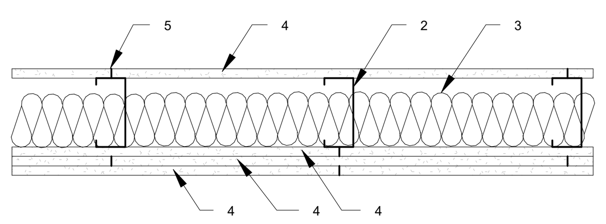
Design No. U408
May 09, 2012
Nonbearing Wall Rating — 2 Hr



1. **Floor and ceiling Runners** - (Not Shown) - Channel shaped, 3-1/2 inch (min) deep, with min 1-1/4 inch long legs, fabricated from min 25 MSG corrosion-protected steel, attached to floor and ceiling with fasteners 24 inch OC maximum

1A. **Framing Members* - Floor and Ceiling Runner** - Not shown - In lieu of Item 1 - For use with Item 2A, proprietary channel shaped runners, 1-1/4 inch deep by min 3-1/2 inch wide fabricated from min 0.020 inch thick galv steel, attached to floor and ceiling with fasteners spaced 24 in. OC maximum
CALIFORNIA EXPANDED METAL PRODUCTS CO - Viper20 TM Track
MARINO/WARE, DIV OF WARE INDUSTRIES INC - Viper20 TM Track
PHILLIPS MFG CO L L C - Viper20 TM Track
TELLING INDUSTRIES L L C - Viper20 TM Track

1B. **Framing Members* - Floor and Ceiling Rummers** - Not shown - In lieu of Item 1 - For use with Item 2B, channel shaped runners, 1-1/4 inch deep by min 3-1/2 inch wide fabricated from min 0.018 inch thick galv steel, attached to floor and ceiling with fasteners spaced 24 inch OC max.
CLARKDIETRICH BUILDING SYSTEMS - CD ProTRAK
DMFCWBS L L C - ProTRAK
SOUOTHEASTERN STUD & COMPONENTS INC - ProTRAK
STEEL STRUCTURAL SYSTEMS L L C - Tri -S ProTrak
TELLING INDUSTRIES L L C - TRUE-TRACK TM

2. **Steel Studs** - Channel shaped, min 3-1/2 inch deep, 1-1/4 inch flanges and 3/16 inch returns, fabricated from min 25 MSG corrosion-protected steel, spaced a max of 24 inch OC. Studs to be cut 5/8 inch less than assembly height and friction-fit in place.

2A. **Framing Member* - Steel Studs** - Not shown - in Lieu of Item 2 - For use with Item 1A, proprietary channel shaped steel studs, 1-1/4 inch deep by min 3-1/2 inch wide fabricated from min 0.020 inch thick galv steel Stud cut 5/8 inch less in length than assembly height.
CALIFORNIA EXPANDED METAL PRODUCTS CO - Viper20 TM
MARINO/WARE, DIV OF WARE INDUSTRIES INC - Viper20 TM
PHILLIPS MFG CO L L C - Viper20 TM
TELLING INDUSTRIES L L C - Viper20 TM

2B. **Framing Members* - Steel Studs**- Not shown - In lieu of Item 2 - For use with Item 1B, channel shaped steel studs, min 3-1/2 inch wide fabricated from min 0.018 inch thick galv steel, spaced a max of 24 inch OC. Studs cut 5/8 inch less in length than assembly height.
CLARKDIETRICH BUILDING SYSTEMS - CD ProSTUD
DMFCWBS L L C- ProSTUD
SOUTHEASTERN STUD & COMPONENTS INC - ProSTUD
STEEL STRUCTURAL SYSTEMS L L C - Tri-S ProSTUD
TELLING INDUSTRIES L L C - TRUE - STUD TM

3. **Batts and blankets*** - (optional) places in stud cavities, any glass fiber or mineral wool insulation bearing the UL Classification Marking as to Surface Burning Characteristics and/or Fire Resistance.
see **Batts and Blankets** (BKNV or BZJZ) Categories for names of Classified companies.

4. **gypsum Board*** - Gypsum panels with beveled, square or tapered edges. Base layer applied vertically or horizontal on both sides of the studs, with vertical joints centered over studs and staggered one stud cavity on opposite sides of studs. Horizontal edge joints (when applied horizontally) and horizontal butt joints (when applied vertically) on opposite sides of studs need not be staggered or backed. Base layer panels attached to studs with 1 inch long type S crews spaced 8 inch OC when applied horizontally, or 8 inch OC along the vertical edges and 12 inch OC in the field when applied vertically. Remaining two layers applied vertically or horizontally on one side of the wall. Horizontal butt joints staggered a minimum of 6 inch on adjacent layers. First o these two layers attached to studs with 1-5/8 inch long type A screws spaced 12 inch OC. Face layer attached to studs with 2-3/8 inch. type S screws spaced 8 inch OC when used in widths other than 48 inch, gypsum panels to be installed horizontally.
CGC INC - 5/8 inch thick Type AR, C, IP-AR, C, IP-X1, IP-X2, IPC-AR, SCX, SGX, SHX, WRX,WRC,USGX (Joint tape and compound, Item 5, optional for use with type USGX).
USG MEXICO S A DE C V - 5/8 inch thick Type AR, C, IP-AR, C, IP-X1, IP-X2, IPC-AR, SCX, SHX, WRX, WRC.

4A. **Gypsum Board*** - (As an alternate to Item 4, not for use witih Items 1B and 2B) - Nom 5/8 inch thick gypsum panels with beveled, square or tapered edges installed as described in item 4.
CGC INC - Type ULX.
UNITED STATES GYPSUM CO - type ULX.
USG MEXICO S A DE C V - Type ULX.

5. **Joint Tape and Compound** - Vinyl or casein, dry or premixed joint compound applied in two coats to joints and screw heads or outer layers. paper tape, nom 2 inch wide, embedded in first layer of compound over all joints od outer layer panels. When square-edge gypsum board is used, treatment of joints is optional.

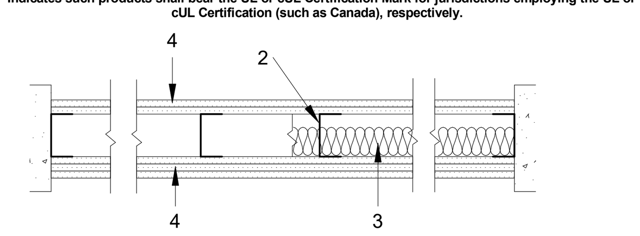
6. **Caulking and Sealants*** - (optional, not shown) - A bead of acoustical sealant applied around the partition perimeter for sound control.
UNITED STATES GYPSUM CO - Type AS

*Bearing the UL Classification Mark

Design No. U412

November 21, 2017

Nonbearing Wall Rating — 2 Hr
*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**



1. Floor and Ceiling Runner — (Not Shown) — 25 MSG (min) galv steel 1 in. high, return legs 1-5/8 in. wide (min), attached to floor and ceiling with fasteners 24 in. OC max.

1A. Framing Members* — Floor and Ceiling Runners — (Not Shown) — As an alternate to Item 1 - For use with Item 2A, channel shaped, min 1-5/8 in. wide, attached to floor and ceiling with fasteners 24 in. OC. max.

ALLSTEEL & GYPSUM PRODUCTS INC — Type SUPREME Framing System

CONSOLIDATED FABRICATORS CORP, BUILDING PRODUCTS DIV — Type SUPREME Framing System

QUAIL RUN BUILDING MATERIALS INC — Type SUPREME Framing System

SCAFCO STEEL STUD MANUFACTURING CO — Type SUPREME Framing System

STEEL CONSTRUCTION SYSTEMS INC — Type SUPREME Framing System

UNITED METAL PRODUCTS INC — Type SUPREME Framing System

1B. Framing Members — Floor and Ceiling Runner* — (Not Shown) — In lieu of Item 1 — For use with Item 2B, proprietary channel shaped runners, 1-1/4 in. deep by min 1-5/8 in. wide fabricated from min 0.018 in. thick galv steel, attached to floor and ceiling with fasteners spaced 24 in. OC max.

CALIFORNIA EXPANDED METAL PRODUCTS CO — Viper20™ Track

MARINO/WARE, DIV OF WARE INDUSTRIES INC — Viper20™ Track

1C. Framing Members* — Floor and Ceiling Runners — (Not Shown) — As an alternate to Item 1 - For use with Item 2C, channel shaped, min 1-5/8 in. wide fabricated from min 0.015 in. thick galv steel, attached to floor and ceiling with fasteners 24 in. OC. max.

CLARKDIETRICH BUILDING SYSTEMS — CD ProTRAK

DMFCWBS L L C — ProTRAK

MBA METAL FRAMING — ProTRAK

RAM SALES L L C — Ram ProTRAK

STEEL STRUCTURAL PRODUCTS L L C — Tri-S ProTRAK

1D. Framing Members* — Floor and Ceiling Runners — (Not Shown) — As an alternate to Item 1 - For use with Item 2D, channel shaped, min 1-5/8 in. wide fabricated from min 0.018 in. thick galv steel, attached to floor and ceiling with fasteners 24 in. OC. max.

TELLING INDUSTRIES L L C — TRUE-TRACK™

1E. Framing Members* — Floor and Ceiling Runners — (Not Shown) — As an alternate to Item 1 - For use with Item 2E, channel shaped, min 1-5/8 in. wide fabricated from min 25 MSG steel, attached to floor and ceiling with fasteners 24 in. OC. max.

KIRII (HONG KONG) LTD — Type KIRII

1F. Framing Members — Floor and Ceiling Runner* — (Not Shown) — In lieu of Item 1 — For use with Item 2F, proprietary channel shaped runners, 1-1/4 in. deep by min 1-5/8 in. wide fabricated from min 0.018 in. thick galv steel, attached to floor and ceiling with fasteners spaced 24 in. OC max.

TELLING INDUSTRIES L L C — Viper20™ Track

1G. Framing Members* — Floor and Ceiling Runners — (Not Shown) — As an alternate to Item 1 - For use with Item 2G, channel shaped, min 1-5/8 in. wide (SmartTrack20™), min 3-5/8 in. wide (SmartTrack25™), attached to floor and ceiling with fasteners 24 in. OC max.

CRACO MFG INC — SmartTrack25™, SmartTrack20™

1H. Framing Members* — Floor and Ceiling Runners — (Not Shown) — As an alternate to Item 1 - For use with Item 2K. Channel shaped, attached to floor and ceiling with fasteners 24 in. OC. max.

BAILEY METAL PRODUCTS LTD — Type PLATINUM PLUS

1I. Framing Members* — Floor and Ceiling Runners — (Not Shown) — As an alternate to Item 1 - For use with Item 2L, channel shaped, min 3-1/2 in. wide fabricated from min 0.018 in. thick galv steel, attached to floor and ceiling with fasteners 24 in. OC. Max.

STEEL INVESTMENT GROUP L L C — AlphaTRAK

1J. Framing Members — Floor and Ceiling Runner* — (Not Shown) — In lieu of Item 1 — For use with Item 2M, proprietary channel shaped runners, 1-1/4 in. deep by min 1-5/8 in. wide fabricated from min 25 MSG (0.018 in. min. bare metal thickness), attached to floor and ceiling with fasteners spaced 24 in. OC max.

CALIFORNIA EXPANDED METAL PRODUCTS CO — Viper X Track

2. Steel Studs — 1-5/8 in. wide (min), 1-1/4 in. legs, 1/4 in. return, formed of 25 MSG (min) galv steel max stud spacing 24 in. OC. Studs to be cut 3/4 in. less than assembly height.

2A. Framing Members*— Steel Studs — As an alternate to Item 2 — For use with Item 1A, channel shaped studs, min 1-5/8 in. wide, spaced a max of 24 in. OC. Studs to be cut 3/4 in. less than assembly height.

ALLSTEEL & GYPSUM PRODUCTS INC — Type SUPREME Framing System

CONSOLIDATED FABRICATORS CORP, BUILDING PRODUCTS DIV — Type SUPREME Framing System

QUAIL RUN BUILDING MATERIALS INC — Type SUPREME Framing System

SCAFCO STEEL STUD MANUFACTURING CO — Type SUPREME Framing System

STEEL CONSTRUCTION SYSTEMS INC — Type SUPREME Framing System

UNITED METAL PRODUCTS INC — Type SUPREME Framing System

2B. Framing Members* — Steel Studs — Not Shown — In lieu of Item 2 — For use with Item 1B, channel shaped steel studs, 1-1/4 in. deep by min 1-5/8 in. wide fabricated from min 0.018 in. thick galv steel. Studs to be cut 3/4 in. less in length than assembly height.

CALIFORNIA EXPANDED METAL PRODUCTS CO — Viper20™

MARINO/WARE, DIV OF WARE INDUSTRIES INC — Viper20™

2C. Framing Members* — Steel Studs — As an alternate to Item 2 — For use with Item 1C, channel shaped studs, min 1-5/8 in. wide fabricated from min 0.015 in. thick galv steel, spaced a max of 24 in. OC. Studs to be cut 3/4 in. less than assembly height.

CLARKDIETRICH BUILDING SYSTEMS — CD ProSTUD

DMFCWBS L L C — ProSTUD

MBA METAL FRAMING — ProSTUD

RAM SALES L L C — Ram ProSTUD

STEEL STRUCTURAL PRODUCTS L L C — Tri-S ProSTUD

2D. Framing Members*— Steel Studs — As an alternate to Item 2 — For use with Item 1D, channel shaped studs, min 1-5/8 in. wide fabricated from min 0.018 in. thick galv steel, spaced a max of 24 in. OC. Studs to be cut 3/4 in. less than assembly height.

TELLING INDUSTRIES L L C — TRUE-STUD™

2E. Framing Members* — Steel Studs — As an alternate to Item 2 — For use with Item 1D, channel shaped studs, min 1-5/8 in. wide fabricated from min 25 MSG steel, spaced a max of 24 in. OC. Studs to be cut 3/4 in. less than assembly height.

KIRII (HONG KONG) LTD — Type KIRII

2F. Framing Members* — Steel Studs — Not Shown — In lieu of Item 2 — For use with Item 1F, channel shaped steel studs, 1-1/4 in. deep by min 1-5/8 in. wide fabricated from min 0.018 in. thick galv steel. Studs to be cut 3/4 in. less in length than assembly height.

TELLING INDUSTRIES L L C — Viper20™

2G. Framing Members* — Steel Studs — As an alternate to Item 2 — For use with Item 1G, channel shaped studs, min 1-5/8 in. wide (SmartStud20™), min 3-5/8 in. wide (SmartStud25™) spaced a max of 24 in. OC. Studs to be cut 3/4 in. less than assembly height.

CRACO MFG INC — SmartStud25™, SmartStud20™

2H. Framing Members* — Steel Studs — Not Shown — In lieu of Item 2 — For use with Item 1, channel shaped steel studs, 1-1/4 in. deep by min 1-5/8 in. wide fabricated from min 25 MSG galv steel. Studs to be cut 3/4 in. less in length than assembly height.

EB METAL INC — NITROSTUD

2I. Framing Members* — Steel Studs — Not Shown — In lieu of Item 2 — For use with Item 1, channel shaped steel studs, min 1-5/8 in. deep by min 1-1/4 in. wide, fabricated from min 25 MSG galv steel. Studs cut 3/4 in. less in length than assembly height.

OLMAR SUPPLY INC — PRIMESTUD

2J. Framing Members* — Steel Studs — As an alternate to Item 2 — For use with Item 1B (3-5/8 in. wide track), channel shaped studs, fabricated from min 25 MSG corrosion-protected steel, 1-1/4 in. wide by 3-5/8 in. deep, spaced a max of 24 in. OC. Studs to be cut 3/8 to 3/4 in. less than assembly height.

MARINO/WARE, DIV OF WARE INDUSTRIES INC — StudRite™

2K. Framing Members* — Steel Studs — As an alternate to Item 2 — For use with Item 1H, channel shaped, min 3-5/8 in. wide, spaced a max of 24 in. OC. Studs to be cut 3/8 to 3/4 in. less than assembly height.

BAILEY METAL PRODUCTS LTD — Type PLATINUM PLUS

2L. Framing Members*— Steel Studs — As an alternate to Item 2 — For use with Item 1I, channel shaped studs, min 3-1/2 in. wide fabricated from min 0.018 in. thick galv steel, spaced a max of 24 in. OC. Studs to be cut 3/4 in. less than assembly height.

STEEL INVESTMENT GROUP L L C — AlphaSTUD

2M. Framing Members* — Steel Studs — (Not Shown) — In lieu of Item 2 — For use with Item 1J, channel shaped steel studs, 1-1/4 in. deep by min 1-5/8 in. wide fabricated from min 25 MSG (0.018 in. min. bare metal thickness). Studs to be cut 3/4 in. less in length than assembly height.

CALIFORNIA EXPANDED METAL PRODUCTS CO — Viper X

3. Batts and Blankets* — (Optional) — Mineral wool or glass fiber batts partially or completely filling stud cavity.

See Batts and Blankets (BZJZ) category for names of manufacturers.

3A. Fiber, Sprayed* — As an alternate to Batts and Blankets (Item 3) — (100% Borate Formulation) — Spray applied cellulose material. The fiber is applied with water to completely fill the enclosed cavity in accordance with the application instructions supplied with the product with a nominal dry density of 2.7 lb/ft3. Alternate Application Method: The fiber is applied without water or adhesive at a nominal dry density of 3.5 lb/ft3, in accordance with the application instructions supplied with the product.

U S GREENFIBER L L C — INS735 & INS745 for use with wet or dry application. INS765LD and INS770LD are to be used for dry application only.

3B. Fiber, Sprayed* — As an alternate to Batts and Blankets (Item 3) and Item 3A - Spray applied cellulose insulation material. The fiber is applied with water to interior surfaces in accordance with the application instructions supplied with the product. Applied to completely fill the enclosed cavity. Minimum dry density of 4.3 pounds per cubic ft.

NU-WOOL CO INC — Cellulose Insulation

3C. Fiber, Sprayed* — As an alternate to Batts and Blankets (Item 3) — Spray applied cellulose fiber. The fiber is applied with water to completely fill the enclosed cavity in accordance with the application instructions supplied with the product. The minimum dry density shall be 4.30 lbs/ft3.

INTERNATIONAL CELLULOSE CORP — Celbar-RL

4. Gypsum Board* — 1/2 in. thick. Gypsum board applied vertically in two layers. (Laminated System) Inner layer attached to studs with 1 in. long Type S steel screws spaced 24 in. O.C. along vertical edges and 24 in. O.C. in the field. Outer layer laminated to inner layer with joint compound, applied with a notched spreader producing continuous beads of compound about 3/8 in. in diameter, spaced not greater than 2 in. O.C. Joints of laminated outer layer offset 12 in. from inner layer joints. Outer layer gypsum board attached to inner layer with 1-1/2 in. long Type G steel screws spaced 24 in. O.C. along edges and center line of each sheet.

Optional, (Direct Attached System) Gypsum board applied vertically in two layers. Inner layer attached to studs with 1 in. long Type S steel screws spaced 24 in. O.C. in the field and along the vertical edges. Outer layer attached to the studs over the inner layer with 1-5/8 in. long Type S steel screws spaced 12 in. O.C. in the field, along the vertical edges, and to the floor and ceiling runners. Joints of screw-attached outer layer offset from inner layer joints.

Optional, (Direct Attached System) Inner layer gypsum board applied vertically, outer layer wallboard applied horizontally. Inner layer attached to studs with 1 in. Type S steel screws spaced 24 in. O.C. along vertical edges and in the field. Outer layer attached to the studs over the inner layer with 1-5/8 in. long Type S steel screws spaced 12 in. OC in the field, along the vertical edges, and to the floor and ceiling runners. Outer layer secured to inner layer gypsum board with 1-1/2 in. long Type G steel screws located midway between studs and 1 in. from the horizontal joint.

Outer layer gypsum board joints covered with joint tape and min two coats of joint compound, and screw heads covered with min two coats of joint compound. As an alternate, nom 3/32 in. thick gypsum veneer plaster may be applied to the entire surface of Classified veneer baseboard. Joints reinforced.

ACADIA DRYWALL SUPPLIES LTD — Type C

AMERICAN GYPSUM CO — Types AG-C.

CERTAINTEED GYPSUM INC — Type FRPC, Type C.

CGC INC — Type C, IP-X2, IPC-AR or WRC.

CONTINENTAL BUILDING PRODUCTS OPERATING CO, L L C — Type LGFC-C/A.

GEORGIA-PACIFIC GYPSUM L L C — Types 5, C, DAP, DA, DAPC, TG-C.

NATIONAL GYPSUM CO — Types eXP-C, FSK-C, FSW-G, FSW-C, FSMR-C.

PABCO BUILDING PRODUCTS L L C, DBA PABCO GYPSUM — Type PG-C.

PANEL REY S A — Type PRC

SAINT-GOBAIN GYPROC MIDDLE EAST FZE — Type Gyproc FireStop, Gyproc FireStop MR, Gyproc FireStop M2TECH, Gyproc FireStop ACTIV'Air, Gyproc FireStop MR ACTIV'Air, Gyproc FireStop M2TECH ACTIV'Air

THAI GYPSUM PRODUCTS PCL — Type C.

UNITED STATES GYPSUM CO — Type C, IP-X2, IPC-AR or WRC.

USG BORAL DRYWALL SFZ LLC — Type C

USG MEXICO S A DE C V — Type C, IP-X2, IPC-AR or WRC.

4A. Gypsum Board* — (As an alternate to Item 4) — 5/8 in. thick. Two layers installed by any method as described in Item 4.

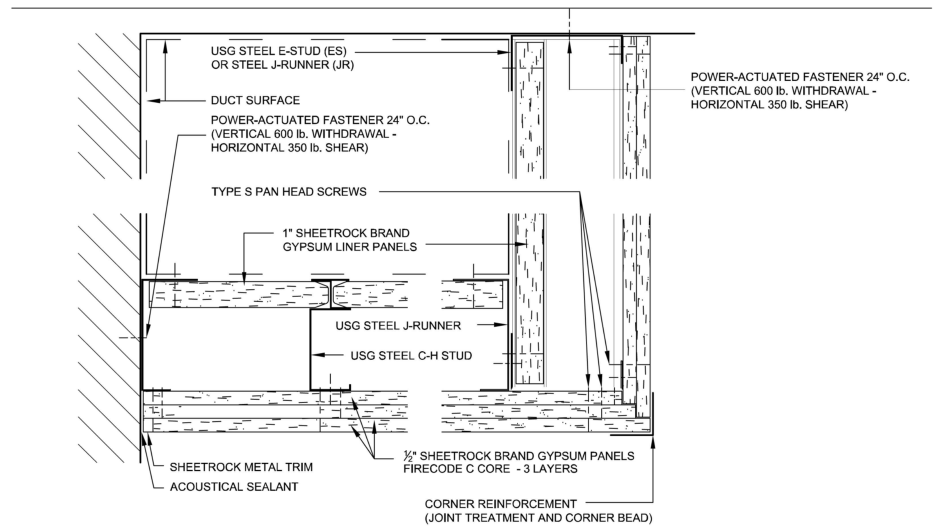
NATIONAL GYPSUM CO — Type FSMR-C.

5. Furring Channels — (Optional, Not Shown, for single or double layer systems) — Resilient furring channels fabricated from min 25 MSG corrosion-protected steel, spaced vertically a max of 24 in. OC. Flange portion attached to each intersecting stud with 1/2 in. long Type S-12 steel screws.

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

Shaft Wall System
NER-258 SYSTEM H - 2 HOUR

This USG System Detail must not be used without a complete evaluation by owner's design professional to verify the suitability of its use with your specific application.



USG Corporation
550 West Adams Street
Chicago, IL 60661-3676

Architectural and Technical Solutions
800-874-4968

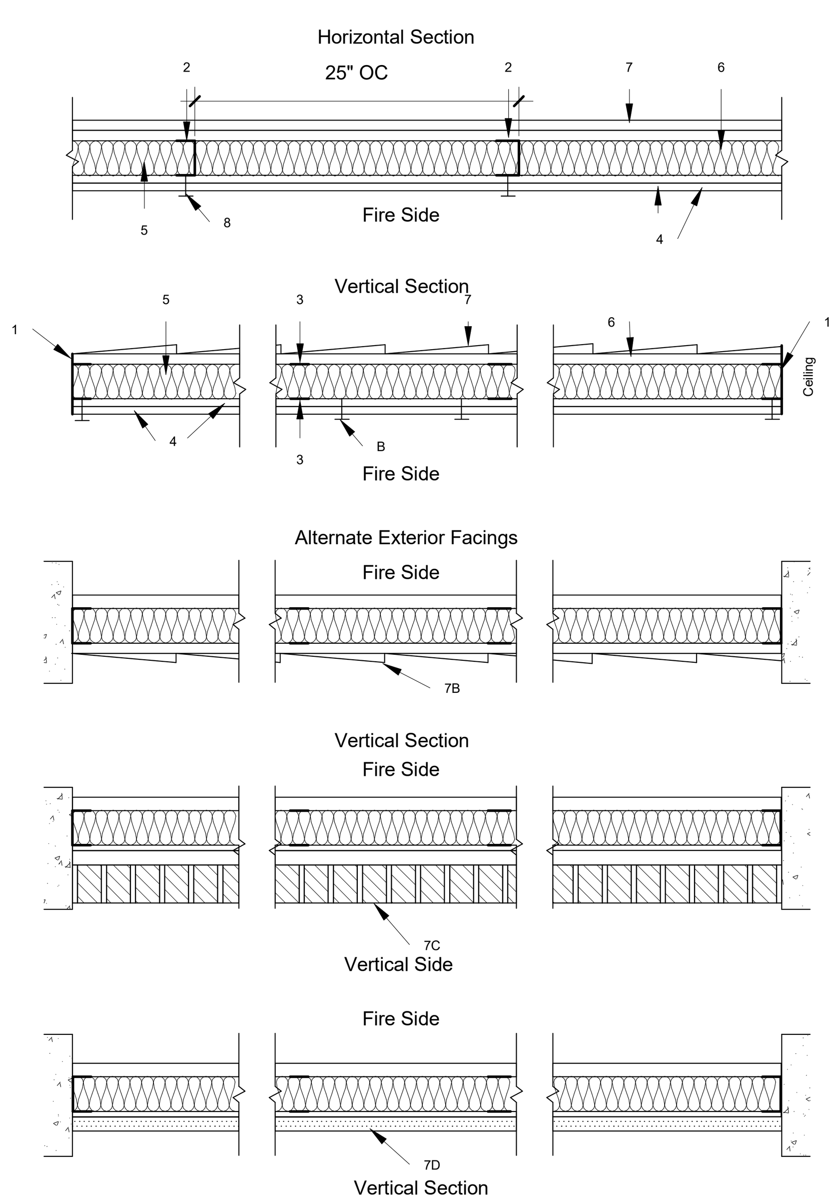
Drawn by: DN
Approved:
Date: 09-04-08
Scale: NTS
File:

Design No. U418

October 11, 2017

(Exposed to Fire on Interior Face Only)
Bearing Wall Rating — 3/4 Hr., 1 or 2 Hr.
(See Item 4)
This design was evaluated using a load design method other than the Limit States Design Method (e.g., Working Stress Design Method). For jurisdictions employing the Limit States Design Method, such as Canada, a load restriction factor shall be used — See Guide BXUV or BXUV7

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



1. Floor and ceiling tracks — Channel shaped, 3-5/8 in. or 5-5/8 in. wide with 1-1/2 in. flanges. Fabricated from No. 18 GSG galv steel. Attached to floor and ceiling with fasteners spaced 24 in. O.C.

2. Steel Studs — C-shaped, fabricated from min No. 18 GSG (0.051 in. thick) galv steel, 3-1/2 in. or 5-1/2 in. wide with 1-1/2 in. flanges and 1/2 in. returns (stiffening flanges.) Min yield strength 40,000 psi. See Ill. 12 of Report R7760-1, -2 dated Dec. 11, 1975 or Ill. 15 of Report R7760-3, -4 dated Aug. 23, 1976 for tables containing max allowable axial loads. Report Ills. available from U. S. Steel Corp., Rm. 1846, 600 Grant St., Pittsburgh, PA 15230.

3. Steel Strapping — Flat stock, 2 in. wide, fabricated from No. 18 GSG galv steel. Located horizontally and attached to both sides of the studs at the third points using one No. 6-20 by 1/2 in. self-drilling steel screw at each intersection.

4. Gypsum Board* — Any 1/2 in. thick UL Classified Gypsum Board that is eligible for use in Design No. X515. Any 5/8 in. thick UL Classified Gypsum Board that is eligible for use in Design Nos. L501, G512 or U305. Gypsum board with beveled, square, or tapered edges. The thickness, number of layers and method of attachment of the wallboard for the 2 Hr, 1 Hr, and 45 Min ratings are: **2 Hr Rating —** Three layers of 1/2 in. thick gypsum board applied vertically. Inner layer attached to the studs and tracks with 1 in. long, 0.142 in. diam, Type S-12 bugle head screws spaced 12 in. O.C. Middle layer attached to the inner layer of gypsum board with 1-1/2 in. long, 0.210 in. diam, Type G bugle head screws spaced 12 in. OC and to the end studs with 1-7/8 in. long, 0.118 in. diam, Type S-12 bugle head screws spaced 12 in. OC. Outer layer attached to studs and tracks with 1-7/8 in. long, 0.118 in. diam, Type S-12 bugle head screws spaced 12 in. OC and into the gypsum board with 1-1/2 in. long 0.210 in. diam Type G screws spaced 12 in. OC. Middle layer of wallboard edge joints staggered 2 ft from joints of inner and lower layer. **1 Hr Rating —** Two layers of 1/2 in. thick gypsum board applied horizontally or vertically. Inner layer attached to studs and tracks with 1 in. long, 0.142 in. diam Type S-12 bugle head screws spaced 12 in. OC beginning 6 in. from the edge. Outer layer attached to the studs and tracks with 1-5/8 in. long, 0.142 in. diam, Type S-12 bugle head screws spaced 12 in. OC beginning 1 in. from the edge. In addition, the outer layer to be attached to the inner layer at the joints with 1-1/2 in. long, 0.210 in. diam Type G bugle head screws spaced 24 in. OC located between studs. **3/4 Hr. Rating —** One layer of 5/8 in. thick gypsum board applied horizontally or vertically unless specified below. Attached to studs and tracks with 1 in. long, 0.142 in. diam Type S-12 bugle head screws spaced 12 in. OC beginning 6 in. from edges.

When used in widths other than 48 in., gypsum board to be installed horizontally.

ACADIA DRYWALL SUPPLIES LTD (View Classification) — CKNX.R25370

AMERICAN GYPSUM CO (View Classification) — CKNX.R14196

BEIJING NEW BUILDING MATERIALS PUBLIC LTD CO (View Classification) — CKNX.R19374

CERTAINTEED GYPSUM INC (View Classification) — CKNX.R3660

CGC INC (View Classification) — CKNX.R19751

CONTINENTAL BUILDING PRODUCTS OPERATING CO, L L C (View Classification) — CKNX.R18482

GEORGIA-PACIFIC GYPSUM L L C (View Classification) — CKNX.R2717

LOADMASTER SYSTEMS INC (View Classification) — CKNX.R11809

NATIONAL GYPSUM CO (View Classification) — CKNX.R3501

PABCO BUILDING PRODUCTS L L C, DBA PABCO GYPSUM (View Classification) — CKNX.R7094

PANEL REY S A (View Classification) — CKNX.R21796

SIAM GYPSUM INDUSTRY (SARABURI) CO LTD (View Classification) — CKNX.R19262

THAI GYPSUM PRODUCTS PCL (View Classification) — CKNX.R27517

UNITED STATES GYPSUM CO (View Classification) — CKNX.R1319

USG BORAL DRYWALL SFZ LLC (View Classification) — CKNX.R38438

USG MEXICO S A DE C V (View Classification) — CKNX.R16089

4A. Gypsum Board* — (As an alternate to Item 4) - 5/8 in. thick, 4 ft. wide, paper surfaced applied vertically only and secured as described in Item 4.

GEORGIA-PACIFIC GYPSUM L L C — Type X ComfortGuard Sound Deadening Gypsum Board.

NATIONAL GYPSUM CO — SoundBreak XP Type X Gypsum Board

4B. Gypsum Board* — (As an alternate to Items 4 through 4A) — Nominal 5/8 in. thick, 4 ft wide panels, applied vertically and secured as described in Item 4.

PABCO BUILDING PRODUCTS L L C, DBA PABCO GYPSUM — Type QuietRock ES.

4C. Gypsum Board* — (As an alternate to 5/8 in. Type FSW in Item 4) - Nom. 5/16 in. thick gypsum panels applied vertically or horizontally. Two layers of 5/16 in. for every single layer of 5/8 in. gypsum board described in Item 4. Horizontal joints on the same side need not be staggered. Inner layer of each double 5/16 in. layer attached with fasteners, as described in item 4, spaced 24 in. OC. Outer layer of each double 5/16 in. layer attached per Item 4.

NATIONAL GYPSUM CO — Type FSW.

4D. Wall and Partition Facings and Accessories* — (As an alternate to Items 4 through 4B) — Nominal 5/8 in. thick, 4 ft wide panels, applied vertically and secured as described in Item 4.

PABCO BUILDING PRODUCTS L L C, DBA PABCO GYPSUM — Type QuietRock 527.

5. Batts and Blankets* — 3-1/2 in. thick, 2 ft wide, glass fiber or mineral wool batts. Inserted between each stud to fill the wall cavity.

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JOHNS MANVILLE

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MANSON INSULATION INC

OWENS CORNING

ROCKWOOL — Type AFB

6. Gypsum Sheathing — One layer of nominal 1/2 in. thick exterior sheathing, applied vertically and secured to the studs and runner tracks with 1 in. long, 0.142 in. diam, Type S-12 bugle head screws spaced 12 in. OC along the studs and the runner tracks.

7. Exterior Facings —

7A. Aluminum Siding — Horizontal lap type 9 in. wide fabricated from 0.019 in. thick or 0.024 in. thick painted aluminum. Interior face of 0.019 in. thick siding lined with 3/8 in. thick unbonded insulation material. Attached to the studs with 1-7/8 in. long, 0.118 in. diam steel screws spaced 9 in. OC along the studs. A starter strip to be fastened to floor runner with 0.118 in. diam screws spaced 12 in. OC.

7B. Steel Siding — Same description as above (No. 17 GSG) gauge 0.017 in. thick.

7C. Brick Veneer — Any type 4 in. wide brick. Metal ties used as every fourth course spaced 24 in. OC horizontally. Fastened to steel studs through gypsum sheathing with one No. 6-20 steel screw per tie. One inch air space provided between veneer and gypsum sheathing.

7D. Stucco — Portland cement type — 3/4 in. min thickness. Metal lath or mesh base attached to studs with No. 6-20 steel screws. "T-Nails," or staples approved by local building codes. Spaced 6 in. OC max and driven through gypsum sheathing.

7E. Fiber-Cement Siding — (Not Shown) — Fiber-cement exterior sidings including smooth and patterned panel or lap siding.

7F. Building Units* — (Not Shown) - 3 in. thick 18 x 24 in. cellular glass blocks, applied to the gypsum sheathing (Item 6) with PC 88 adhesive or fastened with F anchors spaced a maximum 24 in. OC. F anchors fastened to framing members with 1-1/4 in. long #6 drywall screws.

PITTSBURGH CORNING CORP — Type FoamGlas

8. Joint Tape and Compound — Vinyl or casein, dry or premixed joint compound applied in two coats to joints and screw heads. Perforated paper tape, 2 in. wide, embedded in first layer of compound over all joints.

9. Furring Channels — (Optional, not shown, for single or double layer systems) — Resilient furring channels fabricated from min 25 MSG corrosion-protected steel, spaced vertically a max of 24 in. OC. Flange portion attached to each intersecting stud with 1/2 in. long Type S-12 steel screws.

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

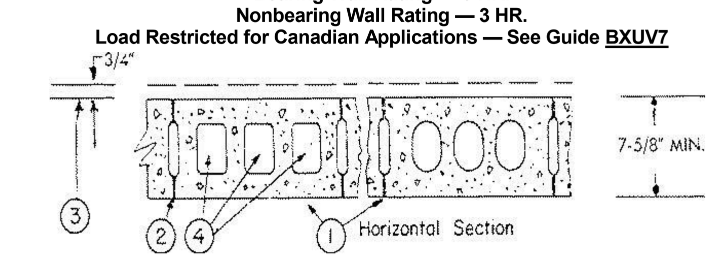
TABLE 720.1 (2)
RATED FIRE-RESISTANCE PERIODS FOR VARIOUS WALL AND PARTITIONS a,o,p

MATERIAL	ITEM NUMBER	CONSTRUCTION	MINIMUM FINISHED THICKNESS FACE-TO-FACE b (INCH)			
			4 hour	3 hour	2 hour	1 hour
1. Brick of clay or shale	1-1.1	Solid brick of clay or shale e	6.0	4.9	3.8	2.7
	1-1.2	Hollow brick, not filled.	5.4	4.3	3.4	2.3
	1-1.3	Hollow brick unit wall, grout or filled with perlite vermiculite or expanded shale aggregate.	6.6	5.5	4.4	3.0
	1-2.1	4" nominal thick units at least 75 percent solid backed with a hat- shaped metal furring channel 3/4" thick formed 0.021" sheet metal attached to the brick wall on 24" centers with approved fasteners, and 1/2" Type X gypsum wallboard attached to the metal furring strips with 1" - long Type S screws spaced 8" on center.	-	-	5 d	-
2. Combination of clay brick and load-bearing hollow clay tile	2-1.1	4" solid brick and 4" tile (at least 40 percent solid).	-	8	-	-
	2-1.2	4" solid brick and 8" tile (at least 40 percent solid).	12	-	-	-
3. Concrete masonry units	3-1.1 f,g	Expanded slag or pumice.	4.7	4.0	3.2	2.1
	3-1.2 f,g	Expanded clay, shale or slate.	5.1	4.4	3.6	2.6
	3-1.3 f	Limestone, cinders or air-colleed slag.	5.9	5.0	4.0	2.7
	3-1.4 f,g	Calcareous or siliceous gravel.	6.2	5.3	4.2	2.8
4. Solid concrete h,i	4-1.1	Siliceous aggregate concrete.	7.0	6.2	5.0	3.5
		Carbonate aggregate concrete.	6.6	5.7	4.6	3.2
		Sand-lightweight concrete.	5.4	4.6	3.8	2.7
		Lightweight concrete.	5.1	4.4	3.6	2.5
5. Glazed or unglazed facing tils, nonload-bearing	5-1.1	One 2" unit cored 15 percent maximum and one 4" unit cored 25 percent maximum with 3/4" mortar-filled collar joint. Unit positions reversed in alternate courses.	-	6-3/8	-	-
	5-1.2	One 2" unit cored 15 percent maximum and one 4" unit cored 40 percent maximum with 3/4" mortar-filled collar joint. Unit positions side with 3/4" gypsum plaster. Two wythes tied together every fourth course with No. 22 gage corrugated metal ties.	-	6-3/4	-	-
	5-1.3	One unit with three cells in wall thickness, cored 29 percent maximum.	-	-	6	-
	5-1.4	One 2" unit cored 22 percent maximum and one 4" unit cored 41 percent maximum with 1/4" mortar-filled collar joint. Two wythes tied together every third course with 0.030" (No.22 galvanized sheet steel gage) corrugated metal ties.	-	-	6	-
	5-1.5	One 4" unite cored 25 percent maximum with 3/4" gypsum plaster on one side.	-	-	4-3/4	-
	5-1.6	One 4" unite with two cells in wall thickness, cored 22 percent maximum.	-	-	-	4
	5-1.7	One 4" unite cored 30 percent maximum with 3/4" vermiculite gypsum plaster on one side.	-	-	4-1/2	-
	5-1.8	One 4" unite cored 39 percent maximum with 3/4" gypsum plaster on one side.	-	-	-	4-1/2

(continued)

For SI: 1 inch= 25.4 mm, 1 square inch = 645.2mm 2, 1 cubic foot = 0.0283 m3.
a. Staples with equivalent holding power and penetration shall be permitted to be used as alternate fasteners to nails for attachment to wood framing.
b. Thickness shown for brick and clay tile are nominal thicknesses unless plastered, in which case thicknesses are net. Thickness shown for concrete masonry and clay masonris equivalent thickness defined in Section 721.3.1 for concrete masonry and Section 721. 4.1 for clay masonry. Where all cells are solid grouted or filled with silicone-trperlite loose-fill insulation; vermiculite losses-fill insulation; or expanded clay, shale or slate lightweight aggregate, the equivalent thickness shall be the thickness of the block obrick using specified dimensions as defined in Chapter 21. Equivalent thickness may also include the thickness of applied plaster and lath or gypsum wallboard, where specified.
c. For units in which the net cross-section area of cored brick in any plane parallel to the surface containing the cores is at least 75 percent of the gross cross-sectional area measured in the same plane.
d. Shall be used for nonbearing purposes only.
e. For all of the construction with gypsum wallboard described in this table, gypsum base for veneer plaster of the same size, thickness and core type shall be permitted to be substituted for gypsum wallboard, provided attachment is identical to that specified for the wallboard, and the joints on the face layer are reinforced and the entire surfaccovered with a minimum of 1/16 inch gypsum veneer plaster.
f. The fire-resistance time period for concrete masonry units meeting the equivalent thicknesses required for a 2-hour fire-resistance rating in Item 3, and having a thickness of not less than 75/8 inches is 4 hours when cores which are not grouted are filled with silicone-treated perlite loose-fill insulation; vermiculite loose-fill insulation; or expanded clay, shale or slate lightweight aggregate, sand or slag having a maximum particle size of 3/8 inch.
g. The fire-resistance rating of concrete masonry units composed of a aggregate types of where plaster is applied directly to the concrete masonry shall be determaccordance with ACI 216.1/TMS 216. Lightweight aggregate shall have a maximum combined density of 65 pounds per cubic foot.
h. See also Note b. The equivalent thickness shall be permitted to include the thickness of cement plaster or 1.5 times the thickness of gypsum plaster applied in accordance withe requirements of Chapter 25.
i. Concrete wall shall be reinforced with horizontal and vertical temperature reinforcement as required by chapter 19.
j. Studs are welded truss wire stud with 0.18 inch (No. 7 B.W.gage) flange wire and 0.18 inch (No. 7 B.W. gage) truss wires.
k. Nailable metal studs consist of two channel studs spot welded back to back with a crimped wed forming a nailing groove.
l. Wood structural panels shall be permitted to be installed between the fire protection and the wood studs on either the interior or exterior side of the wood framessemblies in this table, provided the length of the fasteners used to attach the fire protection are increased by the amount at least equal to the thickness of the wood structurpanel.
m. The design stress of studs shall be reduced to 78 percent of allowable F'c with the maximum not greater than 78 percent of the calculated stress with studs havilenderness ratio 1/d of 33.
n. For properties of cooler or wallboard nails, see ASTM C 514, ASTM C 547 or ASTM F 1667.
o. Generic fire-resistance ratings (those not designated as proprietary* in the listing) in the GA 600 shall be accepted as if herein listed.
p. NCMA TEK 5-8, shall be permitted for the design of fir walls.
q. The design stress of studs shall be equal to a maximum of 100 percent of the allowable F', calculated in accordance with Section 2306.

Design No. U904
September 30, 2010
Bearing Wall Rating — 3 HR.
Nonbearing Wall Rating — 3 HR.
Load Restricted for Canadian Applications — See Guide BXUV7



1. **Concrete Blocks* —** Various designs. Classification C-3 (3 hr).
See **Concrete Blocks** category for list of eligible manufacturers.

2. **Mortar —** Blocks laid in full bed of mortar, nom. 3/8 in. thick, of not less than 2-1/4 and not more than 3-1/2 parts of clean sharp sand to 1 part Portland cement (proportioned by volume) and not more than 50 percent hydrated lime (by cement volume). Vertical joints staggered.

3. **Portland Cement Stucco or Gypsum Plaster —** Add 1/2 hr to Classification if used. Attached to concrete bolcks (Item 1).

4. **Loose Masonry Fill —** If all core spaces are filled with loose dry expanded slag, expanded clay or shale (Rotary Kiln Process), water repellant vermiculite masonry fill insulation, or silicone treated perlite loose fill insulation add 1 hr to Classification.

5. **Foamed Plastic* —** (Optional-Not Shown) — 1-1/2 in. thick max, 4 ft wide sheathing attached to concrete blocks (Item 1).
THE DOW CHEMICAL CO — Type Thermax Sheathing, Thermax Light Duty Insulation, Thermax Heavy Duty Insulation, Thermax Metal Building Board, Thermax White Finish Insulation, Thermax ci Exterior Insulation, Thermax IH Insulation, Thermax Plus Liner Panel and Thermax Heavy Duty Plus (HDP)

*Bearing the UL Classification Mark

721.2.4 Concrete coloumns. Concrete columns shall comply with this section.

TABLE 721.2.4
MINIMUM DIMENSION OF CONCRETE COLUMNS (inches)

TYPES OF CONCRETE	FIRE-RESISTANCE RATING (hours)				
	1	1-1/2	2a	3a	4b
SILICEOUS	8	9	10	12	14
Carbonate	8	9	10	11	12
Sand-lightweight	8	8-1/2	9	10-1/2	12

For SI: 1 inch = 25 mm.
a. The minimum dimension is permitted to be reduced to 8 inches for rectangular columns with two parallel sides at least 36 inches in length.
b. The minimum dimension is permitted to be reduced to 10 inches for rectangular columns with two parallel sides at least 36 inchs in length.

TABLE 721.2.1.1
MINIMUM EQUIVALENT THICKNESS OF CAST-IN-PLACE OR PRECAST CONCRETE WALLS, LOAD-BEARING OR NONLOAD-BEARING

CONCRETE TYPE	MINIMUM SLAB THICKNESS (inches) FOR FIRE-RESISTANCE RATING OF				
	1-hour	$1^1/_2$-hour	2-hour	3-hour	4-hour
Siliceous	3.5	4.3	5.0	6.2	7.0
Carbonate	3.2	4.0	4.6	5.7	6.6
Sand-Lightweight	2.7	3.3	3.8	4.6	5.4
Lightweight	2.5	3.1	3.6	4.4	5.1

For SI: 1 inch = 25.4 mm.

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W [SQUARED] ARCHITECTS

ISSUES AND REVISIONS

NO	DATE	DESCRIPTION
A	19 JUL 22	ISSUE FOR PERMIT
B	19 AUG 16	ISSUE FOR BID

REGISTERED ARCHITECT
SHANE C. WILSON
25235
STATE OF TEXAS
2019 AUG 16

GH SCHOOL
4780 N MAIN STREET

SHEET TITLE
FIRE RATED ASSEMBLIES

SHEET NUMBER
G101

PROJECT # A041

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