**Summary**

With a recent addition to Metal Building Manufacturers’ Association’s (MBMA) UL #W404 fire wall assembly, designers now have an easy solution to not only to meet 1-hour non-load bearing wall fire requirements, but - more importantly - meet newer model energy code requirements for continuous insulation. In the past, UL#W404 specified only in-between girt fiberglass batt insulation that does not meet continuous insulation requirements. Now this design offers both fire-resistive and energy-efficient options, such as continuous insulation, in one easy-to-construct wall assembly.

Underwriters Laboratory (UL) has granted Metal Building Manufacturers Association (MBMA) (and its affiliated metal building manufacturers/ members) a non-load bearing 1-hour rated wall assembly designation for UL #W404. This commonly-used design supports increased interest in green building codes and other high-performance standards by allowing designers to substitute high R-value/ inch THERMAX™ Insulation for more traditional fiberglass batts or use THERMAX™ Insulation in combination with fiberglass batts. UL #W404 is versatile in new and retrofit applications. For example, THERMAX™ Insulation can be installed on the exterior (see Option A), on the interior (Option B) or on both sides of the furring channels or girts (Option C). Up to 4” of insulation can be installed following the fastener schedule that outlines the type, diameter and required spacing. Depending on the state energy code requirements, a continuous layer of 4” THERMAX Insulation with an R-value of 26.0 may mean that fiberglass batts are not needed. In addition, the insulation can be installed horizontally or vertically provided the required fastening schedule is followed.

Because the fire protection offered through the gypsum wallboard is installed on the interior of the wall, this assembly is ideal in retrofitting and adding energy upgrades to existing metal buildings. For new construction, the fire resistive design allows metal buildings to be used for higher occupancy commercial and institutional uses – and where proximity to adjacent buildings requires a fire rated construction.

The following types of THERMAX™ Insulations are approved for UL Assembly #W404: THERMAX™ Sheathing, THERMAX™ Light Duty Insulation, THERMAX™ Heavy Duty Insulation, THERMAX™ Metal Building Board, THERMAX™ White Finish Insulation, THERMAX™ ci Exterior Insulation and THERMAX™ Heavy Duty Plus (HDP)*.

For more information on the UL listing, see: www.ul.com
Design No. W404

Fire Resistance Ratings - ANSI/UL 263
Non Load Bearing Wall Rating — 1 Hr.

1. **Girts** — “Z” or “C” shaped girts, minimum 0.056 in. thick steel, minimum 8 inch deep, with minimum 2 in. wide flanges. Girts placed horizontally (with flanges up or down) and spaced maximum 90 in. o.c. Girts are secured to columns with girt clips, Item 2, or bolted to the column through the girt flange.

2. **Girt Clips** — (optional, not shown) - Steel clips secured to column by welds or bolts.

3. **Steel Wall Panels** — Minimum No. 26 MSG, minimum 1-1/8 in depth, minimum 36 in. wide coated steel panels. Vertical raised rib profiles of adjacent panels are overlapped and attached to each other with self-drilling or self-tapping screws spaced 30 in. o.c. (max.) along the lap. Metal panel attachment to steel girt using self-drilling or self-tapping screws spaced 12” o.c. (max) along girt.

3A. **Brick or Masonry Veneer** — (optional, not shown) - Brick or masonry veneer meeting the requirements of local code agencies may be installed over additional furring channels (not shown), Item 4, on exterior of wall in place of steel wall panels. Brick or masonry veneer attached to furring channels with corrugated metal wall ties attached to each furring channel with steel screws, not more than each sixth course of brick. When a minimum 3-¾ in. thick brick or masonry veneer facing is used, the fire resistance rating applies from either side of the wall.

4. **Furring Channels** — Hat shaped, minimum 20 MSG galvanized steel, nominally 3 in. wide, 1-1/2 in. deep, spaced maximum 24 in. o.c. perpendicular to girts. Channels are secured to each girt with 3/8 in. (minimum) long self-drilling sheet steel type screws. Two screws are used at each fastening location, one through each leg of the furring channel.
4A. **(optional)** — In place of the furring channels, the following standard steel framing for rated gypsum board walls may be used: Steel framing (steel studs, runners and their attachment) for support of the gypsum board wall shall be constructed of the materials and in the manner specified in UL Design No. V497.

**Lateral Support Members** — (not shown) — Where required for lateral support of studs, support may be provided by means of steel straps, channels or other similar means as specified in the design of a particular steel stud wall system.

5. **Wallboard, Gypsum** — Two layers on interior face of wall of any 5/8 in. thick gypsum wallboard bearing the UL Classification Mark for Fire Resistance. Both layers applied horizontally or vertically. First layer attached to furring channels, Item 4, using 1 in. long Type S bugle head drywall screws spaced 24 in. o.c. maximum vertically and horizontally. Second layer attached to furring channels using 1-5/8 in. long Type S bugle head drywall screws spaced 12 in. o.c. maximum vertically and 24 in. o.c. maximum horizontally. The horizontal or vertical joints of the wallboard shall be offset 24 in. when 2 successive layers are applied in the same orientation. Wallboard joints finished dry or premixed joint compound applied in two coats to joints and screw heads of face layer of gypsum wallboard. Paper or glass fiber tape embedded in first layer of compound over all joints.

See **Wallboard, Gypsum** (CKNX) category for names of manufacturers.

6. **Column Protection** — (not shown) - Horizontal wall girts, Item 1, are attached to vertical structural steel columns. See Column Design No. X524 or X530 if protected columns are required.

7. **Batts and Blankets** — Min. 3.5 in thick (R-10) glass fiber blankets placed in the cavities of exterior walls, and attached to the girts. As an alternate, 1" min. Rigid Foam Board, Item 8, shall be permitted, in addition to the glass fiber blankets.

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

8. **Rigid Foam Board** — (optional) - Min. 1 in. thick rigid foam board (THERMAX™). Applied horizontally or vertically within the wall cavity (between steel wall panels and/or gypsum wallboard), on exterior face only or on interior face only or on both faces. First layer attached to furring channels, Item 4, or to girt, Item 1.

The following fastener diameter, length and spacing is required for each thickness when THERMAX™ Insulation is attached on the metal panel side (see optional details A & C):

<table>
<thead>
<tr>
<th>THERMAX™ Insulation</th>
<th>Fastener Diameter and Spacing Required:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot;</td>
<td>Min. 2-in. long, #12-14 self-drilling or self-tapping screws spaced 12&quot; o.c. along girt</td>
</tr>
<tr>
<td>2&quot;</td>
<td>Min. 3-in. long, #12-14 self-drilling or self-tapping screws spaced 12&quot; o.c. along girt</td>
</tr>
<tr>
<td>3&quot;</td>
<td>Min. 4-in. long, #1/4-14 self-drilling or self-tapping screws spaced 12&quot; o.c. along girt</td>
</tr>
<tr>
<td>4&quot;</td>
<td>5&quot; long, #1/4-14 self-drilling or self-tapping screws spaced 12&quot; o.c. along girt</td>
</tr>
</tbody>
</table>

The following fastener diameter, length and spacing is required for each thickness when THERMAX™ is applied under furring channels on the interior side (see optional details B & C):

<table>
<thead>
<tr>
<th>THERMAX™ Insulation</th>
<th>Fastener Diameter and Spacing Required:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot;</td>
<td>Min. 2-in. long, #12-14 self-drilling or self-tapping screws, (2) at each girt location through the furring channel legs</td>
</tr>
<tr>
<td>2&quot;</td>
<td>Min. 3-in. long, #12-14 self-drilling or self-tapping screws, (2) at each girt location through the furring channel legs</td>
</tr>
<tr>
<td>3&quot;</td>
<td>Min. 4-in. long, #1/4-14 self-drilling or self-tapping screws, (2) at each girt location through the furring channel legs</td>
</tr>
<tr>
<td>4&quot;</td>
<td>Min. 5-in. long, #1/4-14 self-drilling or self-tapping screws, (2) at each girt location through the furring channel leg</td>
</tr>
</tbody>
</table>

See Optional Details A, B and C for allowable configurations.

Type THERMAX™ Sheathing, THERMAX™ Light Duty Insulation, THERMAX™ Heavy Duty Insulation, THERMAX™ Metal Building Board, THERMAX™ White Finish Insulation, THERMAX™ ci Exterior Insulation and THERMAX™ Heavy Duty Plus (HDP)*

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* For use in walls only
**Key Learnings**

MBMA’s UL #W404 fire wall assembly provides designers with a 1-hour non-load bearing wall that meets newer model energy code requirements for continuous Insulation. Fire-resistive and energy-efficiency in one easy-to-construct wall assembly, UL W404 allows designers to substitute high R-value/inch THERMAX™ insulation for more traditional fiberglass batts and is ideal in both new and retrofit applications.

For Technical Information: 1-866-583-BLUE (2583) (English) . 1-800-363-6210 (French)
For Sales Information: 1-800-232-2436 (English) . 1-800-565-1255 (French)
THE DOW CHEMICAL COMPANY . Dow Building Solutions . 200 Larkin . Midland, MI 48674

Illustrations are not intended to replace the need for design by appropriate professionals such as architects or engineers.

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Dow Polyisocyanurate Insulation
CAUTION: This product is combustible and shall only be used as specified by the local building code with respect to flame spread classification and to the use of a suitable thermal barrier. For more information, consult MSDS, call Dow at 1-866-583-BLUE (2583) or contact your local building inspector. In an emergency, call 1-989-636-4400.

WARNING: Rigid foam insulation does not constitute a working walkable surface or qualify as a fall protection product.

Building and/or construction practices unrelated to building materials could greatly affect moisture and the potential for mold formation. No material supplier including Dow can give assurance that mold will not develop in any specific system.