Pei Evaluation Service® is an accredited ISO Standard 17065 Product Certifier, accredited by the IAS. This Assembly Evaluation Report represents a product that Pei ES has Evaluated and has an Assembly Evaluation Agreement. This Assembly Evaluation Report is no way implies warranty for this product or relieves ClarkDietrich Building Systems, LLC of their liabilities for this product. This AER is an official document if it is within one year of the initial or re-approval date.

Report Owner
ClarkDietrich® Building Systems, LLC
9050 Centre Point Drive
Suite 400
West Chester, OH 45069

Assemblies Evaluated For
1. Transverse Load Capacity
2. Fire Resistance
3. Sound Control

Component Descriptions
ClarkDietrich® Shaftwall & Stairwall non-load bearing assemblies consist of the following components:
1. J-Tabbed Track / J-Runners (Part No's. TTE2, TTE4, TTE6, TTN2, TTN4)
The metal framing members used in construction of ClarkDietrich® Shaftwall Systems are manufactured from cold-formed galvanized steel conforming to ASTM A1003, or other steel complying with AISI Specifications having a minimum yield strength of 33,000 or 50,000 psi. The galvanization coating shall be a ASTM A653 G40 or shall provide equivalent corrosion protection as noted in ASTM C645 specification. The available sizes are 2-1/2", 4", and 6" deep and a minimum thickness of 0.0219", 0.0329", or 0.0428". These metal framing members must be third party certified to meet ICC-ES AC46.

2. Steel C-T Studs (Part No’s. CTE2, CTE4, CTE6, CTN2, CTN4)
ClarkDietrich® Steel C-T Studs are manufactured from cold-formed galvanized steel conforming to ASTM A653, A1003, or other steel complying with AISI specifications having a minimum yield strength of 33,000 or 50,000 psi. The galvanization coating shall be a G40 or shall provide equivalent corrosion protection per the ASTM C645 specifications. The available sizes are 2-1/2", 4", and 6" deep and a minimum thickness of 0.0219", 0.0329", or 0.0428". ClarkDietrich® Steel C-T Studs must be third party certified to meet ICC-ES AC46 for Cold-Formed Steel Framing Members.

3. Gypsum Shaft liner Panels
The paper-faced gypsum liner panel is utilized in the shaftwall assembly construction. The gypsum liner panels are 1" thick x 24" wide x 8' to 14' long. Any butt joints used must be factory edge to edge with pieces pushed tight together. All liner panels must be Third-Party Certified for fire rating.

4. Gypsum Wallboard
The paper-faced gypsum wallboard panels used for the Shaftwall assembly construction are of a proprietary 1/2" Type C or 5/8" Type X and must comply with, and be Third Party Certified to ASTM C1396.

Code Compliance

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Two-Hour Cavity Stairwall (Non-Load Bearing) - See Figure 1
1. A minimum 25 gauge, 2-1/2" deep ClarkDietrich® floor and ceiling J-runners.
2. A minimum 25 gauge, 2-1/2" deep ClarkDietrich® C-T studs, spaced 24" o.c. centered between the top and bottom J-Runners with a minimum 1/2" clearance from the web of the J-runner.
3. Two (2) layers of 1/2" Type C or 5/8" Type X gypsum board, one layer per side. The face layers should be installed parallel to each face of the framing members with #6 x 1" Type S drywall screws 12" o.c. (Note - Use Type S-12 drywall screws for 20 gauge), 1" from board ends at joints and a minimum of 3/8" from board edges. All edge and end joints should be offset from the base layer minimally 6".
4. 1" thick fire rated gypsum (Type X). The 1" liner panels should be cut 1" less than the opening height. At the ends the 1" liner panel may be retained by bending the J-runner tabs 90 degrees. If the J-runners are used at end walls, bend the J-runner tabs 90 degrees, or the 1" liner panels need to be fastened at the ends with 1-5/8" Type S screws spaced 12" o.c.

Two-Hour Cavity Shaftwall (Non-Load Bearing) - See Figure 1
1. A minimum 25 gauge, 2-1/2" deep ClarkDietrich® floor and ceiling J-runners.
2. A minimum 2-1/2" deep ClarkDietrich® C-T studs 25 gauge, centered between the top and bottom J-Runners with a minimum 1/2" clearance from the web of the J-runner.
3. The base layer of 1/2" Type C or 5/8" Type X gypsum board should be installed horizontally to the framing members with #6 x 1" Type S drywall screws, 24" o.c., starting 3" maximum from the top and bottom. The butt joint should be centered on a stud flange.
4. The face layer of 1/2" Type C or 5/8" Type X gypsum board should be installed vertically to the framing members with 1-5/8" Type S drywall screws, maximum 12" o.c. starting 6" from the top and bottom. The vertical edge and butt joints should be offset to different studs from the base layer. The horizontal butt joint in the face layer should be offset 18" from the horizontal edge joint in the base layer.
5. 1" thick fire rated (Type X) gypsum liner panel. The 1" liner panels should be cut 1" less than the opening height. At the ends of the partition the 1" liner panel may be retained by bending the J-runner tabs 90 degrees. If the J-runners are used at end walls, bend the J-runner tabs 90 degrees, or the 1" liner panels need to be fastened at the ends with 1-5/8" Type S screws spaced 24" o.c.

Two-Hour Corridor Ceilings and Stair Soffits Horizontal Assembly - See Table 2
The Two-Hour assembly is constructed as described above in the Two-Hour Shaftwalls. See Table 2 for stud size, thickness, and maximum spans. See Figures 3 & 4 for assembly details and specifications.

Sound Control
The Shaftwall / Stairwall assemblies and their components mentioned in this AER report have been tested in accordance with ASTM E90 (90) and ASTM E413 (87). The shaftwall assemblies were evaluated for sound transmission loss values. These values are only valid if the assemblies are constructed as noted in the test reports. When the assemblies are installed in the same manner as noted in the test reports, the assembly will have a minimum STC (Sound Transmission Class) rating of 50.

General Product Usage and Limitations
1. Shaftwall assemblies are limited to interior applications only.
2. The ClarkDietrich® Shaftwall/Stairwall systems should be installed according to AISI’s Standard S220 - North American Standard for Cold-Formed Steel Framing - Non Structural Members and to the manufacturer's written instructions unless more stringent requirements are required.
3. The ClarkDietrich® Shaftwall/Stairwall systems are designed to enclose stairwells, corridors, elevator shafts, mechanical components, and other vertical shafts.
4. Non-load bearing Shaftwall / Stairwall assemblies are limited to fire-resistance only. Structural and other requirements shall be in accordance with pertinent building code and manufacturer's requirements.
5. Do not install in areas which will be adjacent to occupancies of unusually high moisture conditions.
6. C-T Studs cannot be spliced. They must be installed full length and one piece. J-runners when not attached to the structure shall not be spliced. Do not attach the J-runners to the C-T Studs unless noted otherwise by the manufacturer's installation procedures.
7. To prevent air movement, the partition perimeters, as well as all penetrations, should be effectively sealed with non-hardening sealant.
8. Applications that require the use of joint treatment shall follow the manufactures usage instructions to ensure the finishing of the joint layers is done within the temperature requirements of the product. Reference Section 715 of the 2012 International Building Code.
9. Not recommended for use as unlined HVAC supply shafts or ducts.
10. Hollow cavities must be fire stopped at each floor.
11. All fire resistive assemblies shall be built in accordance with the applicable published UL designs, or as a otherwise described within this report.
General Product Usage and Limitations Continued

12. Control joints should be located in way that limits the maximum continuous partition length to 30 feet. The partition control joints should coincide with the building structure where possible.

13. All Shaftwall and Stairwall members shall be simple span members with no intermediate supports.

14. Gypsum panels may be cut and stacked with joints occurring within the top and bottom third points of the wall. Joints in adjacent panels shall be alternately staggered to prevent a continuous horizontal joint. The gypsum panels must engage a minimum of two (2) tabs.

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<th>Framing Depth</th>
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<th>Limiting Height (feet - inches)</th>
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<td>L/360 23 - 2</td>
<td>19 - 9</td>
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Notes:
* Reduced for End Reaction capacity
** Reduced for Flexural Strength Capacity

1. 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.
2. Minimum base steel thickness is 95% of design thickness.
3. Limiting Height values shown, were assessed from the lowest Flexural Strength value of Gypsum tested.
Figure 1 - Shaftwall Assembly Profiles for use with 1/2" Type C and 5/8" Type X Gypsum
Figure 2 - Construction Detail - Framing
Table 2 - Maximum Horizontal Spans for Corridor Ceilings and Stairway Soffits

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<tr>
<th>Stud Depth (&quot;&quot;)</th>
<th>Reference Gauge</th>
<th>Minimum Steel (psi)</th>
<th>Design Thickness (in)</th>
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<th>2 Hour (2) 5/8&quot; Type X + (1) 1-in Shaft Liner</th>
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<td>20</td>
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Notes:
1. Dead Load of assembly ONLY is considered.
2. Not designed to carry any Live Loads, Mechanical equipment, Storage Loads or Lighting.
3. Studs must be one piece, full span.
4. Minimum base steel thickness is 95% of design thickness.
5. Verify details of construction for specific assembly to achieve required fire resistance rating.

Figure 3 - Two (2) Hour Assembly
Figure 4 - C-T Stud to J-Runner Connection

Figure 3 & 4 descriptions
1. J-Track
2. Corridor Side Gypsum
3. C-T Stud (full span length)- See Table 2 above.
4. Liner Panel on top side. One seam only per stud bay allowed.
5. Fastener thru J-Track into wall at 24"o.c. maximum spacing. Fastener must provide a minimum of 200 Lbs. of shear value per C-T Stud
6. Framing fastener thru J-Track top & bottom legs into C-T Stud.
7. Gypsum fasteners thru gypsum into framing.
8. Approved Fire-Resistance joint sealant system.
See ClarkDietrich Horizontal Shaftwall Assembly Instructions for more details.
Product Labeling

Each assembled ClarkDietrich® Shaft Partition System member that is covered by this AER, must be marked with the following information:

1. Each bundle of steel studs contains a label with the Steel Gauge and Yield Strength.
2. Each stud is identified at a maximum spacing of 96” with the ClarkDietrich® Name, Initials or Logo, Product Code, Minimum Thickness, Yield Strength and AER Number.

Tested to

ASTM E72 - Standard Methods of Conducting Strength Test of Panels for Building Construction
ASTM E330 (97) - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, Doors by Uniform Static Air Pressure Differences following Procedure A. (End Reaction Tests conducted were based on this procedure)

Product Documentation

ClarkDietrich® Product Catalog - Dated 4/1/17
ClarkDietrich™ Shaftwall CT Studs/Tabbed J-Runner Quality Control Manual - Dated 2/11/19
ClarkDietrich® Installation Procedures
ClarkDietrich® SDS - Dated: 7/15/2018

An Assembly Evaluation Service Agreement between Pei Evaluation Service® and ClarkDietrich® Building Systems LLC


Product Documentation Continued


A Pei test report No. 2014-0413 (B) - Evaluation of C-T Studs-18ga with National Gypsum Board to ICC-ES AC86 for Use as a Shaft Wall Assembly - Dated: 11/12/2015.

UL Evaluation Report No. ER3660-02 - Gypsum Shaftwall Systems Consisting of 1/2" (12.7mm) Thick Gypsum Wallboard Type C, 5/8" (15.9MM) Thick Gypsum Wallboard Type X, and 1" (25.4 mm) Thick Gypsum Wallboard Type Shaftliner - Dated July 18, 2014.


