Cavity Shaftwall Systems

Cavity shaftwall systems are non-load-bearing, 1-hour to 4-hour, fire-rated partitions constructed from one side used to enclose elevator shafts, stairs and mechanical shafts where the design requires resistance to both fire and air pressure. Cavity shaftwall systems can also be used as fire-rated, interior partitions where access is restricted to one side and as fire-rated, horizontal membranes.

CAVITY SHAFTWALL SYSTEM
U497 2-Hour (Fire Tested Both Sides)

1. J-Track
2. C-T, C-H or I-Stud
3. 1" Fire-Shield® Shaftliner XP®
4. Fire-Shield® Gypsum Board
Description

The cavity shaftwall system consists of steel C-T, C-H or I-Studs and J-Tracks with 1 in. (25.4 mm) shaftliner panels friction fit between the studs. Single or multiple layers of Gold Bond® BRAND Fire-Shield® Gypsum Board are applied to the face of the studs to complete the fire-rated assembly. Shaft enclosures can be framed with C-T, C-H or I-Studs with integral tabs and flanges that hold the panels in place and J-Track for runners at top, bottom, as well as vertically at partition ends and to frame openings.

National Gypsum Company produces three shaftliner products:

- **Gold Bond® BRAND Fire-Shield® Shaftliner** consists of a fire-resistant gypsum core encased in a heavy, moisture-resistant and green paper that is made from 100-percent recycled content.

- **Gold Bond® BRAND XP® Shaftliner** consists of a mold-, mildew-, moisture- and fire-resistant gypsum core with a specially designed PURPLE® paper that offers superior resistance to mold and mildew.

- **Gold Bond® BRAND eXP® Shaftliner** consists of a fire-resistant gypsum core encased in a coated, specially designed PURPLE® fiberglass mat facer for superior mold, mildew and moisture resistance.

The double-beveled edge configurations for all three products allow for simple installation into the C-T, C-H or I-Studs.
Cavity shaftwall systems are the preferred method for the construction of shaft enclosures. In fact, it is now more common than traditional masonry shafts. The advantages of shaftwall include:

**Lightweight.** Masonry shaftwalls weigh 20 to 45 lbs. per square ft. (98 to 220 kg/m²). By contrast, gypsum shaftwall assemblies weigh in at a remarkably low 10 to 13 lbs. per square ft. (49 to 63 kg/m²).

**Easy Installation.** Shafts can be quickly enclosed with steel framing, and the Shaftliner panels can be installed from outside the shaft. This means the contractor need not erect scaffolding.

**Weather Resistance.** Shaftliner panels can be installed under conditions that would halt masonry work, including temperatures that are too cold for Portland cement mortar. For protection against wet weather during installation, 1 in. (25.4 mm) Shaftliner is encased in light green, moisture-resistant paper. XP® Shaftliner is encased in a specially designed PURPLE® paper with superior mold, mildew and moisture resistance. These systems are not designed for long-term moisture exposure.

**Cost Savings.** Best of all, cavity shaftwall systems are more economical than masonry shaft construction.

**Technical Data**

Cavity Shaftwall Systems have non-bearing wall ratings of one hour through four hours and are listed in the UL Fire Resistance Directory as design Nos. U428, U429, U497, U498, U499 and W419 and in the GA-600 Fire Resistance Manual as file numbers WP 6904, WP 6905, WP 7051, WP 7060, WP 7061, WP 7062, WP 7064, WP 7065, WP 7076, WP 7077, WP 7079, WP 7080, WP 7084, WP 7493 and WP 7691.

The cavity shaftwall system has been evaluated for code compliance in UL Evaluation Report UL ER R3501-02.

Additionally, J-Track products are tested to rigorous standards. For example, a 25-gauge (.018 in. minimum steel thickness) J-Track exceeded 2,000,000 lateral load oscillation cycles in a test conducted to duplicate the positive and negative pressures created as elevator cabs rise and descend in a shaft.

**Loading Performance.** Although cavity shaftwall systems are non-load-bearing, this system has been designed and tested to withstand positive and negative air pressure forces exerted by high-speed, high-rise elevators.

**Fire Resistance.** Cavity shaftwall systems have been fire tested and have achieved fire-resistance ratings from one through four hours.

**Sound Transmission.** STC ratings of 40 to 56 have been achieved in tests conducted in accordance with ASTM E90. Refer to the Fire And Sound Selector section.

**LIMITATIONS**

1. Non-load-bearing.
2. Cavity shaftwall systems should not be used where exposed to constant dampness or conditions under which free water can be formed.
3. This system should not be exposed to temperatures over 125°F (51.7°C) for extended periods of time.
4. Where reference is made to nominal gauges, 25-gauge relates to minimum base steel of .018 in (.457 mm) and 20-gauge to .0329 in (.836 mm).

**Installation**

Shaftliner panels should be handled with care to prevent fracturing or deformation of edges.

**FRAMING AND SHAFTLINER PANELS**

1. Locate and lay out partition floor and ceiling lines to ensure plumb partition.
2. Ensure accurate stud spacing to maintain gypsum board face layer module.
3. Position top and bottom J-Track with long leg toward the shaft along ceiling, floor and vertically at column and/or wall where erection of shaftwall will begin. Attach with fasteners 24 in. (610 mm) o.c. max.
4. Frame all openings for ducts with J-Track as shown in accompanying details to protect cut gypsum core edges and to provide resistance to bending and other stresses.

5. Cut shaftliner panels 1 in. (25.4 mm) less than ceiling height and install first by placing outside vertical edge against long leg of vertical track, plumb and attach with Type S 1-5/8 in. (41.3 mm) screws 24 in. (610 mm) o.c.

6. Place studs within flanges of floor and ceiling track and rotate into place. Slide stud tabs and flanges snugly over edge of shaftliner previously installed.

7. Install next shaftliner panel between tabs and flanges of studs. Continue in this manner until end of partition run. Occasionally check spacing of studs to maintain 24 in. (610 mm) module.

8. At the end of the run, cut vertical J-Track at least 2 in. (50.8 mm) short of partition height. Cut shaftliner 1/4 in. (6.4 mm) less than remaining width of partition and 2 in. (50.8 mm) short of full height. Lay piece of shaftliner 2 in. (50.8 mm) wide x length of opening in floor track as support for last shaftliner panel. Fit cut edge of shaftliner into vertical track and, holding shaftliner and track together, slide paper-bound edge of shaftliner into stud. Align last panel and fasten the vertical track with fasteners 24 in. (610 mm) o.c. max. Fasten shaftliner to vertical track with 1-5/8 in. (41.3 mm) Type S or S-12 Screws 24 in. (610 mm) o.c.

9. Locate shaftwall horizontal end joints within the upper and lower third points of wall. Stagger joints in adjacent panels to avoid continuous horizontal joint. Shaftliner horizontal end joints do not require taping, back blocking or framing. When using I-Studs or C-T Studs, the shaftliner panels should be of sufficient length to engage a minimum of two tabs along the edge.

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**GYPSUM BOARD**

For a two-hour fire rating, apply base layer 1/2 in. (12.7 mm) Fire-Shield® C or 5/8 in. (15.9 mm) Fire-Shield® Gypsum Board vertically to studs with 1 in. (25.4 mm) Type S screws 24 in. (610 mm) o.c. on side opposite shaftliner panel. Apply face layer 1/2 in. (12.7 mm) Fire-Shield C or 5/8 in. (15.9 mm) Fire-Shield Gypsum Board vertically with 1-5/8 in. (41.3 mm) Type S screws 12 in. (305 mm) o.c. Stagger vertical and horizontal joints.

Refer to the Fire And Sound Selector section for more fire-rated assemblies using Nation Gypsum Company Cavity Shaftwall Systems.

**CAULKING**

Caulk cavity shaftwall system with an acoustical sealant wherever the wall is enclosing shafts where positive or negative air pressure exists. Caulk perimeter of wall and at any other place where voids create the possibility of moving air causing dust accumulation, noise or smoke leakage. Caulk in compliance with details specified by the architect or designer.

**AIR SHAFTS**

The system is not designed to serve as an unlined air-supply duct. Caulking is recommended at perimeters and penetrations wherever the shaftwall system is used to enclose elevators or other shafts where positive or negative pressures will exist. The contractor installing this system should caulk in compliance with details specified by the architect or designer. Proper caulking will seal perimeters and penetrations to minimize air noises and dust associated with air movement.

**FRAMING FOR OPENINGS**

Frame doors and duct openings with J-Track. Use adequate structural support for openings over 48 in. (1,219 mm) wide. For openings up to 48 in. (1,219 mm) wide, use vertical J-Track on either side of openings. For head and sill of openings, place J-Track horizontally across openings. Cut J-Track about 12 in. (305 mm) longer than openings. Then cut flanges and fold back to nest over vertical J-Track and fasten webs or flanges with two 3/8 in. (9.5 mm) Type S or 1/2 in. (12.7 mm) Type S-12 Pan-Head Screws per connection. When nesting J-Track to J-Track, cut off the short flange of horizontal J-Track so it will fit over the vertical J-Track.
CHASES
When possible, locate all vertical rise, conduit and stair hangers within wall cavity. If the cavity in the 2-1/2 in. (63.6 mm) stud wall is not of sufficient width, the 4 in. (102 mm) or 6 in. (152 mm) studs can be used.

ELEVATOR DOORS
Elevator door frames must be braced and supported independently of the shaftwall. However, the shaftwall must be tied into elevator door frames by being attached to jamb and anchor clips with pan-head screws. The 3 in. (76.2 mm) leg, nominal 20-gauge J-Track shall be used at the juncture of the elevator door frame and the Cavity Shaftwall System.

Door frames (other than elevator door frames) should be formed from not less than 18-gauge steel, shop primed, with throat openings accurately formed to the nominal wall thickness plus 3/32 in. (2.4 mm). Frames must have trim returns not less than 7/16 in. (11.1 mm) in width to bear flush against the gypsum board surface. Floor anchor plates should be 14-gauge (min.) steel, firmly welded to frames and designed with not less than two anchor holes 3 in. (76.2 mm) o.c. minimum to prevent frame rotation. Anchor plates should be securely fastened to the floor with fasteners having minimum dimensions of 3/16 in. (4.76 mm) diameter and 3/4 in. (19.1 mm) length. The type and size of fastener is dependent on job conditions, type of concrete or steel framing, and must be sufficient to provide rigid, continuous anchorage to the frames. Jamb anchor clips should be formed from minimum 18-gauge steel, and welded to jambs to provide adequate anchorage to jamb framing as shown on details.

Elevator door frames must be fastened to and supported by the building structure, separately framed and independent of the partition. They should be securely anchored to the sills and to the building structure or to the track supports. Anchors or fastenings to suit the wall construction are required and should not be more than 24 in. (610 mm) apart.

CALL BOXES AND POSITION INDICATORS
Protect call boxes, position indicators and fireman switch as shown in drawings on the following pages.

STAIR AND ELEVATOR ENCLOSURE HARDENING CODE REQUIREMENTS
High-rise buildings with an assigned risk category of III or IV and all buildings more than 420 ft. (128 m) in height are required to have higher resistance to hard- and soft-body impact in accordance with ASTM C1629.

STAIR AND ELEVATOR ENCLOSURES IN HIGH-RISE BUILDINGS
Stair and Elevator enclosures in high-rise buildings with an assigned risk category of III or IV and all buildings more than 420 ft. (128 m) in height are required to have resistance to hard- and soft-body impact. The shaft enclosure is required to meet or exceed a soft-body impact classification level 2 in accordance with ASTM C1629 and have a layer of impact-resistant material with a hard-body impact classification level 3 in accordance with ASTM C1629.

Gold Bond® brand Hi-Impact XP® Gypsum Board installed as the face layer on the tenant side of a 2-hour shaftwall meets both the hard- and soft-body impact requirements of the International Building Code.

2-HOUR HORIZONTAL MEMBRANE
For a 2-hour horizontal membrane, 1 in. (25.4 mm) Gold Bond Fire-Shield® Shaftliner is inserted between the flanges of 4 in. (102 mm) 20-gauge steel C-T studs 24 in. (610 mm) o.c. A base layer of 5/8 in. (15.9 mm) Fire-Shield® C Gypsum Board is applied at right angles to studs with 1 in. (25.4 mm) Type S screws 12 in. o.c. (305 mm). The second layer of 5/8 in. (15.9 mm) Fire-Shield C Gypsum Board is applied at right angles to studs with 1-5/8 in. (41.3 mm) Type S screws 12 in. o.c. (305 mm). The face layer of 5/8 in. (15.9 mm) Fire-Shield C Gypsum Board is applied with long dimension parallel to studs with 2-1/4 in. (57.2 mm) Type S screws 12 in. (305 mm) o.c.

For spans greater than 8 ft. (2,438 mm), intermediate supports are constructed by fastening J-Tracks to each side of 6 in. (152 mm) steel track. The 6 in. (152 mm) steel track is suspended from the deck with 8-gauge steel wires 24 in. (610 mm) o.c. 2 in. x 6 in. (50.8 mm x 152 mm) strips of mineral wool insulation are draped over the J-Tracks on each side of the 6 in. (152 mm) track.
## TABLE 1 – C-T STUD LIMITING HEIGHT: Per ICC-ES AC 86 1995

<table>
<thead>
<tr>
<th>Framing Depth</th>
<th>Minimum Steel</th>
<th>Deflection Limit</th>
<th>Design Pressure (psf)</th>
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<tr>
<td></td>
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<td>5</td>
<td>7.5</td>
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<tr>
<td>2-1/2&quot;</td>
<td>0.0231&quot; 33,000 psi</td>
<td>L/120</td>
<td>16' 10&quot;</td>
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<td></td>
<td></td>
<td>L/180</td>
<td>13' 8&quot;</td>
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<td></td>
<td>L/240</td>
<td>11' 10&quot;</td>
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<tr>
<td></td>
<td></td>
<td>L/360</td>
<td>9' 10&quot;</td>
</tr>
<tr>
<td></td>
<td>0.0346&quot; 33,000 psi</td>
<td>L/120</td>
<td>16' 10&quot;</td>
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<tr>
<td></td>
<td></td>
<td>L/180</td>
<td>14' 4&quot;</td>
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<td></td>
<td></td>
<td>L/240</td>
<td>12' 11&quot;</td>
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<td></td>
<td>L/360</td>
<td>11' 1&quot;</td>
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<tr>
<td></td>
<td>0.0451&quot; 50,000 psi</td>
<td>L/120</td>
<td>17' 11&quot;</td>
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<td></td>
<td></td>
<td>L/180</td>
<td>15' 10&quot;</td>
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<td>L/240</td>
<td>14' 6&quot;</td>
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<td>L/360</td>
<td>12' 10&quot;</td>
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<td>4&quot;</td>
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<td>L/120</td>
<td>21' 8&quot;</td>
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<td>L/120</td>
<td>23' 0&quot;</td>
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<td>L/180</td>
<td>21' 0&quot;</td>
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<td>18' 7&quot;</td>
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<td>15' 10&quot;</td>
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<td>6&quot;</td>
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<td>L/120</td>
<td>30' 3&quot;***</td>
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<td>L/180</td>
<td>30' 3&quot;</td>
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<td></td>
<td>L/240</td>
<td>26' 6&quot;</td>
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<td>22' 2&quot;</td>
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<td>L/120</td>
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<td>27' 3&quot;</td>
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<tr>
<td></td>
<td></td>
<td>L/360</td>
<td>23' 2&quot;</td>
</tr>
</tbody>
</table>

1. *Reduced for End Reaction Capacity. **Reduced for Flexural Strength Capacity.
2. The values in this table are based on testing per ICC-ES AC 86 and ASTM E72 and represent the limiting height capacity for strength using a 1.5 Safety Factor.
3. Minimum base steel thickness is 95% of design thickness.
4. Limiting Height values shown were assessed from the lowest Flexural Strength value of gypsum tested.

Provided with permission from ClarkDietrich Building Systems, LLC.
<table>
<thead>
<tr>
<th>Wall System</th>
<th>Steel thickness (gauge/inch)</th>
<th>5</th>
<th>Transverse Design Load (psf)</th>
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</tr>
<tr>
<td>1 hour 2-1/2 in. Shaftwall</td>
<td>25 / 0.020</td>
<td>L/120</td>
<td>13 ft. 4 in.</td>
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<tr>
<td></td>
<td></td>
<td>L/240</td>
<td>10 ft. 7 in.</td>
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<tr>
<td></td>
<td></td>
<td>L/360</td>
<td>9 ft. 3 in.</td>
</tr>
<tr>
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<td>20 / 0.0329</td>
<td>L/120</td>
<td>15 ft. 2 in.</td>
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<td>L/240</td>
<td>12 ft. 1 in.</td>
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<td>L/360</td>
<td>10 ft. 7 in.</td>
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<tr>
<td>1 hour 4 in. Shaftwall</td>
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<td>14 ft. 3 in.</td>
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<tr>
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<td>L/360</td>
<td>12 ft. 5 in.</td>
</tr>
<tr>
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<td>L/120</td>
<td>20 ft. 0 in.</td>
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<td></td>
<td>L/240</td>
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<td></td>
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<td>14 ft. 5 in.</td>
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<td>18 ft. 4 in.</td>
</tr>
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<td>L/360</td>
<td>12 ft. 4 in.</td>
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<tr>
<td>2 hour 4 in. Shaftwall</td>
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<td>19 ft. 10 in.</td>
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<td>9 ft. 8 in.</td>
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<td>L/360</td>
<td>11 ft. 6 in.</td>
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<td>L/120</td>
<td>20 ft. 2 in.</td>
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<td>L/240</td>
<td>16 ft. 0 in.</td>
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<td>L/360</td>
<td>11 ft. 11 in.</td>
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<td>22 ft. 3 in.</td>
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<td>L/240</td>
<td>17 in. 8 in.</td>
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<td>L/360</td>
<td>15 ft. 6 in.</td>
</tr>
<tr>
<td>2 hour 6 in. Stairwell</td>
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<td>L/120</td>
<td>28 ft. 0 in.</td>
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<tr>
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<td>L/240</td>
<td>22 ft. 7 in.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>L/360</td>
<td>19 ft. 9 in.</td>
</tr>
</tbody>
</table>

1. Allowable heights are based on transverse load tests complying with AC86, dated July 1995, with studs spaced a maximum of 24 inches on center.  
2. Limiting height is based on the lesser height of deflection or strength.  
3. Hourly ratings indicate that the assemblies described by this table were constructed the same as the hourly fire-rated assemblies described in this report. The fire-rated assemblies were tested at 10 ft. height as per standards ASTM E119 and UL263.
SHAFTWALL FRAMING FOR ELEVATOR DOORS – UP TO 7'-0"

1. 1” Fire-Shield Shaftliner
2. Two Layers Fire-Shield Gypsum Board
3. Elevator Door Frame
4. 25-Ga. 2-1/4” Leg J-Track
5. 20-Ga. 3” Leg J-Track
6. C-T, C-H or I-Stud

SHAFTWALL ELEVATOR DOOR JAMB (SECTION A-A)

1. Two Layers Fire-Shield Gypsum Board
2. 1” Fire-Shield Shaftliner
3. 20-Ga. 3” Leg J-Track
4. Elevator Door Frame
5. Jamb Anchor Clip

SHAFTWALL ELEVATOR DOOR HEAD (SECTION B-B)

1. Two Layers Fire-Shield Gypsum Board
2. 1” Fire-Shield Shaftliner
3. 25-Ga. 2-1/4” Leg J-Track
4. Elevator Door Frame

SHAFTWALL J-TRACK FRAMING ELEVATOR DOORS – UP TO 7’0” (SECTION C-C)

1. 1” Fire-Shield Shaftliner
2. 20-Ga. 3” Leg J-Track
3. 25-Ga. 2-1/4” Leg J-Track
4. Two Layers Fire-Shield Gypsum Board
SHAFTWALL FRAMING FOR ELEVATOR DOORS – OVER 7’0”

1. 1” Fire-Shield Shaftliner
2. Two Layers 1/2” Fire-Shield C Gypsum Board
3. Elevator Door Frame
4. 25-Ga. 2-1/4” Leg J-Track
5. 20-Ga. 3” Leg J-Track
6. C-T, C-H or I-Stud
7. 1/2” Gypsum Board Filler
8. 1” Gypsum Board Filler

SHAFTWALL ELEVATOR DOOR JAMB (SECTION D-D)

1. Two Layers Fire-Shield Gypsum Board
2. 1” Fire-Shield Shaftliner
3. 20-Ga. 3” Leg J-Track
4. 1/2” Fire-Shield C Gypsum Board
5. Elevator Door Frame
6. Jamb Anchor Clip

SHAFTWALL ELEVATOR DOOR HEAD (SECTION E-E)

1. Two Layers Fire-Shield Gypsum Board
2. 1” Fire-Shield Shaftliner
3. 25-Ga. 2-1/4” Leg J-Track
4. 1/2” Fire-Shield C Gypsum Board
5. Elevator Door Frame
6. Jamb Anchor Clip

SHAFTWALL J-TRACK FRAMING ELEVATOR DOORS – OVER 7’0” (SECTION F-F)

1. 1” Fire-Shield Shaftliner
2. 20-Ga. 3” Leg J-Track
3. 25-Ga. 2-1/4” Leg J-Track
4. Two Layers Fire-Shield Gypsum Board
Cavity Shaftwall Systems
Technical Details

SHAFTWALL ELEVATOR ELECTRICAL CONTROL LAYOUT

1. J-Track
2. 1" Fire-Shield Shaftliner
3. C-T, C-H or I-Stud
4. 1/2" Fire-Shield C or 5/8" Fire-Shield Gypsum Board
5. Position Indicator
6. Elevator Door Frame
7. Fireman Switch
8. Call Box
9. Conduit

SHAFTWALL CALL BOX (SECTION CC)
FM Design WP621

1. 1" x 16" x 30" Fire-Shield Shaftliner
2. 25-Ga. x 3" x 28" Sheet Steel
3. 3/4" C.R. Channel
4. Call Box

SHAFTWALL WITH CONDUIT (SECTION DD)

1. Rigid Elbow and Conduit
2. 1" Fire-Shield Shaftliner
3. Fire-Shield Gypsum Board

SHAFTWALL FIREMAN SWITCH (SECTION BB)
FM Design WP612

1. 1" x 22" x 16" Fire-Shield Shaftliner
2. 3/4" C.R. Channel
3. Fireman Switch

SHAFTWALL POSITION INDICATOR BOX (SECTION AA)
FM Design WP612

1. 25-Ga. x 3" x 14" Sheet Steel
2. 1" x 22" x 16" Fire-Shield Shaftliner
3. 4" Shaftwall Stud
4. Position Indicator
5. 3/4" C.R. Channel
SHAFTWALL FRAMING AT DUCT PENETRATION

1. Duct
2. Shaftwall Stud
3. J-Track

J-Track headers with ends slotted to fit into shaftwall studs.

J-Track cut and folded to frame duct and fastened with pan-head screws.

Detail 1

Detail 2

Cut web from J-Track to receive C-T Stud and fasten with pan-head screws.

2-HOUR HORIZONTAL DUCT PROTECTION

UL Design G586

1. Duct
2. J-Track
3. Fasteners 24" o.c.
4. Flexible Sealant
5. 1/2" Type S or S-12 Pan-Head Screws (2 per Stud)
6. 1" Fire-Shield Shaftliner
7. C-T Stud 24" o.c.
8. 5/8" Fire-Shield C Gypsum Board
OUTSIDE CORNER
1. C-T, C-H or I-Stud
2. J-Track
3. 1” Fire-Shield Shaftliner
4. Two layers Fire-Shield Gypsum Board
5. Pan-Head Sheet Metal Screws, 24” o.c.

INSIDE CORNER
1. C-T, C-H or I-Stud
2. J-Track
3. 1” Fire-Shield Shaftliner
4. Two layers Fire-Shield Gypsum Board
5. Pan-Head Sheet Metal Screws, 24” o.c.

INSIDE CORNER
1. C-T, C-H or I-Stud
2. J-Track
3. 1” Fire-Shield Shaftliner
4. Two layers Fire-Shield Gypsum Board
5. Pan-Head Sheet Metal Screws, 24” o.c.

HYBRID CORNER
1. C-T, C-H or I-Stud
2. J-Track
3. 1” Fire-Shield Shaftliner
4. Two layers Fire-Shield Gypsum Board
5. Pan-Head Sheet Metal Screws, 24” o.c.

OUTSIDE CORNER
1. C-T, C-H or I-Stud
2. J-L Corner
3. 1” Fire-Shield Shaftliner
4. Two layers Fire-Shield Gypsum Board

SHAFTWALL INTERSECTION
1. C-T, C-H or I-Stud
2. J-Track
3. 1” Fire-Shield Shaftliner
4. Two layers Fire-Shield Gypsum Board
**HANDRAIL SUPPORT ELEVATION**

1. Handrail
2. 20-Ga. x 6” x 26” Sheet Metal Plate
3. C-T, C-H or I-Stud
4. Pan-Head Sheet Metal Screws

**HANDRAIL SUPPORT DETAILS**

1. Handrail
2. 20-Ga. x 6” x 26” Sheet Metal Plate
3. C-T, C-H or I-Stud
4. 1” Fire-Shield Shaftliner
5. Fire-Shield Gypsum Board

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**1-HOUR HORIZONTAL SHAFTWALL – CORRIDOR CEILING AND STAIR SOFFIT**

UL Evaluation Report
UL ER R3501-02

1. I-Stud, 24” o.c.
2. 1” Fire-Shield Shaftliner
3. 5/8” Fire-Shield Gypsum Board
4. J-Track

**2-HOUR HORIZONTAL SHAFTWALL – CORRIDOR CEILING AND STAIR SOFFIT**

UL Evaluation Report
UL ER R3501-02

1. I-Stud, 24” o.c.
2. 1” Fire-Shield Shaftliner
3. Two Layers 5/8” Fire-Shield Gypsum Board
4. J-Track

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**TABLE 3 – MAXIMUM HORIZONTAL SPANS**

<table>
<thead>
<tr>
<th>I-Stud Size and Thickness (Inches/Gauge)</th>
<th>Corridor Ceilings and Underside of Stairs</th>
<th>Horizontal Membrane and Duct Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>One layer of 5/8” gypsum board on one side and one layer 1” Shaftliner on the other side.</td>
<td>Three layers of 1/2” gypsum board on one side and one layer 1” Shaftliner on the other side.</td>
</tr>
<tr>
<td>2-1/2 (25)</td>
<td>7” 8”</td>
<td>5’ 4”</td>
</tr>
<tr>
<td>2-1/2 (20)</td>
<td>8” 8”</td>
<td>5’ 4”</td>
</tr>
<tr>
<td>4 (25)</td>
<td>10” 9”</td>
<td>5’ 4”</td>
</tr>
<tr>
<td>4 (20)</td>
<td>11” 11”</td>
<td>5’ 4”</td>
</tr>
<tr>
<td>6 (20)</td>
<td>14” 10”</td>
<td>5’ 4”</td>
</tr>
</tbody>
</table>

For 1: 1 inch = 25.4 mm
1 foot = 305 mm

1. Calculations based on systems supporting twice their own dead weights and should not be used
where there is access to an attic or loft space above, or anywhere where there is any probability of storage above.
2. Spans are based upon a deflection limitation of L/240.

Refer to UL Evaluation Report R3501-02.
Cavity Shaftwall Systems Technical Details

**SHAFTWALL OFFSET FROM STEEL BEAM**
UL Design HW-D-0645
UL Design HW-D-0636

1. Concrete on Fluted Steel Deck
2. Steel Beam
3. Steel Hanger Rod
4. Fire-Shield Shaftliner
5. C-T, C-H or I-Stud
6. Cants Screwed to Shaftwall Studs
7. Gypsum Board Cant Strips

**2-HOUR SHAFTWALL PARTITION TO STEEL BEAM**
UL Design HW-D-0642
UL Design HW-D-0571

1. Concrete on Fluted Steel Deck
2. Steel Beam
3. Steel Hanger Rod
4. Fire-Shield Shaftliner
5. C-T, C-H or I-Stud
6. Cants Screwed to Shaftwall Studs
7. Gypsum Board Cant Strips

**STAIR HANGER ROD**
1. Fire-Shield Gypsum Board
2. Steel Hanger Rod
3. 1" Fire-Shield Shaftliner
4. Steel Angle Bracket
5. Stair Landing
6. C-T, C-H or I-Stud

**START-END CONDITION**
1. 1" Fire-Shield Shaftliner
2. J-Track
3. Two Layers Fire-Shield Gypsum Board

**SHAFT CANTS**
1. 1" Fire-Shield Shaftliner
2. C-T, C-H or I-Stud
3. Cants Screwed to Shaftwall Studs
4. Gypsum Board Cant Strips
5. Floor Slab