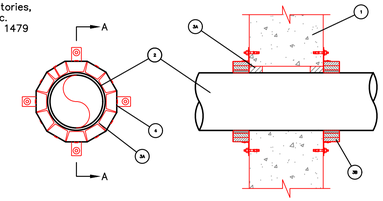
System No. W-J-2091

WJ 2091

Classified by Underwriters Laboratories, Inc. to UL 1479



1. WALL ASSEMBLY —THE 1 OR 2 HR FIRE–RATED GYPSUM WALLBOARD/STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER SPECIFIED IN THE INDIVIDUAL U300 OR U400 SERIES WALL AND PARTITION DESIGNS IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE FOLLOWING CONSTRUCTION FEATURES:

   A. STUDS —WALL FRAMING MAY CONSIST OF EITHER WOOD STUDS OR STEEL CHANNEL STUDS. WOOD STUDS TO CONSIST OF NOM 2 BY 4 IN. LUMBER SPACED 16 IN. OC. STEEL STUDS TO BE MIN 2–1/2 IN. WIDE AND SPACED MAX 24 IN. OC. WHEN STEEL STUDS ARE USED AND THE DIAM OF OPENING EXCEEDS THE WIDTH OF STUD CAVITY, THE OPENING SHALL BE FRAMED ON ALL SIDES USING LENGTHS OF STEEL STUD INSTALLED BETWEEN THE VERTICAL STUDS AND SCREW–ATTACHED TO THE STEEL STUDS AT EACH END. THE FRAMED OPENING IN THE WALL SHALL BE 4 TO 6 IN. WIDER AND 4 TO 6 IN. HIGHER THAN THE DIAM OF THE PENETRATING ITEM SUCH THAT, WHEN THE PENETRATING ITEM IS INSTALLED IN THE OPENING, A 2 TO 3 IN. CLEARANCE IS PRESENT BETWEEN THE PENETRATING ITEM AND THE FRAMING ON ALL FOUR SIDES.
   B. GYPSUM BOARD* —5/8 IN. THICK, 4 FT WIDE WITH SQUARE OR TAPERED EDGES. THE GYPSUM BOARD TYPE, THICKNESS, NUMBER OF LAYERS, FASTENER TYPE AND SHEET ORIENTATION SHALL BE AS SPECIFIED IN THE INDIVIDUAL U300 OR U400 SERIES DESIGN IN THE UL FIRE RESISTANCE DIRECTORY. MAX DIAM OF OPENING IS 32–1/4 IN. FOR STEEL STUD WALLS. MAX DIAM OF OPENING IS 14–1/2 IN. FOR WOOD STUD WALLS.
   THE F RATING OF THE FIRESTOP SYSTEM IS EQUAL TO THE FIRE RATING OF THE WALL ASSEMBLY.

2. THROUGH–PENETRANTS —ONE METALLIC PIPE, CONDUIT OR TUBING TO BE INSTALLED EITHER CONCENTRICALLY OR ECCENTRICALLY WITHIN THE FIRESTOP SYSTEM. THE ANNULAR SPACE SHALL BE MIN 0 IN. TO MAX 2–1/4 IN. PIPE MAY BE INSTALLED WITH CONTINUOUS POINT CONTACT. PIPE, CONDUIT OR TUBING MAY BE INSTALLED AT AN ANGLE NOT GREATER THAN 45 DEGREES FROM PERPENDICULAR. PIPE, CONDUIT OR TUBING TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF METALLIC PIPES, CONDUITS OR TUBING MAY BE USED:

   A. STEEL PIPE —NOM 30 IN DIAM (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE.
   B. IRON PIPE —NOM 30 IN. DIAM (OR SMALLER) CAST OR DUCTILE IRON PIPE.
   C. CONDUIT —NOM 4 IN DIAM (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING OR 6 IN. DIAM STEEL CONDUIT.
   D. COPPER TUBING —NOM 6 IN. DIAM (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING.
   E. COPPER PIPE —NOM 6 IN. DIAM (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE.

3. FILL, VOID OR CAVITY MATERIAL* —SEALANT —MIN 5/8 IN. THICKNESS OF FILL MATERIAL APPLIED WITHIN THE ANNULUS, FLUSH WITH BOTH SURFACES OF WALL. AT THE POINT OR CONTINUOUS CONTACT LOCATIONS BETWEEN PIPE AND WALL, A MIN 1/2 IN. DIAM BEAD OF FILL MATERIAL SHALL BE APPLIED AT THE PIPE WALL INTERFACE ON BOTH SURFACES OF WALL.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC —FS–ONE SEALANT

*BEARING THE UL CLASSIFICATION MARK

HILTI — Hilti Firestop Systems

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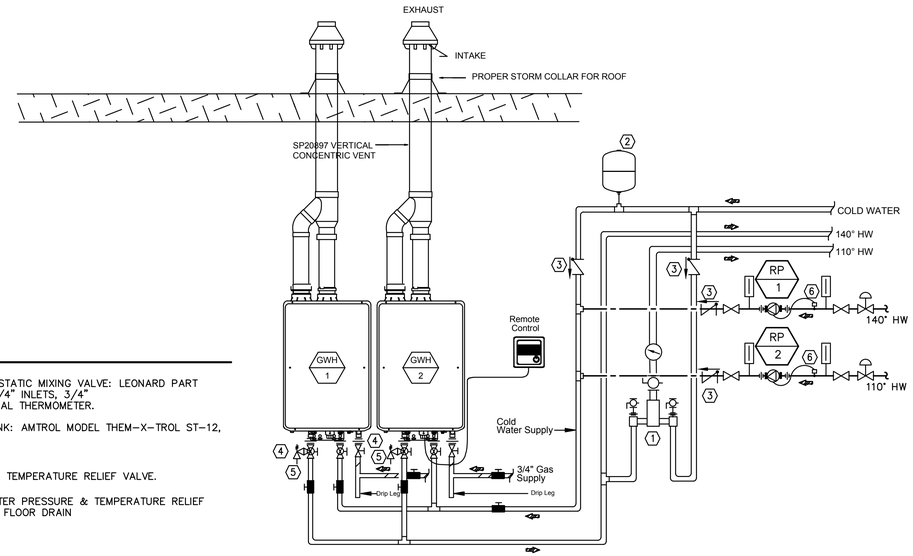


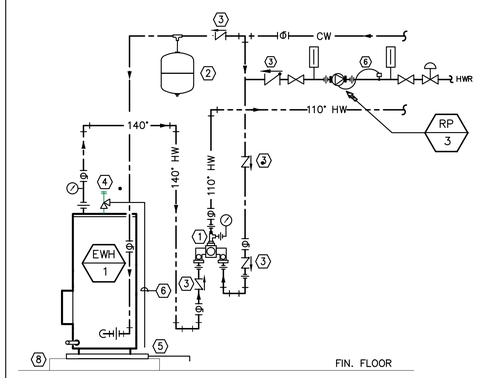
NOTES

1. HI–LO THERMOSTATIC MIXING VALVE: LEONARD PART #TM–26–LF, 3/4" INLETS, 3/4" OUTLET AND DIAL THERMOMETER.
2. EXPANSION TANK: AMTROL MODEL THEM–X–TROL ST–12,
3. CHECK VALVE.
4. PRESSURE AND TEMPERATURE RELIEF VALVE.
5. TERMINATE WATER PRESSURE & TEMPERATURE RELIEF LINE 1" ABOVE FLOOR DRAIN
6. AQUASTAT

GAS WATER HEATER DETAIL

GENERAL NOTES

1. PIPING DIAGRAM SHOWN HERE IS SCHEMATIC. VERIFY AND COORDINATE EXACT PIPING ARRANGEMENTS AND EQUIPMENT LOCATION(S) IN THE FIELD WITH MANUFACTURER PRIOR TO INSTALLATION. MAKE NECESSARY ADJUSTMENTS TO SUIT FIELD CONDITIONS.
2. SET BOILER THERMOSTAT AT 140°F.
3. INSTALLATION SHALL BE IN STRICT CONFORMANCE WITH MANUFACTURER'S REQUIREMENTS.



NOTES

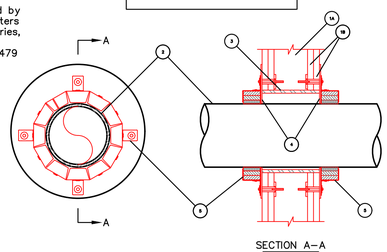
1. HI–LO THERMOSTATIC MIXING VALVE: LEONARD PART #TM–26–LF, 3/4" INLETS, 3/4" OUTLET AND DIAL THERMOMETER.
2. EXPANSION TANK: AMTROL MODEL THEM–X–TROL ST–1,
3. CHECK VALVE.
4. PRESSURE AND TEMPERATURE RELIEF VALVE.
5. PAN DRAIN LINE TO FLOOR DRAIN.
6. TERMINATE WATER PRESSURE & TEMPERATURE RELIEF LINE 1" ABOVE PAN DRAIN.
7. AQUASTAT
8. 4" TALL CONCRETE PAD.

WATER HEATER DETAIL

System No. W-L-2084

WL 2084

Classified by Underwriters Laboratories, Inc. to UL 1479



1. WALL ASSEMBLY —THE FIRE–RATED GYPSUM WALLBOARD/STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER SPECIFIED IN THE INDIVIDUAL U300 OR U400 SERIES WALL AND PARTITION DESIGNS IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE CONSTRUCTION FEATURES NOTED BELOW.

   THE HOURLY F RATING OF THE FIRESTOP SYSTEM IS EQUAL TO THE HOURLY FIRE RATING OF THE WALL ASSEMBLY IN WHICH IT IS INSTALLED. THE HOURLY T RATING IS 1–1/2 HR WHEN INSTALLED IN 2 HR FIRE–RATED WALL, 0 HR WHEN INSTALLED IN 1 HR FIRE–RATED WALL.

   A. STUDS —WALL FRAMING MAY CONSIST OF EITHER WOOD STUDS OR STEEL CHANNEL STUDS. WOOD STUDS TO CONSIST OF NOM 2 BY 4 IN. LUMBER SPACED 16 IN. OC. STEEL STUDS TO BE MIN 2–1/2 IN. WIDE AND SPACED MAX 24 IN. OC.
   B. GYPSUM BOARD* —NOM 5/8 IN. THICK GYPSUM WALLBOARD, AS SPECIFIED IN THE INDIVIDUAL WALL AND PARTITION DESIGN. MAX DIAM OF OPENING IS 8 IN.

2. THROUGH–PENETRANTS —ONE NONMETALLIC PIPE, CONDUIT OR TUBING TO BE INSTALLED WITHIN THE FIRESTOP SYSTEM. THE ANNULAR SPACE BETWEEN PIPE AND PERIPHERY OF OPENING SHALL BE MIN 1/4 IN. TO MAX 1–1/4 IN. PIPE OR CONDUIT TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF THE WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF NONMETALLIC PIPES MAY BE USED:

   A. POLYVINYL CHLORIDE (PVC) PIPE —NOM 6 IN. DIAM (OR SMALLER) SCHEDULE 40 SOLID–CORE OR CELLULAR CORE PVC PIPE FOR USE IN CLOSED (PROCESS OR SUPPLY) OR VENTED (DRAIN, WASTE OR VENT) PIPING SYSTEM.
   B. CHLORINATED POLYVINYL CHLORIDE (CPVC) PIPE —NOM 6 IN. DIAM (OR SMALLER) SDR17 CPVC PIPE FOR USE IN CLOSED (PROCESS OR SUPPLY) OR VENTED (DRAIN, WASTE OR VENT) PIPING SYSTEMS.
   C. ACRYLONITRILE BUTADIENE STYRENE (ABS) PIPE —NOM 6 IN. DIAM (OR SMALLER) SCHEDULE 40 SOLID–CORE OR CELLULAR CORE ABS PIPE FOR USE IN CLOSED (PROCESS OR SUPPLY) OR VENTED (DRAIN, WASTE OR VENT) PIPING SYSTEMS.
   D. FLAME RETARDANT POLYPROPYLENE (FRPP) PIPE —NOM 6 IN. DIAM (OR SMALLER) SCHEDULE 40 FRPP PIPE FOR USE IN CLOSED (PROCESS OR SUPPLY) OR VENTED (DRAIN, WASTE OR VENT) PIPING SYSTEM.

3. METALLIC SLEEVE —NOM 8 IN. DIAM (OR SMALLER) SCHEDULE 40 (OR THINNER) STEEL PIPE CAST INTO WALL ASSEMBLY WITH JOINT COMPOUND AND INSTALLED FLUSH WITH WALL SURFACES

4. METAL COVER PLATE —MIN. 18 GA. STEEL WITH MAX I.D. 1/4 IN. LARGER THAN O.D. OF PIPE. MIN. O.D. OF COVER PLATE TO BE 2–1/2 IN. LARGER THAN O.D. OF PIPE. INSTALLED BETWEEN COLLAR AND WALL SURFACES.

5. FIRESTOP DEVICE* —FIRESTOP COLLAR —FIRESTOP COLLAR SHALL BE INSTALLED IN ACCORDANCE WITH THE ACCOMPANYING INSTALLATION INSTRUCTIONS. COLLAR TO BE INSTALLED AND LATCHED AROUND THE PIPE AND SECURED TO BOTH SIDES OF THE WALL USING THE ANCHOR HOOKS PROVIDED WITH THE COLLAR. (MINIMUM 2 ANCHOR HOOKS FOR 1–1/2 AND 2 IN. DIAM PIPES, 3 ANCHOR HOOKS FOR 3 AND 4 IN. DIAM PIPES, AND 4 ANCHOR HOOKS FOR 6 IN. DIAM PIPES). THE ANCHOR HOOKS ARE TO BE SECURED TO THE SURFACE OF WALL WITH 3/16 BY 2–1/2 IN. LONG TOGGLE BOLTS ALONG WITH WASHERS. AS AN ALTERNATE FOR PIPE SIZES OF NOM 4 IN. DIAM OR LESS, MIN NO. 10 BY 1–1/2 IN. LONG DRYWALL OR LAMINATE SCREWS WITH MIN 3/4 IN. STEEL WASHERS MAY BE USED.
   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI INC —CP 643 50/1.5"N, CP 643 63/2"N, CP 643 90/3"N, CP 643 110/4"N OR CP 643 160/6"N FIRESTOP COLLAR

*BEARING THE UL CLASSIFICATION MARK

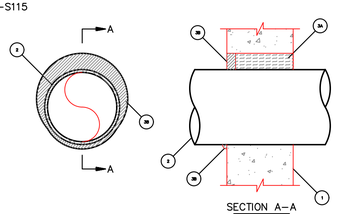
HILTI — Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. November 29, 2005

System No. W-J-1089

WJ 1089

Classified by Underwriters Laboratories, Inc. to UL 1479 and CAN/ULC-S115



1. FLOOR OR WALL ASSEMBLY -- MIN 4–1/2 IN. (114 MM) THICK REINFORCED LIGHTWEIGHT OR NORMAL WEIGHT (100–150 PCF OR 1600–2400 KG/M3) CONCRETE FLOOR. MIN 5 IN. (127 MM) THICK REINFORCED LIGHTWEIGHT OR NORMAL WEIGHT (100–150 PCF OR 1600–2400 KG/M3) CONCRETE WALL. WALL MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS*. MAX DIAM OF OPENING IS 12 IN. (305 MM).

2. STEEL SLEEVE -- (OPTIONAL) – NOM 12 IN. (305 MM) DIAM (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE CAST OR GROUTED INTO FLOOR OR WALL ASSEMBLY, FLUSH WITH FLOOR OR WALL SURFACES.

3. THROUGH–PENETRANT -- ONE METALLIC PIPE, TUBE OR CONDUIT TO BE INSTALLED WITHIN THE OPENING. THE FOLLOWING TYPES AND SIZES OF METALLIC PENETRANTS MAY BE USED:

   A. STEEL PIPE -- NOM 6 IN. (152 MM) DIAM (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE.
   B. IRON PIPE -- NOM 6 IN. (152 MM) DIAM (OR SMALLER) CAST OR DUCTILE IRON PIPE.
   C. COPPER PIPE -- NOM 6 IN. (152 MM) DIAM (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE.
   D. COPPER TUBING -- NOM 6 IN. (152 MM) DIAM (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING.

4. PIPE COVERING* -- NOM 2 IN. (51 MM) THICK (OR THINNER) HOLLOW CYLINDRICAL HEAVY DENSITY GLASS FIBER UNITS JACKETED ON THE OUTSIDE WITH AN ALL SERVICE JACKET. LONGITUDINAL JOINTS SEALED WITH METAL FASTENERS OR FACTORY–APPLIED SELF–SEALING LAP TAPE. TRANSVERSE JOINTS SECURED WITH METAL FASTENERS OR WITH BUTT TAPE SUPPLIED WITH THE PRODUCT. THE ANNULAR SPACE BETWEEN THE PIPE COVERING AND PERIPHERY OF OPENING SHALL BE MIN 1/4 IN. (6 MM) TO MAX 1–5/8 IN. (41 MM).
   SEE PIPE AND EQUIPMENT COVERING – MATERIALS (BRGU) CATEGORY IN THE BUILDING MATERIALS DIRECTORY FOR NAMES OF MANUFACTURERS. ANY PIPE COVERING MATERIAL MEETING THE ABOVE SPECIFICATIONS AND BEARING THE UL CLASSIFICATION MARKING WITH A FLAME SPREAD INDEX OF 25 OR LESS AND A SMOKE DEVELOPED INDEX OF 50 OR LESS MAY BE USED
   THE T RATING IS 0 HR WHEN PIPE COVERING IS LESS THAN NOM 2 IN. (51 MM) THICK.

5. FIRESTOP SYSTEM -- THE FIRESTOP SYSTEM SHALL CONSIST OF THE FOLLOWING:

   A. PACKING MATERIAL -- MIN 4 IN. (102 MM) THICKNESS OF 4 PCF (64 KG/M3) MINERAL WOOL BATT INSULATION TIGHTLY PACKED INTO THE OPENING AS A PERMANENT FORM. PACKING MATERIAL TO BE RECESSED FROM TOP SURFACE OF FLOOR TO ACCOMMODATE THE REQUIRED THICKNESS OF FILL MATERIAL.

   B. FILL, VOID OR CAVITY MATERIAL – SEALANT* -- MIN 1/2 IN. (6 MM) THICKNESS OF FILL MATERIAL APPLIED WITHIN THE ANNULUS FLUSH WITH THE TOP SURFACE OF THE FLOOR OR BOTH SURFACES OF THE WALL.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC -- CP606 SEALANT

*BEARING THE UL CLASSIFICATION MARK

HILTI — Hilti Firestop Systems

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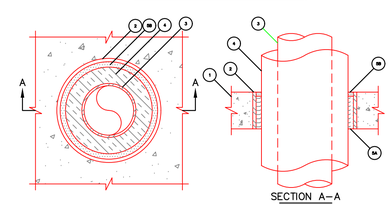
System No. C-AJ-5265

CAJ 5265

Classified by Underwriters Laboratories, Inc. to UL 1479 and CAN/ULC-S115



1. WALL ASSEMBLY —MIN 3–3/4 IN. THICK REINFORCED LIGHTWEIGHT OR NORMAL WEIGHT (100–150 PCF) CONCRETE. WALL MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS*. MAX DIAMETER OF OPENING 10–1/2 IN.
   SEE CONCRETE BLOCKS (CAZT) CATEGORY IN THE FIRE RESISTANCE DIRECTORY FOR NAMES OF MANUFACTURERS.

2. THROUGH–PENETRANTS —ONE METALLIC PIPE, CONDUIT OR TUBING TO BE INSTALLED EITHER CONCENTRICALLY OR ECCENTRICALLY WITHIN THE FIRESTOP SYSTEM. AN ANNULAR SPACE OF MIN 0 IN. (POINT CONTACT) TO MAX 1–7/8 IN. IS REQUIRED WITHIN FIRESTOP SYSTEM. PIPE, CONDUIT OR TUBING TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF METALLIC PIPES, CONDUITS OR TUBING MAY BE USED:

   A. STEEL PIPE —NOM 8 IN. DIAM (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE.
   B. IRON PIPE —NOM 8 IN. DIAM (OR SMALLER) CAST OR DUCTILE IRON PIPE.
   C. CONDUIT —NOM 4 IN. DIAM (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING (EMT) OR 6 IN. DIAM STEEL CONDUIT.
   D. COPPER TUBING —NOM 4 IN. DIAM (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING.
   E. COPPER PIPE —NOM 4 IN. DIAM (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE.
   F. FLEXIBLE STEEL CONDUIT+ —NOM 2 IN. DIAM (OR SMALLER) FLEXIBLE STEEL CONDUIT.
   SEE FLEXIBLE METAL CONDUIT (DXUZ) CATEGORY IN THE ELECTRICAL CONSTRUCTION EQUIPMENT DIRECTORY FOR NAMES OF MANUFACTURERS.

3. FIRESTOP SYSTEM —THE FIRESTOP SYSTEM SHALL CONSIST OF THE FOLLOWING:

   A. PACKING MATERIAL —MIN 1–5/8 IN. OR 2–1/4 IN. THICKNESS OF MIN 4 PCF MINERAL WOOL BATT INSULATION FIRMLY PACKED INTO OPENING ON ONE SIDE OF THE WALL AS PERMANENT FORM FOR 1 AND 2 HR WALLS, RESPECTIVELY. PACKING MATERIAL TO BE RECESSED FROM ONE SIDE OF WALL AS REQUIRED TO ACCOMMODATE THE REQUIRED THICKNESS OF FILL MATERIAL.
   B. FILL, VOID OR CAVITY MATERIAL —SEALANT* —MIN 1–1/2 IN. THICKNESS APPLIED WITHIN OPENING, FLUSH WITH ONE SURFACE OF WALL. AT THE POINT CONTACT LOCATION BETWEEN PIPE AND WALL, A MIN 1/2 IN. DIAM BEAD OF FILL MATERIAL SHALL BE APPLIED AT THE PIPE/WALL INTERFACE.

   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC —FS–ONE SEALANT

*BEARING THE UL CLASSIFICATION MARK
+BEARING THE UL LISTING MARK

HILTI — Hilti Firestop Systems

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