertical shafts with the following construction requirements:

   A. Construction material: Min. 0.059 in. (16 GA) carbon steel.

   B. Dimensions:

   - Rectangular: Max. 1152 $in.^2$ cross-sectional area with a max. 48 in. dimension
   - Round: Max. 36 in. diameter.

   C. Reinforce the grease duct to National Building Code of Canada and NFPA 96 requirements as applicable, designed to carry the weight of the grease duct assembly covered with two layers of duct insulation (Item 4) under a fire load equivalent to that of the ISO 6944 exposure and the ISO 834 time-temperature curve for the rated period.

   D. Rigidly support the grease duct as specified in Item 5 or in accordance with National Building Code of Canada and NFPA 96 requirements when not specified herein or when those requirements are greater. This includes code provisions for design for gravity and seismic loads.

2. **PINS (Not Shown):** When pins are used to secure the duct insulation, weld min. 12 GA, copper-coated, steel insulation pins to the grease duct. Space the pins max. 12 in. on center (oc) and max. 6 in. from grease duct edges. Locate pins 1-1/2 in. to either side of all second layer duct insulation butt joints. Locate pins centered on all second layer duct insulation overlap joints. After the duct insulation is installed, place min. 1-1/2 in. round or square, galvanized steel, self-locking washer clips onto all insulation pins. After clips are installed, cut off or bend pins of excessive length.

3. **BANDING:** When banding is used to secure the duct insulation, use min. 1/2 in. wide, 0.015 in. thick stainless steel or carbon steel bands. Space the bands max. 12 in. on center. Locate the bands 1-1/2 in. to either side of all second layer duct insulation transverse joints. Secure the bands with min. 1 in. long stainless steel or carbon steel crimp clamps corresponding to banding material. Tension the banding to hold the duct insulation in place without cutting or damaging the duct insulation or grease duct.

4. **DUCT INSULATION**

   - **Intertek-Certified, Thermal Ceramics, Inc., nominal 1-1/2 in. thick, nominal 4.4 pcf density, FireMaster® FastWrap® XLS.**
   - **Intertek-Certified, Thermal Ceramics, Inc., nominal 1-1/2 in. thick, nominal 6 pcf density, FireMaster® FastWrap® XL.**
   - **Intertek-Certified, Thermal Ceramics, Inc., nominal 1-1/2 in. thick, nominal 6 pcf density, Pyroscat® Duct Wrap XL.**

   Apply two layers of duct insulation, over the entire surface of the grease duct. Finish and seal exposed ends of insulation with finish/seal tape (Item 8). When needed to ease installation, use filament tape as a temporary hold for the duct insulation. Use one of the following installation methods, with the provision that 3 in. overlap insulation joints can be substituted for compression butt joints at any location:

   A. Compression Butt Joint: Refer to Figure 1, Illustration 4A. Use compression butt joints with min. 1-1/2 in. compression at all joints. Stagger first layer and second layer joints a min. of 6 in. Offset insulation pieces so that first layer insulation pieces are centered under the second layer insulation transverse joints.

Secure the insulation with pins or banding.

B. Butt Joint with Collar: Refer to Figure 1, Illustration 4B. Use tightly butted joints at all joints. Stagger first layer and second layer joints a min. of 6 in. Offset insulation pieces so that first layer insulation pieces are centered under the second layer insulation transverse joints. Place and center 6 in. wide insulation collar over each transverse butt joint. Secure the insulation with pins or banding.

C. Single End Overlap (Telescope): Refer to Figure 1, Illustration 4C. Use tightly butted joints at all first layer joints. Use 3 in. min. overlaps at all second layer joints, overlapping each adjacent insulation edge with the edge of the next piece of insulation. Stagger first layer and second layer joints a min. of 6 in. Secure the insulation with pins or banding.

D. Dual End Overlap (Checkerboard): Refer to Figure 1, Illustration 4D. Use tightly butted joints at all first layer joints. Use 3 in. min. overlaps at all second layer joints, overlapping every other piece of insulation onto the adjacent pieces. Stagger first layer and second layer joints a min. of 6 in. Secure the insulation with pins or banding.

5. SUPPORTS: Support the horizontal portion of the grease duct using an un-insulated “trapeze” system composed of min. 2 × 2 × 1/8 in. steel angle as the cross-member, and two, min. 3/8 in. all-thread, steel rods connected using nuts and washers. The horizontal supports shall be spaced a max. of 60 in. oc between supports. Connect the all-thread steel rods to the underside of the floor/ceiling assembly using an attachment method designed to carry the system weight under a fire exposure condition equivalent to the exposure corresponding to the listed 2-hr fire rating. Place one all-thread steel rod at each end of the trapeze cross-member. Center grease duct covered by duct insulation on trapeze cross-member. Space all-thread steel rods a min. of 1 in. and max. 6 in. from surface of the insulated grease duct. Extend trapeze cross-member at least 2 in. past each all-thread rod. Where the grease duct penetrates a fire rated floor/ceiling assembly, rigidly support the grease duct with a steel frame designed and constructed to meet the requirements of the National Building Code of Canada and NFPA 96.

6. ACCESS DOORS: Where required, install a prefabricated or field-fabricated access door as described in any of the options below:

A. PREFABRICATED ACCESS DOOR: Use the following prefabricated access door.

- Thermal Ceramics Inc. FireMaster FastDoor™ XL, max. 12 in. by 8 in. opening size

The prefabricated access door shall be verified to be listed and labeled by an approved agency for use as a grease duct access door in accordance with UL 1978.

Cut an opening, centrally located, into the side of the grease duct according to the manufacturer's instructions for the size of access door to be installed. After installing the duct insulation, cut and remove the section of duct insulation directly over the opening and matching the outside dimensions of the prefabricated access door. Finish and seal exposed ends of insulation with finish/seal tape. Cut an opening into the side of the grease duct according to the manufacturer's instructions for the size of the prefabricated access door to be installed. Install and tightly secure the prefabricated access door to the

grease duct in accordance with the manufacturer's instructions. Install the factory-insulated cover plate onto the two threaded rods on the access door. Install and finger tighten the provided washers and wing nuts.

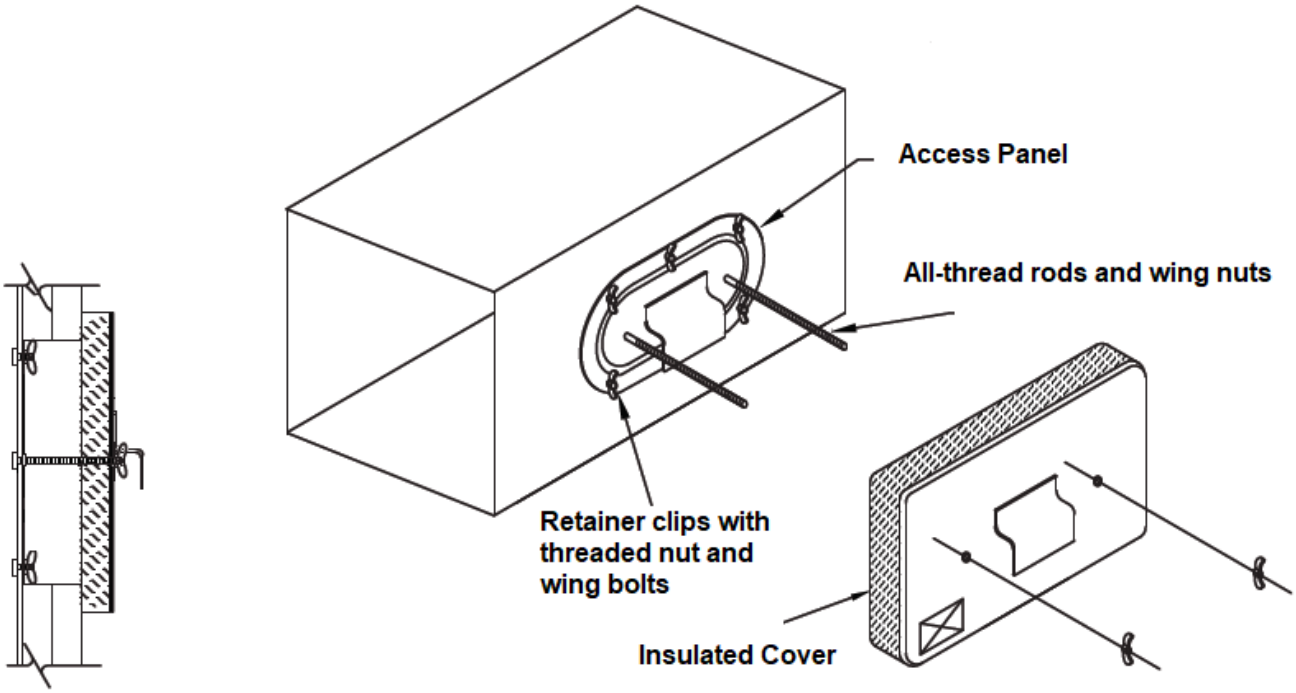

Figure 2 – Prefabricated Access Door – Thermal Ceramics Inc. FireMaster FastDoor™XL

B. PREFABRICATED ACCESS DOOR WITH FIELD FABRICATED COVER: Use one of the following prefabricated access doors.

- DuctMate Industries Inc. Ultimate Door™, max. 24 in. by 18 in. opening size
- DuctMate Industries Inc. F2 Grease Duct Sandwich® Access Door, max. 12 in. by 8 in. opening size
- Component Hardware Group, Hi-Temp Access Door, max. 12 in. by 8 in. opening size
- Thermal Ceramics Inc, FireMaster FastDoor, max. 12 in. by 8 in. opening size

The prefabricated access door shall be verified to be listed and labeled by an approved agency for use as a grease duct access door in accordance with UL 1978.

Cut an opening, centrally located, into the side of the grease duct according

to the manufacturer's instructions for the size of access door to be installed. After installing the duct insulation, cut and remove the section of duct insulation directly over the opening and matching the outside dimensions of the prefabricated access door. Cut the outer layer of insulation another 3 in. wider and taller than the inner layer to create a stepped opening. Install and tightly secure the prefabricated access door to the grease duct in accordance with the manufacturer's instructions. Fit prefabricated access door with 6-in. long, 3/8 in. steel threaded rods for cover plate installation. Use minimum of two (2) threaded rods for max. 12 in. by 8 in. access openings, located along the longitudinal centerline of the access door and spaced max. 4 in. from either side of the access door. Use min. of four (4) threaded rods for access openings greater than 12 in. by 8 in., located at each corner at max. 1-1/2 in. from the door edges. Install two layers of duct insulation, tightly fitted into the stepped opening with min. of 1 in. compression. Cut a third layer of duct insulation sized 3 in. wider and taller than the opening in the second layer of duct insulation. When required for larger doors, the third layer of duct insulation can be made from two pieces of duct insulation tightly butted with min. 1-1/2 in. compression. Seal the cut edges of the third layer of insulation with finish/seal tape (Item 8). Center this third layer of duct insulation over the opening such that it overlaps the second layer insulation opening by 1-1/2 in. Install a 16 GA steel cover plate with holes drilled to match the two threaded rods attached to the access door. The cover plate dimensions shall match the dimensions of the third layer of duct insulation. Fasten the cover plate using steel flat washers and wing nuts, finger tightened.

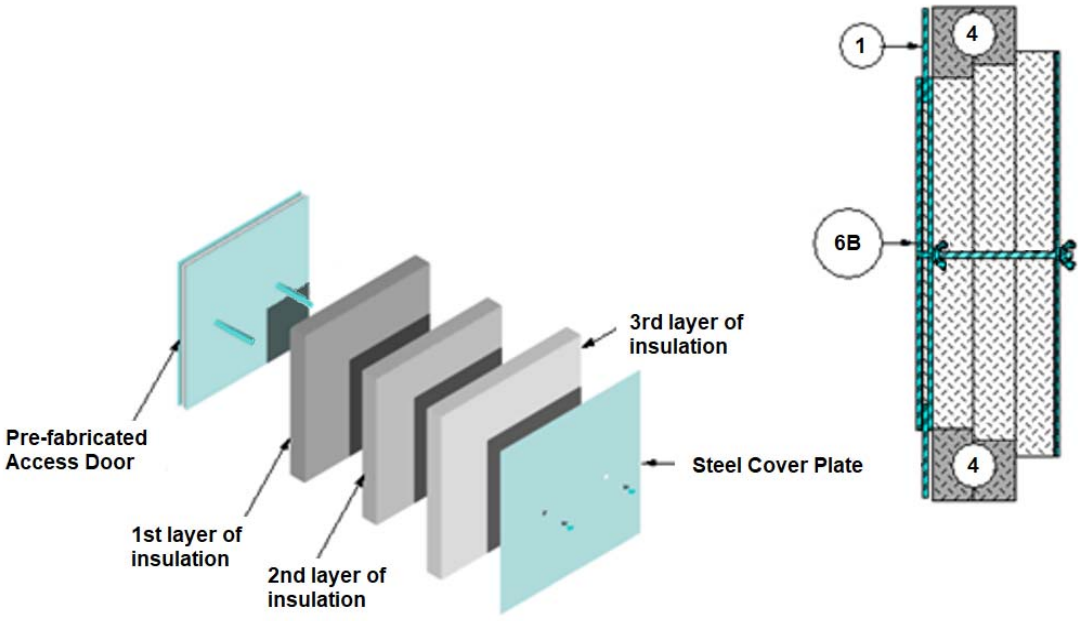

Figure 3 – Prefabricated Access Door with Cover Plate

C. FIELD-FABRICATED ACCESS DOOR WITHOUT COVER PLATE: Install a max. 12 in. by 8 in. (opening size) field-fabricated access door as described below. Cut an opening, centrally located, into the side of the grease duct. After installing the duct insulation, cut and remove the section of duct insulation directly over the opening. Cut the duct insulation 2 in. wider and taller than the opening in the grease duct to maintain a 1 in. clearance to the opening. Cut the outer layer of insulation another 3 in. wider and taller than the inner layer to create a stepped opening. Weld four (4), min. 5 in. long, 1/4 in. diameter, steel threaded rods to the grease duct. Locate one (1) steel rod within 1/2 in. of each corner of the access door opening. Cut a 16 GA steel access door two inches larger in height and width than the access door opening. Drill clearance holes in the access door to match the steel threaded rod pattern. Set the access door in place over the steel threaded rods. Place 4-1/2 in. long hollow steel tubes over the steel threaded rods. Weld four min. 12 GA, min. 5 in. long copper-coated, steel insulation pins to the access door, one at each corner. Install two layers of duct insulation, tightly fitted into the stepped openings. Cut a third layer of duct insulation sized 3 in. wider and taller than the opening in the second layer of duct insulation. Seal the cut edges of the third layer of insulation with finish/seal tape (Item 8). Center this third layer of duct insulation over the opening such that it overlaps the second layer insulation opening by 1-1/2 in. After the duct insulation is installed, place min. 1-1/2 in. round or square, galvanized steel, self-locking washer clips onto the insulation pins. After clips are installed, cut off or bend pins of excessive length. Secure the insulated access door using steel flat washers and wing nuts on the steel threaded rods, finger tightened.

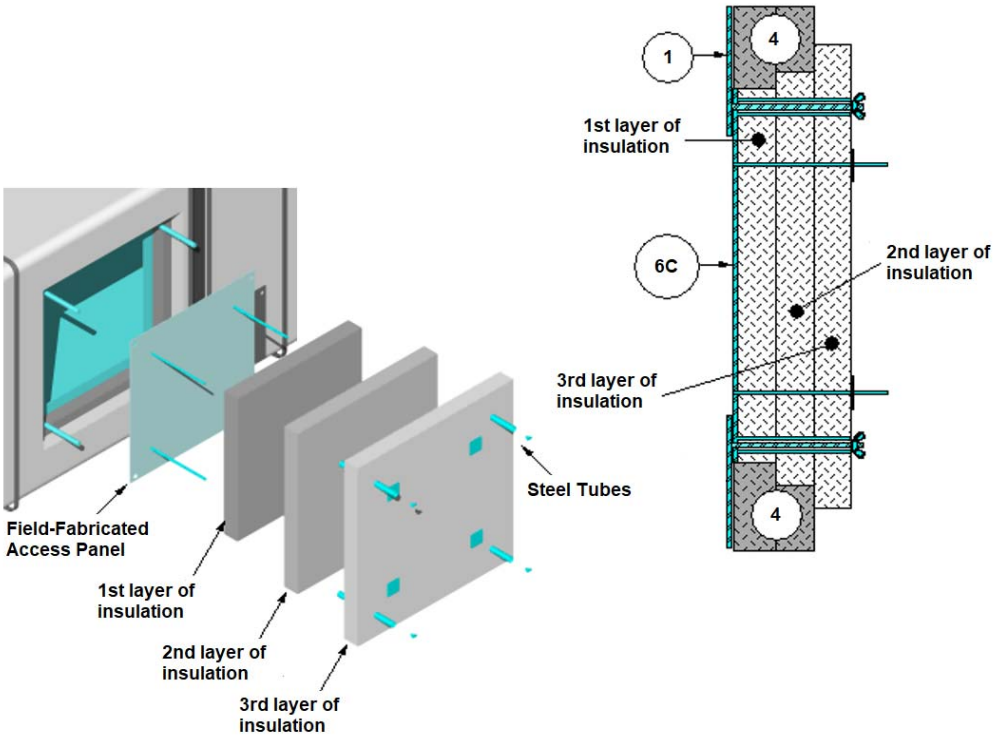

Figure 4 – Field-Fabricated Access Door Without Cover Plate

D. FIELD-FABRICATED ACCESS DOOR WITH COVER PLATE: See Figure 5. Install a max. 20 in. by 20 in. (opening size) field-fabricated access door as described below. Cut an opening, centrally located, into the side of the grease duct. After installing the duct insulation, cut and remove the section of duct insulation directly over the opening. Cut the duct insulation 2 in. wider and taller than the opening in the grease duct to maintain a 1 in. clearance to the opening. Cut the outer layer of insulation another 3 in. wider and taller than the inner layer to create a stepped opening. Cut a 16 GA steel inner access door plate 2 in. larger in height and width than the access door opening. Weld four (4), min. 7 in. long, 1/4 in. diameter, steel threaded rods to the inner access door plate in the corners such that they clear the access door opening. Install the inner access door from inside the duct with the threaded rods passing through the access door opening.

Cut an access door gasket from 1/2 in. thick, nominal 8 pcf, ceramic fiber insulation, with dimensions 4 in. larger in height and width than the access door opening. Alternatively, use the core insulation from the Certified Duct Insulation, sliced to a min. 1/2 in. thickness.

Cut a 16 GA steel outer access door plate 6 in. larger in height and width than the access door opening. Drill clearance holes in the outer access door plate to match the steel threaded rod pattern from the inner access door plate.

Install the access door gasket followed by the outer access door plate over the steel threaded rods. Fasten the outer access door plate and access door gasket using steel flat washers and wingnuts.

Install two layers of duct insulation, tightly fitted into the stepped openings with min. 1 in. compression. Cut a third layer of duct insulation sized 3 in. wider and taller than the opening in the second layer of duct insulation. Seal the cut edges of the third layer of insulation with finish/seal tape (Item 8). Center this third layer of duct insulation over the opening such that it overlaps the second layer insulation opening by 1-1/2 in. When required for larger doors, the third layer of duct insulation can be made from two pieces of duct insulation tightly butted with min. 1-1/2 in. compression.

Cut a 16 GA steel cover plate with dimensions matching the third layer of duct insulation. Drill clearance holes to match the threaded rod pattern. Install the steel cover plate over the duct insulation using steel flat washers and wing nuts on the steel threaded rods, finger tightened.

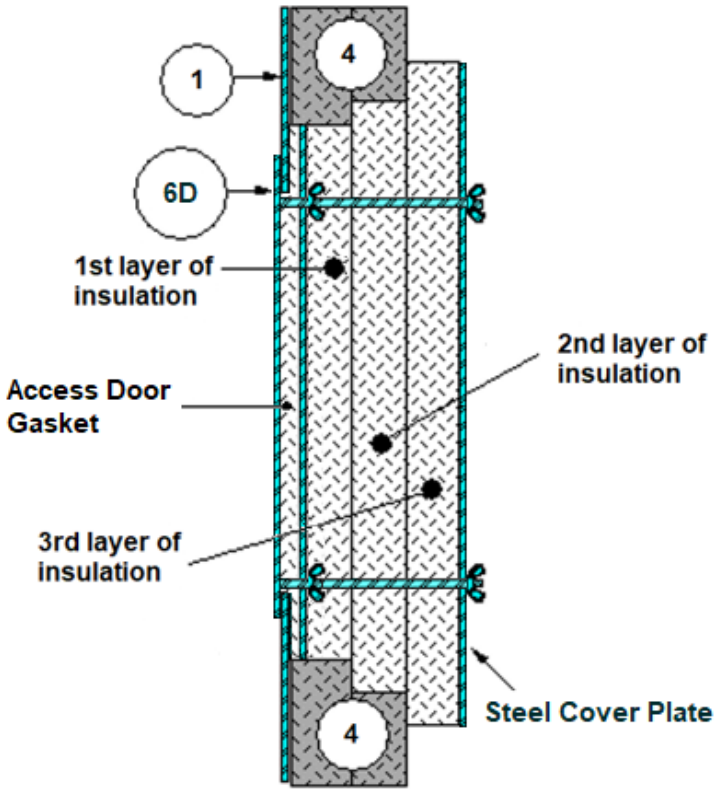

Figure 5 – Field-Fabricated Access Door with Cover Plate

7. **PENETRATION FIRESTOP:** The penetration firestop systems recognized in Intertek Design No. TC/BI 120-06 and TC/BI 120-07 are approved for use. Other firestop systems may be used provided the system is listed by an approved certification agency with the following conditions:

   - The system shall be certified to CAN/ULC-S115 with FT Rating of 2 hours.
   - The system shall be certified to ISO 6944:1985 Duct A with an Insulation, Integrity, and Stability Rating of 2 hours, or shall be certified to CAN/ULC-S144 with a rating of 2 hours.
   - The listed firestop system shall recognize one or more of the FireMaster® and Pyroscat® duct insulation products included in this design; any of the duct insulation products listed in this design listing may be used as an alternate if not directly included in the listed firestop system. In cases where 6 pcf duct insulation is used as the duct insulation that penetrates through the supporting construction or used as the firestop packing material, the overall compression of duct insulation and packing material at the firestop location shall be increased by a factor of min. 1.36.

- The listed firestop system shall not employ fasteners or devices that penetrate the grease duct walls.

8. **FINSH/SEAL TAPE:** Finish and seal exposed ends of insulation with aluminum foil tape, aluminum foil/scrim tape or tape certified to UL 181A or UL 181B.

Consult the listing report on the Directory of Building Products (https://bpdirectory.intertek.com) for the edition of the standard(s) evaluated.

Compliance of the assembly described in this Design Listing with the referenced standard relies on verification that the assembly constructed in the field is consistent with that described herein. Intertek certified products may be verified by the approved Intertek label; other products must be verified by the Authority Having Jurisdiction as meeting the specifications stated herein.