

### SCHEDULES OF THROUGH PENETRATION FIRESTOP SYSTEMS

CONCRETE FLOORS			CONCRETE OR BLOCK WALLS		
TYPE OF PENETRANT	F-RATING (HR)	UL-CLASSIFIED SYSTEM	TYPE OF PENETRANT	F-RATING (HR)	UL-CLASSIFIED SYSTEM
SINGLE METAL PIPES OR CONDUIT	1	CAJ-1228	SINGLE METAL PIPES OR CONDUIT	1	CAJ-1228
	2	CAJ-1229		2	CAJ-1229
	3	CAJ-1228		3	CAJ-1228
SINGLE INSULATED PIPES	1	CAJ-6960, CAJ-6961	SINGLE INSULATED PIPES	1	CAJ-6960, CAJ-6961
	2	CAJ-6960, CAJ-6961		2	CAJ-6960, CAJ-6961
	3	CAJ-6960		3	CAJ-6960
NON INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	CAJ-7048	NON INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	CAJ-7048
	2	CAJ-7048		2	CAJ-7048
	3	CAJ-7048		3	CAJ-7048
MIXED PENETRANTS	1	CAJ-8041	MIXED PENETRANTS	1	CAJ-8041
	2	CAJ-8041		2	CAJ-8041
	3	CAJ-8041		3	CAJ-8041

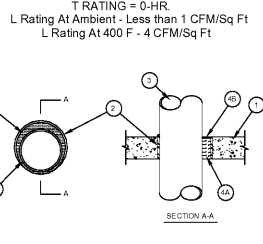
### GYPSON WALLBOARD ASSEMBLIES

TYPE OF PENETRANT	F-RATING (HR)	UL-CLASSIFIED SYSTEM
METAL PIPES OR CONDUIT	1	W-L-1154, W-L-1156
INSULATED PIPES	1	W-L-028
	2	W-L-029
NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	W-L-7040, W-L-7042
	2	W-L-7040, W-L-7042
MIXED PENETRANTS	1	W-L-8013
	2	W-L-8013

NOTES:  
 1. JOBSITE CONDITIONS OF EACH THROUGH-PENETRATION FIRESTOP SYSTEM MUST MEET ALL DETAILS OF THE UL-CLASSIFIED SYSTEM SELECTED.  
 2. WHERE MORE THAN ONE APPLICABLE UL-CLASSIFIED SYSTEM IS LISTED IN THE SCHEDULES, CHOOSE THE UL SYSTEM WHICH IS MOST ECONOMIC FOR EACH PENETRANT TYPE.  
 3. COORDINATE WORK WITH OTHER TRADES TO ASSURE THE PENETRATION OPENING SIZES ARE APPROPRIATE FOR PENETRANT LOCATIONS, AND VICE VERSA.

#### System No. C-AJ-1226

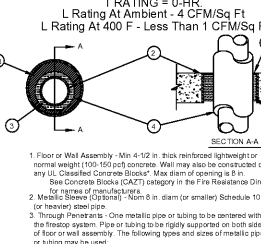
F RATING = 3-HR  
 T RATING = 0-HR  
 L Rating At Ambient - Less than 1 CFM/Sq Ft  
 L Rating At 400 F - 4 CFM/Sq Ft



- Floor or Wall Assembly - Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified Concrete Block. Max diam of opening is 2 in.
- Metall Sleeve - (Optional) Nom 3/4 in. diam (or smaller) Schedule 40 (or heavier) steel sleeve cast or grouted into floor or wall assembly. Flush with top surface or extending a max of 1/2 in. above floor or beyond both surfaces of wall.
- Through-Penetrant - One metallic pipe, tube or conduit to be installed either concentrically or eccentrically within the firestop system. The annular space between penetrant and periphery of opening shall be max 1/8 in. (spot contact) to max 1/16 in. Penetrant may be installed with continuous joint contact. Penetrant to be tightly supported on both sides of floor or wall assembly. The following types and sizes of metallic penetrants may be used.
  - Steel Pipe - Nom 3/8 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
  - Iron Pipe - Nom 3/8 in. diam (or smaller) cast or ductile iron pipe.
  - Copper Pipe - Nom 3/8 in. diam (or smaller) Regular (or heavier) copper pipe.
  - Copper Tubing - Nom 3/8 in. diam (or smaller) Type 1, (or heavier) copper tubing.

#### System No. C-AJ-5090

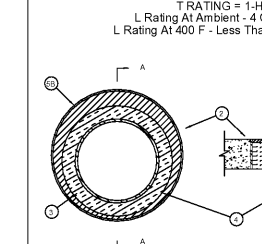
F RATING = 3-HR  
 T RATING = 0-HR  
 L Rating At Ambient - 4 CFM/Sq Ft  
 L Rating At 400 F - Less Than 1 CFM/Sq Ft



- Floor or Wall Assembly - Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified Concrete Block. Max diam of opening is 2 1/8 in.
- Metall Sleeve (Optional) - Nom 3/4 in. diam (or smaller) Schedule 10 (or heavier) steel sleeve.
- Through-Penetrant - One metallic pipe or tubing to be centered within the firestop system. Penetrant to be tightly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipe or tubing may be used.
  - Steel Pipe - Nom 3/8 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
  - Iron Pipe - Nom 3/8 in. diam (or smaller) Regular (or heavier) copper pipe.
  - Copper Pipe - Nom 3/8 in. diam (or smaller) Regular (or heavier) copper pipe.
  - Copper Tubing - Nom 3/8 in. diam (or smaller) Type 1, (or heavier) copper tubing.

#### System No. C-AJ-5091

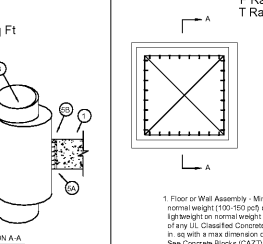
F RATING = 2-HR  
 T RATING = 1-HR  
 L Rating At Ambient - 4 CFM/Sq Ft  
 L Rating At 400 F - Less Than 1 CFM/Sq Ft



- Floor or Wall Assembly - Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified Concrete Block. Max diam of opening is 2 1/8 in.
- Metall Sleeve (Optional) - Nom 3/4 in. diam (or smaller) Schedule 10 (or heavier) steel sleeve.
- Through-Penetrant - One metallic pipe or tubing to be installed either concentrically or eccentrically within the firestop system. Pipe or tubing to be tightly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipe or tubing may be used.
  - Steel Pipe - Nom 3/8 in. diam (or smaller) Regular (or heavier) copper pipe.
  - Iron Pipe - Nom 3/8 in. diam (or smaller) Regular (or heavier) copper pipe.
  - Copper Pipe - Nom 3/8 in. diam (or smaller) Regular (or heavier) copper pipe.
  - Copper Tubing - Nom 3/8 in. diam (or smaller) Type 1, (or heavier) copper tubing.

#### System No. C-AJ-7046

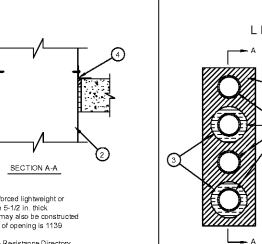
F Rating - 3 Hr  
 T Rating - 0 Hr



- Floor or Wall Assembly - Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified Concrete Block. Max diam of opening is 1 1/8 in. so with a max diameter of 3/32 in.
- Steel Sleeve - Min 1/2 in. dia. (or smaller) Regular (or heavier) steel sleeve. The annular space shall be min 1/4 in. (1/8 in. in duct) to be tightly supported on both sides of floor or wall assembly.
- Firestop System - The firestop system shall consist of the following:
  - Firestop Material - Min 3/16 in. thickness of non-4-pd mineral wool batt insulation (MWO) packed into opening as a permanent form. Packing material to be increased from top surface of floor or wall assembly to bottom surface of floor or wall assembly to accommodate the required thickness of fill material.
  - Fill Void or Cavity Material - Sealant - Min 1/8 in. thickness of fill material applied within the annular, flush with top surface of floor or wall with both surfaces of wall.
  - Through-Penetrant - One metallic pipe or tubing to be installed either concentrically or eccentrically within the firestop system. Pipe or tubing to be tightly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipe or tubing may be used.
    - Steel Pipe - Nom 1/2 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
    - Iron Pipe - Nom 1/2 in. diam (or smaller) Regular (or heavier) copper pipe.
    - Copper Pipe - Nom 1/2 in. diam (or smaller) Regular (or heavier) copper pipe.
    - Copper Tubing - Nom 1/2 in. diam (or smaller) Type 1, (or heavier) copper tubing.

#### System No. C-AJ-8041

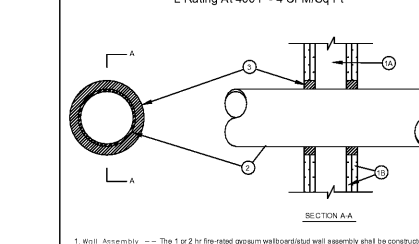
F RATING = 3-HR  
 T Rating = 0 and 1-HR  
 L Rating At Ambient - 10 CFM/Sq Ft  
 L Rating At 400 F - Less Than 6 CFM/Sq Ft



- Floor or Wall Assembly - Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified Concrete Block. Max diam of opening is 1 1/8 in. so with a max diameter of 3/32 in.
- Steel Sleeve - Min 1/2 in. dia. (or smaller) Regular (or heavier) steel sleeve. The annular space shall be min 1/4 in. (1/8 in. in duct) to be tightly supported on both sides of floor or wall assembly.
- Firestop System - The firestop system shall consist of the following:
  - Firestop Material - Min 3/16 in. thickness of non-4-pd mineral wool batt insulation (MWO) packed into opening as a permanent form. Packing material to be increased from top surface of floor or wall assembly to bottom surface of floor or wall assembly to accommodate the required thickness of fill material.
  - Fill Void or Cavity Material - Sealant - Min 1/8 in. thickness of fill material applied within the annular, flush with top surface of floor or wall with both surfaces of wall.
  - Through-Penetrant - One metallic pipe or tubing to be installed either concentrically or eccentrically within the firestop system. Pipe or tubing to be tightly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipe or tubing may be used.
    - Steel Pipe - Nom 1/2 in. diam (or smaller) Regular (or heavier) copper pipe.
    - Iron Pipe - Nom 1/2 in. diam (or smaller) Regular (or heavier) copper pipe.
    - Copper Pipe - Nom 1/2 in. diam (or smaller) Regular (or heavier) copper pipe.
    - Copper Tubing - Nom 1/2 in. diam (or smaller) Type 1, (or heavier) copper tubing.

#### System No. W-L-1054

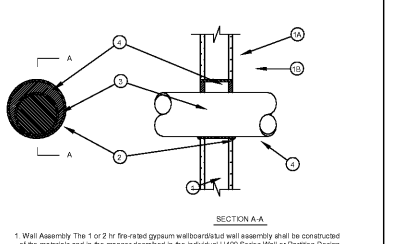
F Ratings - 1 and 2 Hr (See Items 1 and 3)  
 T Rating - 0 Hr  
 L Rating At Ambient - Less Than 1 CFM/Sq Ft  
 L Rating At 400 F - 4 CFM/Sq Ft



- Wall Assembly - The 1 or 2 hr fire-rated gypsum wallboard wall assembly shall be constructed of the materials and in the manner specified in the individual U400 or U400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
  - Steel Stud - 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 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 secured to the steel studs at each end. The framed opening in the wall shall be 4 to 6 in. wider and 4 to 8 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.
  - Gypsum Board - The gypsum wallboard type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U400 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 14-1/2 in. for wood stud walls. Max diam of opening is 14-1/2 in. for wood stud walls.

#### System No. W-L-1164

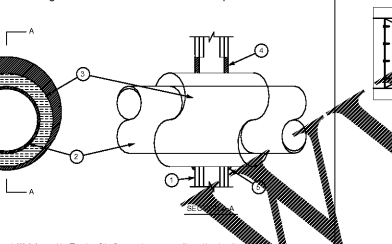
F Ratings - 1 and 2 Hr (See Items 1 and 4)  
 T Rating - 0 Hr



- Wall Assembly - The 1 or 2 hr fire-rated gypsum wallboard wall assembly shall be constructed of the materials and in the manner specified in the individual U400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
  - Steel Stud - 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 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 secured to the steel studs at each end. The framed opening in the wall shall be 4 to 6 in. wider and 4 to 8 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.
  - Gypsum Board - The gypsum wallboard type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U400 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 14-1/2 in. for wood stud walls. Max diam of opening is 14-1/2 in. for wood stud walls.

#### System No. W-L-5029

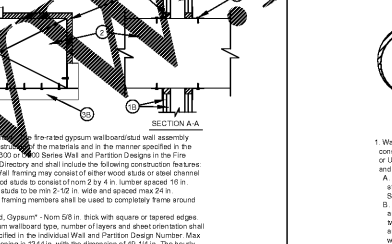
F Ratings - 1 and 2 Hr (See Item 1)  
 T Ratings - 1/2, 3/4, 1 and 1-3/4 Hr (See Item 3)  
 L Rating At Ambient - Less Than 1 CFM/Sq Ft  
 L Rating At 400 F - Less Than 1 CFM/Sq Ft



- Wall Assembly - The 1 or 2 hr fire-rated gypsum wallboard wall assembly shall be constructed of the materials and in the manner specified in the individual U400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
  - Steel Stud - 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 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 secured to the steel studs at each end. The framed opening in the wall shall be 4 to 6 in. wider and 4 to 8 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.
  - Gypsum Board - The gypsum wallboard type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U400 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 14-1/2 in. for wood stud walls. Max diam of opening is 14-1/2 in. for wood stud walls.

#### System No. W-L-7046

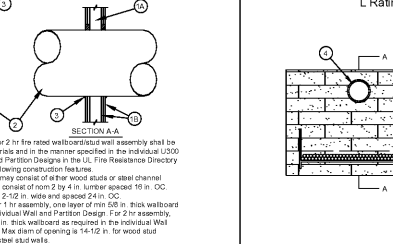
F Ratings - 1 and 2 Hr (See Items 1 and 3)  
 T Rating - 0 Hr



- Wall Assembly - The 1 or 2 hr fire-rated gypsum wallboard wall assembly shall be constructed of the materials and in the manner specified in the individual U400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
  - Steel Stud - 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 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 secured to the steel studs at each end. The framed opening in the wall shall be 4 to 6 in. wider and 4 to 8 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.
  - Gypsum Board - The gypsum wallboard type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U400 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 14-1/2 in. for wood stud walls. Max diam of opening is 14-1/2 in. for wood stud walls.

#### System No. W-L-7042

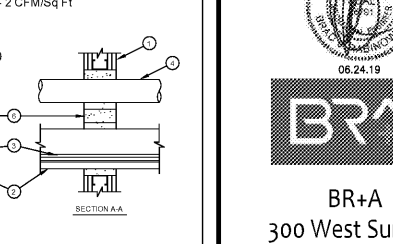
F Ratings - 1 and 2 Hr (See Items 1 and 3)  
 T Rating - 0 Hr



- Wall Assembly - The 1 or 2 hr fire-rated gypsum wallboard wall assembly shall be constructed of the materials and in the manner specified in the individual U400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
  - Steel Stud - 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 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 secured to the steel studs at each end. The framed opening in the wall shall be 4 to 6 in. wider and 4 to 8 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.
  - Gypsum Board - The gypsum wallboard type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U400 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 14-1/2 in. for wood stud walls. Max diam of opening is 14-1/2 in. for wood stud walls.

#### System No. W-L-8013

F Ratings - 1 and 2 Hr (See Item 1)  
 T Rating - 0 Hr  
 L Rating At Ambient - 5 CFM/Sq Ft  
 L Rating At 400 F - 2 CFM/Sq Ft



- Wall Assembly - The 1 or 2 hr fire-rated gypsum wallboard wall assembly shall be constructed of the materials and in the manner specified in the individual U400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
  - Steel Stud - 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 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 secured to the steel studs at each end. The framed opening in the wall shall be 4 to 6 in. wider and 4 to 8 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.
  - Gypsum Board - The gypsum wallboard type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U400 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 14-1/2 in. for wood stud walls. Max diam of opening is 14-1/2 in. for wood stud walls.

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BWA JOB # 2019-095

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Charlotte, NC 28203

PROJECT NUMBER: 19-018  
 CONSTRUCTION ISSUE: 6.20.2019  
 PERMIT COMMENTS: 06.24.2019

FIRE STOPPING DETAILS - PLUMBING  
 SCALE: AS NOTED  
**P0.3**

# Order Plans

# Order Plans