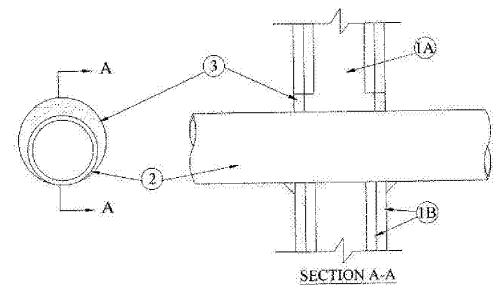


UL Design No. W-L-1054

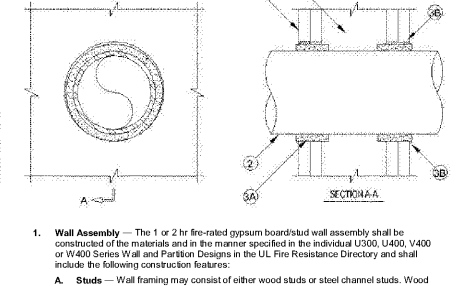
October 14, 2015		CANULC 5115	
F Rating — 1 and 2 Hr (See Item 1 and 3)	FH Rating — 1 and 2 Hr (See Item 1 and 3)	F Rating — 1 and 2 Hr (See Item 1 and 3)	FH Rating — 1 and 2 Hr (See Item 1 and 3)
L Rating — 0 Hr	FT Rating — 0 Hr	L Rating — 0 Hr	FT Rating — 0 Hr
L Rating at Ambient — Less Than 1 CFM/sq ft	FH Rating at Ambient — Less Than 1 CFM/sq ft	L Rating at Ambient — Less Than 1 CFM/sq ft	FH Rating at Ambient — Less Than 1 CFM/sq ft
L Rating at 400 F — Less Than 1 CFM/sq ft	FH Rating at 400 F — Less Than 1 CFM/sq ft	L Rating at 400 F — Less Than 1 CFM/sq ft	FH Rating at 400 F — Less Than 1 CFM/sq ft



- Wall Assembly** — The 1 or 2 hr fire-rated gypsum board/steel 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:
 - Studs** — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nominal 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.
- Through-Penetrants** — One metallic pipe or tubing to be centered within the freestop system. Pipe or tubing to be rigidly supported on both sides of wall assembly.
- Steel Pipe** — Nom 10 in. (254 mm) diam (or smaller) Schedule 40 (or heavier) steel pipe.
- Copper Tubing** — Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tubing.

UL Design No. W-L-2406

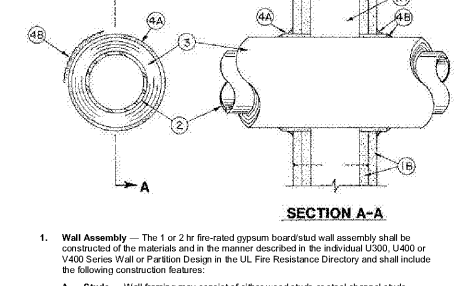
January 26, 2015		CANULC 5115	
F Rating — 1 and 2 Hr (See Item 1)	FH Rating — 1 and 2 Hr (See Item 1)	F Rating — 1 and 2 Hr (See Item 1)	FH Rating — 1 and 2 Hr (See Item 1)
L Rating at Ambient — Less Than 1 CFM/sq ft	FH Rating at Ambient — Less Than 1 CFM/sq ft	L Rating at Ambient — Less Than 1 CFM/sq ft	FH Rating at Ambient — Less Than 1 CFM/sq ft
L Rating at 400 F — Less Than 1 CFM/sq ft	FH Rating at 400 F — Less Than 1 CFM/sq ft	L Rating at 400 F — Less Than 1 CFM/sq ft	FH Rating at 400 F — Less Than 1 CFM/sq ft



- Wall Assembly** — The 1 or 2 hr fire-rated gypsum board/steel wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
 - Studs** — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nominal 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.
- Through-Penetrants** — One metallic pipe or tubing to be centered within the freestop system. Pipe or tubing to be rigidly supported on both sides of wall assembly.
- Steel Pipe** — Nom 10 in. (254 mm) diam (or smaller) Schedule 40 (or heavier) steel pipe.
- Copper Tubing** — Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tubing.

UL Design No. W-L-5001

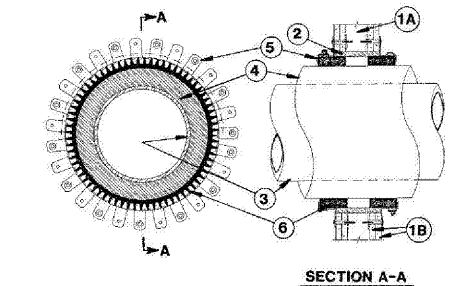
May 19, 2005		CANULC 5115	
F Rating — 1 and 2 Hr (See Item 1)	FH Rating — 1 and 2 Hr (See Item 1)	F Rating — 1 and 2 Hr (See Item 1)	FH Rating — 1 and 2 Hr (See Item 1)
L Rating at Ambient — Less Than 1 CFM/sq ft	FH Rating at Ambient — Less Than 1 CFM/sq ft	L Rating at Ambient — Less Than 1 CFM/sq ft	FH Rating at Ambient — Less Than 1 CFM/sq ft
L Rating at 400 F — Less Than 1 CFM/sq ft	FH Rating at 400 F — Less Than 1 CFM/sq ft	L Rating at 400 F — Less Than 1 CFM/sq ft	FH Rating at 400 F — Less Than 1 CFM/sq ft



- Wall Assembly** — The 1 or 2 hr fire-rated gypsum board/steel wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
 - Studs** — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nominal 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.
- Through-Penetrants** — One metallic pipe or tubing to be centered within the freestop system. Pipe or tubing to be rigidly supported on both sides of wall assembly.
- Steel Pipe** — Nom 10 in. (254 mm) diam (or smaller) Schedule 40 (or heavier) steel pipe.
- Copper Tubing** — Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tubing.

UL Design No. W-L-5025

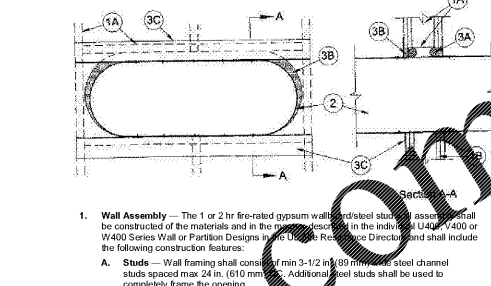
February 06, 2017		CANULC 5115	
F Rating — 1 and 2 Hr (See Item 1)	FH Rating — 1 and 2 Hr (See Item 1)	F Rating — 1 and 2 Hr (See Item 1)	FH Rating — 1 and 2 Hr (See Item 1)
L Rating at Ambient — Less Than 1 CFM/sq ft	FH Rating at Ambient — Less Than 1 CFM/sq ft	L Rating at Ambient — Less Than 1 CFM/sq ft	FH Rating at Ambient — Less Than 1 CFM/sq ft
L Rating at 400 F — Less Than 1 CFM/sq ft	FH Rating at 400 F — Less Than 1 CFM/sq ft	L Rating at 400 F — Less Than 1 CFM/sq ft	FH Rating at 400 F — Less Than 1 CFM/sq ft



- Wall Assembly** — The 1 or 2 hr fire-rated gypsum board/steel wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
 - Studs** — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nominal 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.
- Through-Penetrants** — One metallic pipe or tubing to be centered within the freestop system. Pipe or tubing to be rigidly supported on both sides of wall assembly.
- Steel Pipe** — Nom 10 in. (254 mm) diam (or smaller) Schedule 40 (or heavier) steel pipe.
- Copper Tubing** — Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tubing.

UL Design No. W-L-7033

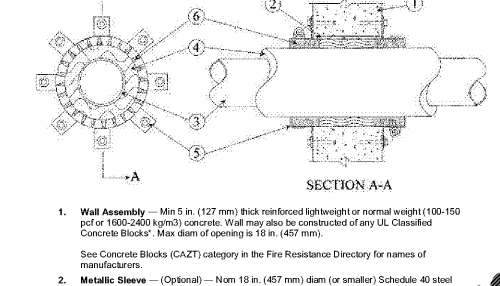
July 20, 2017		CANULC 5115	
F Rating — 1 and 2 Hr (See Item 1)	FH Rating — 1 and 2 Hr (See Item 1)	F Rating — 1 and 2 Hr (See Item 1)	FH Rating — 1 and 2 Hr (See Item 1)
L Rating at Ambient — Less Than 1 CFM/sq ft	FH Rating at Ambient — Less Than 1 CFM/sq ft	L Rating at Ambient — Less Than 1 CFM/sq ft	FH Rating at Ambient — Less Than 1 CFM/sq ft
L Rating at 400 F — Less Than 1 CFM/sq ft	FH Rating at 400 F — Less Than 1 CFM/sq ft	L Rating at 400 F — Less Than 1 CFM/sq ft	FH Rating at 400 F — Less Than 1 CFM/sq ft



- Wall Assembly** — The 1 or 2 hr fire-rated gypsum board/steel wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
 - Studs** — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nominal 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.
- Through-Penetrants** — One metallic pipe or tubing to be centered within the freestop system. Pipe or tubing to be rigidly supported on both sides of wall assembly.
- Steel Pipe** — Nom 10 in. (254 mm) diam (or smaller) Schedule 40 (or heavier) steel pipe.
- Copper Tubing** — Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tubing.

UL Design No. W-L-5003

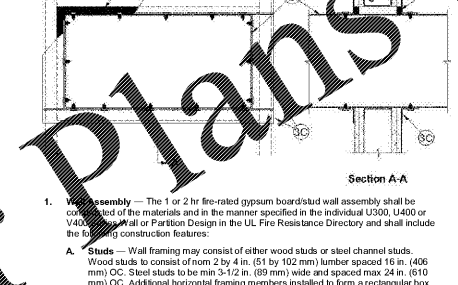
January 21, 2015		CANULC 5115	
F Rating — 2 Hr	FH Rating — 2 Hr	F Rating — 2 Hr	FH Rating — 2 Hr
L Rating — 1-3/4 Hr	FT Rating — 1-3/4 Hr	L Rating — 1-3/4 Hr	FT Rating — 1-3/4 Hr



- Wall Assembly** — Min 5 in. (127 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete. Wall may also be constructed of any UL Classified Concrete Block. Max diam of opening is 18 in. (457 mm). See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
- Metallic Sleeve** — (Optional) — Nom 18 in. (457 mm) diam (or smaller) Schedule 40 steel pipe cast or grouted into wall assembly.
- Through-Penetrants** — One metallic pipe or tubing to be centered within the freestop system. Pipe or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes or tubing may be used:
 - Steel Pipe** — Nom 10 in. (254 mm) diam (or smaller) Schedule 40 (or heavier) steel pipe.
 - Copper Tubing** — Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tubing.
 - Copper Pipe** — Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.
- Pipe Covering** — Nom 1/8 in. (3.2 mm) thick hollow cylindrical heavy density (min 3.5 pcf or 56 kg/m³) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing tape. Transverse joints sealed with metal fasteners or with built up tape supplied with the product. An annular space between the pipe covering and the pipe shall be min 1/4 in. (6 mm) when nom 2 in. (51 mm) thick pipe covering is used. Two layers of wrap strip shall be installed on each surface of wall.

UL Design No. W-L-7060

September 24, 2004		CANULC 5115	
F Rating — 1 and 2 Hr (See Item 1)	FH Rating — 1 Hr	F Rating — 1 and 2 Hr (See Item 1)	FH Rating — 1 Hr
L Rating — 1-1/2 Hr	FT Rating — 1-1/2 Hr	L Rating — 1-1/2 Hr	FT Rating — 1-1/2 Hr

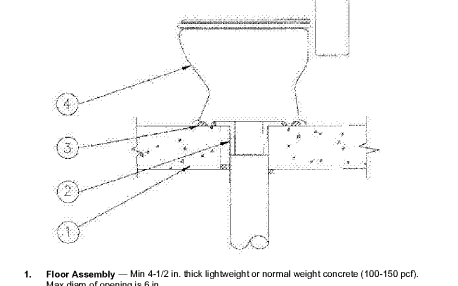


- Wall Assembly** — The 1 or 2 hr fire-rated gypsum board/steel wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400 or V400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
 - Studs** — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nominal 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC. Additional horizontal framing members installed to form a rectangular box around the steel duct (Item 2).
- Steel Duct** — Max 24 by 30 in. (610 by 762 mm) No. 26 gauge (or heavier) galv steel duct installed concentrically or eccentrically within opening. Annular space between duct and periphery of opening to be min 0 in. (0 mm, point contact) to max 2 in. (51 mm). Duct to be rigidly supported on both sides of the wall assembly.
- Freestop System** — The freestop system shall consist of the following:
 - Packing Material** — (Optional, Not Shown) Mineral wool batt insulation, foam backer rod or glass fiber insulation installed as a permanent form to facilitate installation of fill material (Item 3B).
 - Fill, Void or Cavity Material** — Sealant — Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with both surfaces of wall assembly. Additional fill material applied to completely fill the collar.

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

UL Design No. F-A-2040

September 17, 2001		CANULC 5115	
F Rating — 2 Hr	FT Rating — 2 Hr	F Rating — 2 Hr	FT Rating — 2 Hr



- Floor Assembly** — Min 4-1/2 in. thick lightweight or normal weight concrete (100-150 pcf). Max diam of opening is 6 in.
- Nonmetallic Pipe** — One nonmetallic drain pipe with max 4 in. diam ball-float installed either concentrically or eccentrically within the freestop system. The annular space between drain pipe and periphery of opening shall be min 0 in. (point contact) to max 1-1/2 in. (38 mm) to be rigidly supported on lower side of floor assembly. The following types and sizes of nonmetallic pipes, fittings and fittings may be used:
 - Polyvinyl Chloride (PVC) Pipe** — Nom 4 in. diam (or smaller) Schedule 40 solid core or cellular core PVC pipe for use in vented (drain, waste or vent) piping system.
 - Acrylonitrile Butadiene Styrene (ABS) Pipe** — Nom 4 in. diam (or smaller) Schedule 40 cellular core or solid core ABS pipe for use in vented (drain, waste or vent) piping system.
- Fill, Void or Cavity Material** — Sealant — Min 1 in. thickness of fill material applied within the annulus, flush with bottom surface of floor. All point contact location between concrete and pipe, min 1/2 in. diam bead of fill material shall be applied at the pipe/concrete interface on bottom surface of floor assembly. A min 1/2 in. diam bead of fill material shall also be applied around top edge of ball float. Prior to placement of water closed, a min 1/2 in. diam bead of fill material shall be applied to the bottom surface of the outer rim of the water closed.
- Water Closed** — Floor mounted vitreous china water closed.

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

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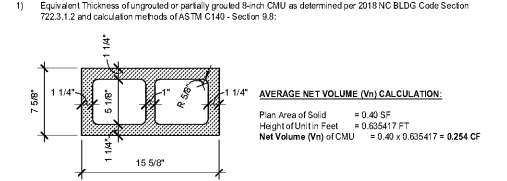
HOME 2 SUITES BY HILTON
HAWLEY AVE
BELMONT, NC 28012

KEY PLAN

Revisions

#	Date	Description

CFR-W: Calculated Fire Resistance for 1, 2, & 3-HR CMU



EQUIVALENT THICKNESS (Te) CALCULATION PER ASTM C140 SECTION 9.8 (Hollow Units)

Te = (Vn / (L x H)) x 1728

Te = equivalent thickness, in.
Vn = average net volume of full-size units, cf.
L = average length of full-size units, in.
H = average height of full-size units, in.

Te = (0.254 / (15.625 x 7.625)) x 1728
Te = (0.254 / 119.140625) x 1728
Te = 0.004124 x 1728
Te = 7.025 in.

2) Equivalent Thickness of 8-inch CMU with airspaces and cells filled as determined per 2018 NC BLDG Code Section 7223.1.3, CMU with airspaces and cells filled as determined per 2018 NC BLDG Code Section 7223.1.4 and calculation methods per ASTM C140 - Section 9.8:

EQUIVALENT THICKNESS (Te) CALCULATION PER ASTM C140 SECTION 9.8 (Units with Airspaces and Cells Filled)

Te = (Vn / (L x H)) x 1728

Te = equivalent thickness, in.
Vn = average net volume of full-size units, cf.
L = average length of full-size units, in.
H = average height of full-size units, in.

Te = (0.527 / (15.625 x 7.625)) x 1728
Te = (0.527 / 119.140625) x 1728
Te = 0.004426 x 1728
Te = 7.625 in.

3) Fire resistance rating of concrete masonry walls as determined per NC BLDG Code Section/Table 7223.2 indicates that a bearing or nonbearing concrete masonry wall with a fire-resistance rating of 1, 2, and 3 hours requires the following minimum equivalent thicknesses:

REQUIRED MINIMUM EQUIVALENT THICKNESS (Te) OF 1-HR RATED CMU (per types of aggregates used)

- 1) Punice or expanded slag aggregates
- 2) Expanded shale, clay, or slate aggregates
- 3) Limestone, cinders, or unexpanded slag aggregates
- 4) Calcareous or siliceous gravel aggregates

REQUIRED MINIMUM EQUIVALENT THICKNESS (Te) OF 2-HR RATED CMU (per types of aggregates used)

- 1) Punice or expanded slag aggregates
- 2) Expanded shale, clay, or slate aggregates
- 3) Limestone, cinders, or unexpanded slag aggregates
- 4) Calcareous or siliceous gravel aggregates

REQUIRED MINIMUM EQUIVALENT THICKNESS (Te) OF 3-HR RATED CMU (per types of aggregates used)

- 1) Punice or expanded slag aggregates
- 2) Expanded shale, clay, or slate aggregates
- 3) Limestone, cinders, or unexpanded slag aggregates
- 4) Calcareous or siliceous gravel aggregates

Project Number: 18021
Issued For: CONSTRUCTION
Issue Date: 2019-06-07

DRAWING TITLE
UL DESIGN ASSEMBLIES