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NATIONAL EVALUATION REPORT

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SUPER FIRETEMP MINERAL AND FIBER BOARD

NESA INSULATION, INC. A JOHNS MANVILLE COMPANY 1110-16 ROAD FRUITA, COLORADO 81521

1.0 SUBJECT

Super Firetemp Mineral and Fiber Board: Super Firetemp L, M, H and X

2.0 PROPERTY FOR WHICH EVALUATION IS SOUGHT

- 2.1 Fire resistance
2.2 Structural performance
2.3 DESCRIPTION

3.1 General:

Super Firetemp insulation board is a noncombustible, inorganic mineral and fiber board used in fire-resistive columns, wall and shaft assemblies and grease duct enclosures.

3.2 Interior Nonbearing Wall Assemblies:

3.2.1 One and Two-hour Monolithic Wall: The one-and two-hour fire-resistance-rated nonbearing wall assembly of Figure 1 consists of the following:

3.2.1.1 Floor Runners: Channel shaped, with 1-1/2-inch (38.1 mm) flanges and 2-1/2 or 3 inch (63.5 or 76.2 mm) depth to accommodate the thickness of Super Firetemp boards. Floor

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runners are fabricated from No. 25 MSG galvanized steel and are attached to floors with fasteners spaced 8 inches (203.2 mm) on center.

3.2.1.2 Super Firetemp Boards: Full height boards applied vertically with vertical joints connected with splines (item d) or adhesive (item e). Boards are fastened to ceiling and side runners (item c) with 1/4 - 20 hexhead bolts spaced 8 inches (203.2 mm) on center, located 3/4 inch (19.05 mm) from edges.

One hour fire-resistive rating: Minimum 2-1/2 inch (63.5 mm) thick Super Firetemp L Boards.

Two hour fire-resistive rating: Minimum 3-inch (76.2 mm) thick Super Firetemp M. As an alternative to 3-inch (76.2 mm) single-layer construction, two layers of minimum 1-1/2 inch (38.1 mm) Super Firetemp M are used with staggered vertical joints.

3.2.1.3 Ceiling and Side Runners: Two-by-two-inch (50.8 x 50.8 mm) angles of No. 22 MSG galvanized steel, attached with fasteners spaced 8 inches (203.2 mm) on center.

3.2.1.4 Splines: One-inch-wide (25.4 mm), No. 10 MSG galvanized steel installed in 1/8-inch by 9/16-inch (3.18 by 14.29 mm) grooves cut in center of butting edges of Firetemp board.

3.2.1.5 Super Calstik Adhesive: Used as an alternative to splines. A 1/16 to 1/8 inch (1.59 to 3.18 mm) thick layer of adhesive is applied to both mating surfaces. Excess adhesive is squeezed out upon joining.

3.2.1.6 Joint Compound: Joints covered with drywall joint compound.

3.2.1.7 Maximum wall height is 8 feet (2.4 m). Horizontal board joints are not permitted.

3.2.2 Two-hour Double-layer Wall with Metal Studs: The two-hour fire-resistance-rated nonbearing wall assembly of Figure 2 consists of the following:

3.2.2.1 Steel Studs: Channel shaped, 1-1/2 inches (38.1 mm) wide with 1-1/2-inch (38.1 mm) flanges fabricated from No. 25 MSG galvanized steel. Double stud spacing 48 inches (1219.2 mm) on center. Studs to be cut 1 inch (25.4 mm) less than assembly height.

3.2.2.2 Mineral and Fiber Board: Full height Super Firetemp M boards minimum 1-1/2 inches (38.1 mm) thick, 4 feet (1.2 m) wide, applied vertically with joints centered over backing strips (item d). Fastened to framing members (item a) with drywall screws (item f) spaced 8 inches (203.2 mm) on center at the joints and located 2-3/4 inches (69.85 mm) from edges. Fasteners to be spaced 8 inches (203.2 mm) on center at the runners (item c).

3.2.2.3 Floor and Ceiling Runners: Channel shaped, 1-1/2 inches (38.1 mm) wide with 1-1/2 inch (38.1 mm) flanges fabricated from No. 25 MSG galvanized steel and attached to floor and ceiling with fasteners spaced 24 inches (609.6 mm) on center.

3.2.2.4 Backing Strips: One-and-one-half inches thick by four inches (101.6 mm) wide cut from mineral and fiber board (item b).

3.2.2.5 Joint Compound: Joints and screw heads covered with drywall joint compound.

3.2.2.6 Type S wallboard screws, 2-1/4 inches (57.15 mm) long.

3.2.2.7 Maximum wall height 8 feet (2.4 m). Horizontal board joints shall not be used.

3.2.3 One-hour Wall with Wood Studs: The one-hour fire resistance rated nonbearing wall assembly of Figure 3 consists of the following:

3.2.3.1 Two-inch-by-three-inch (50.8 mm x 76.2 mm) Douglas fir, S-dry, standard grade wood members.

3.2.3.2 Minimum 1-inch-thick (25.4 mm) Super Firetemp SFH 35 pcf (561 kg/m³) boards.

3.2.3.3 Cement-coated 8d nails, 2-1/2 inches (63.5 mm) long, 0.114 inch (2.90 mm) diameter shank, 1/4-inch (6.35 mm) diameter heads, spaced 8 inches (203.2 mm) on center, maximum.

Not Shown: Sinker nails, 16d in size, to build stud assembly.

Wallboard joints covered with tape and joint compound.

Nail heads covered with joint compound.

Bridging members.

The assembly is symmetrical about the wall center line and is constructed by toenailing the wood studs, placed at 24 inches (609.6 mm) on center, maximum, to the top and bottom plates using two 16d sinker nails at each joint. Bridging members used as fire blocks shall be placed at approximately midwall height and secured using 16d nails. Firetemp boards are secured to the wood framing using 8d cement-coated nails

spaced at 8 inch (203.2 mm) intervals along the perimeter and over the studs. Joints are staggered and centered over studs, then covered with joint tape and compound. All nail heads are covered with compound. Maximum wall height is 10 feet (3 m). Firetemp panels are installed with long dimension parallel to studs with vertical panel joints occurring at wall studs on opposite side of wall at alternating studs.

3.3 Fire-resistance-rated Steel Column Assemblies:

Super Firetemp boards are used for fire-resistance-rated steel column protection under ASTM E 119 fire conditions with the board thickness complying with the following equation:

h = 108R / (1.13WD) - 0.47

Where:

- h = Super Firetemp board thickness ranging from 3/4 inch to 3 inches.
R = Fire resistance in hours ranging from one hour to four hours.
W = Weight of steel column in pounds per foot (lb/ft).
D = Heated perimeter of steel column in inches (two times depth of steel column plus two times the flange width of the steel column).

The allowable range of W/D is from 0.59 to 5.0.

The fire-resistance-rated steel column assemblies of Figure 4 shall consist of the following:

3.3.1 Steel Column: W-shaped and tubular steel columns. Minimum size W shape is W4 by 13 (W/D=0.79) and minimum size tubular is TS 4 by 4 by 0.188 (W/D=0.59).

3.3.2 Ribs: For use with W shaped columns only, optional for boards 1 inch (25.4 mm) or thicker. Ribs are made from minimum 1 1/2-inch (38.1 mm) thick mineral and fiber board (see Item 5) cut to fit snugly and flush between column flanges. Ribs are required to back up butt joints when board thickness is less than 1 inch (25.4 mm).

3.3.3 Adhesive: Used to secure ribs (item 2) in place and at butt joints on the sides of the column and used as spackle along joints and over recessed nailheads. The adhesive, identified as Super Calstik, is applied in a 1/16 to 1/8 inch (1.59 to 3.18 mm) thick layer to the ribs and to both mating surfaces at butt joints on column sides. Excess adhesive is squeezed out on installation.

3.3.4 Fasteners: The boards (item 5) are secured to one another and to the ribs (where applicable) by means of self-drilling, self-tapping Phillips head steel drywall screws spaced 8 inches (203.2 mm) on center maximum, beginning 3 inches (76.2 mm) from board section ends. The minimum length of fasteners shall be twice the thickness of the Firetemp board.

3.3.5 Mineral and Fiber Board: The Super Firetemp boards are cut in various widths and lengths to be compatible with the size of column being protected.

Boards for W-shaped columns placed parallel with the flange are cut the width of the flange plus 1/4 inch (6.35 mm). Boards placed parallel with the web are cut the width of the web face, plus twice the board thickness, plus 1/4 inch (6.35 mm).

SFL is used in locations where protection from physical abuse is provided by alternative methods, while the denser SFM or SFX are applicable to locations where physical abuse is to be guarded against. Boards which exhibit splitting or damage during assembly shall be replaced.

3.4 Grease Duct Enclosure System:

Super Firetemp boards are used in the construction of duct enclosures to contain grease ducts of kitchen ventilation systems. The metal grease duct shall comply with the code and not exceed cross-sectional dimensions of 48 inches by 48 inches (1219.2 by 1219.2 mm). The enclosure is constructed of minimum 2 1/2-inch (63.5 mm) thick Super Firetemp L where required by the code to be of one-hour fire-resistive construction and minimum 3-inch (76.2 mm) thick Super Firetemp M for two-hour fire-resistive construction. The exterior of the enclosure is permitted to be in direct contact with combustibles.

Installation of the enclosure system shall be as shown in Figures 5 through 9. The duct enclosure is to be supported by a conventional "trapeze" arrangement as shown in Figure 7 or directly supported by the ceiling joist structure as shown in Figure 8. The structure supporting the duct enclosure shall be capable of supporting the weight of the enclosure and grease duct. The maximum spacing of duct support points for horizontal enclosures is 4 feet (1.2 m) on center. Supports under the assembly shall be located within 6 inches (152.4 mm) of any metal duct stiffener members as shown in Figure 7. Support shall be provided at the bottom of vertical runs of enclosures in accordance with Figure 8 with a 30 foot (9 m) maximum height of vertical runs. The enclosure shall be laterally braced at floor and roof penetrations and at 10 foot (3 m) maximum intervals for a vertical rise in excess of 10 feet (3 m). On multi-story vertical runs, the enclosure shall be built the same as described for interior nonbearing walls in Section 3.2 and as shown in Figure 9 with angle-iron support brackets at each floor penetration attached to each corner of the metal duct. The concrete floor assembly shall be of fire-resistance-rated construction.

A minimum clearance of 1 inch (25.4 mm) is required on all sides of the grease duct between the enclosure and the grease duct. The exception is that the metal duct is permitted to rest directly on the bottom enclosure material in horizontal runs. When the applicable code requires metal duct reinforcements, the required clearances shall be measured from the maximum projection of the reinforcement rather than the metal duct No. 16 gauge, 1-1/2-by-1-1/2 by 1-1/2 inch (38.1 x 38.1 x 38.1 mm) hat shaped reinforcement is spaced at 8 feet (2.4 m) on center, maximum, for metal ducts having a cross-sectional dimension between 37 and 48 inches (939.8 and 1219.2 mm). Additional clearance of 2 inches (50.8 mm) for every 100 feet (30 m) shall be provided at the end of all straight runs to allow for anticipated expansion of the metal duct inside the enclosure during a fire. If duct sections are connected by welding of turned up "lips" at the junctures between sections, the Firetemp enclosure shall be protected from gouging by lip movement during expansion and contraction with a piece of

sheet metal located under the welded lip. The protecting piece of sheet metal shall be the width of the lip and long enough in the expansion direction to cover anticipated expansion. The sheet metal piece shall be attached to the enclosure material with Super Calstik adhesive.

Super Calstik adhesive is a modified sodium silicate adhesive designed for use with calcium silicate insulation. It is predominately of inorganic sodium silicate composition. Shelf life is one year. Storage shall be in areas where the temperature is maintained between 35°F and 95°F (1.67° C and 35° C).

Spacers shall be attached to the inside of the enclosure to minimize reduction of duct to enclosure clearances to no less than 1/2 inch (12.7 mm) due to duct movement. Spacers are to be constructed of Super Fire-temp material.

All joints between Super Firetemp boards shall be cemented with Super Calstik adhesive. In addition, the boards are attached to each other with 5-inch (127 mm) Type S drywall screws spaced 8 inches (203.2 mm) on center, maximum. Both mating surfaces shall be "buttered" with a 1/16 to 1/8 inch (1.59 to 3.18 mm) thick layer of Super Calstik immediately before joining, with excess adhesive squeezed out on joining.

Enclosure cleanout access covers are constructed by sawing out a section of Super Firetemp adjacent to the metal duct cleanout access as shown in Figures 6 and 8. The sawed-out piece shall be 3 inches (76.2 mm) larger in each direction than the metal duct access cover. The sawed-out piece is attached to another layer of Super Firetemp with Super Calstik adhesive and a minimum number of four drywall screws which are 1 inch (25.4 mm) shorter than the total thickness of the laminated cover. The additional layer of Super Firetemp shall be the same material type and thickness as the enclosure material and shall be 6 inches (152.4 mm) larger in height and width than the sawed-out opening. The 3-inch (76.2 mm) wide overlap between the cover and the duct enclosure shall be sealed with a gasket adhered to the cover with Super Calstik adhesive. The gasket material shall be a 1/8 inch (3.18 mm) thick by 3-inch (76.2 mm) wide strip of 8 pcf (128.15 kg/m³) ceramic fiber blanket, 12 pcf (192.2 kg/m³) mineral wool blanket or 9 pcf (144.17 kg/m³) fiberglass blanket. The enclosure cleanout access cover is held in place with removable steel bars as shown in Figure 8. A label, stating that the cleanout cover shall be replaced after each use, shall be placed adjacent to the cleanout. Labels are supplied by Mesa Insulations, A Johns Manville Company.

4.0 INSTALLATION

Installation is in accordance with this report and the manufacturer's instructions.

The manufacturer's published installation instructions and this report shall be strictly adhered to and a copy of these instructions shall be available at all times on the job site during installation.

The instructions within this report govern if there are any conflicts between the manufacturer's instruction and this report.



REVISIONS: 4 ENTIRE PAGE PER ARCHITECT 10/24/01

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