ESR-1858
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This report is subject to re-examination in two years.

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DIVISION: 06—WOOD AND PLASTIC
Section: 06500—Structural Plastic
Section: 06610—Plastic Railings and Guards

REPORT HOLDER:

AVESTA PROFILE SYSTEMS, LTD.
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EVALUATION SUBJECT:

AVESTARAIL™ SYSTEM

ADDITIONAL LISTEE:

THE DOW CHEMICAL COMPANY
200 LARKIN CENTER
MIDLAND, MICHIGAN 48674
PRODUCT NAME: SYMMATRIX™ CLASSIC ELEGANCE SERIES RAILINGS

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2003 *International Building Code*® (IBC)
- 2003 *International Residential Code*® (IRC)
- 1997 *Uniform Building Code*™ (UBC)

Properties evaluated:

- Structural
- Durability
- Surface-burning characteristics

2.0 USES

The AvestaRail™ System described in this report is limited to exterior use as guards for balconies, porches, and decks. The products described in this report are used in Group R Occupancy (residential) buildings of Type V-B (IBC) or Type V-N (UBC) construction and buildings constructed in accordance with the IRC.

3.0 DESCRIPTION

3.1 AvestaRail™ System:

The AvestaRail™ System is also available as Dow Chemical's Symmatrix™ Classic Elegance Series Railings. Information in this report pertaining to the AvestaRail™ System is also applicable to the Dow Chemical product.

The AvestaRail™ System is made from a composite material that consists of wood fibers and a polyvinyl chloride (PVC) core that is coextruded with a polyvinyl chloride (PVC) cap. The composite material is approximately 55 percent wood fiber and 45 percent polyvinyl chloride (PVC). The guard system consists of post sleeves and caps, top and bottom rails, a retainer, balusters, and a bottom-rail center support block. The post sleeves are placed over a nominally 4-inch-by-4-inch (102 by 102 mm), preservative-treated wood post.

The guard's top rail is manufactured in a width of 2.5 inches (64 mm). The top rail section has an aluminum insert and must be installed over a "retainer" (see Figure 6). The bottom rail has cross-sectional dimensions of 2.155 inches by 2.28 inches (54 by 58 mm). The balusters are 1.25 inches by 1.25 inches (31 by 31 mm) square with hollow cross sections and internal webs. The guard system is available in lengths of 8 feet 2 inches (2489 mm) (center-to-center of post) with a height of 42 inches (1067 mm).

The post sleeve is a hollow sleeve measuring 4.28 inches by 4.28 inches (108 mm by 108 mm) on the outside, which holds a nominally 4-inch-by-4-inch (102 by 102 mm) preservative-treated wood. Figures 1 through 6 provide dimensioned cross-sectional profiles of the rail, baluster and post sleeve.

3.2 Durability:

The material used to manufacture the AvestaRail™ System is equivalent in durability to code-complying, preservative-treated or naturally durable lumber when used in locations described in Section 2.0.

3.3 Surface-burning Characteristics:

When tested in accordance with ASTM E 84, the AvestaRail™ System has a flame-spread index of no greater than 200.

4.0 DESIGN AND INSTALLATION

4.1 General:

Installation of the AvestaRail™ System must comply with this report and the manufacturer's published installation instructions. The manufacturer's published installation instructions must be available at the jobsite at all times during installation.

4.2 Structural:

The AvestaRail™ System resists the loads specified in Chapter 16 of the IBC and the UBC, and Chapter 3 of the IRC, when installed at a maximum distance between center-of-post to center-of-post as prescribed in Table 1. When the railing is supported on one or both ends by the supporting construction, the maximum distance must be measured from the inside face of the post to edge-of-structure or edge-of-structure to edge-of-structure, respectively. See the notes to Table 1 for actual measurement of the rail.

4.3 Installation:

4.3.1 AvestaRail™ System Post Sleeves: The AvestaRail™ System post sleeve slides over a dry, nominally 4-inch-by-4-inch (102 by 102 mm), preservative-treated wood.

4.3.2 AvestaRail™ System: The retaining rail and the bottom rail must be attached through the composite post sleeve to the wood post insert or other structural elements, utilizing two $^1/_4$-inch-diameter-by-1.5-inch-long (6.5 by 38 mm) stainless steel lag screws at each end of each rail and a metal angle bracket. There are two imbedded threaded inserts at each end of the bottom rail. Two $^1/_4$-inch-diameter-by-0.50-inch-long (6.4 mm by 12.7 mm), stainless steel hexhead machine screws are utilized to attach the bottom rail brackets. The top rail is installed over the retainer and is attached to the retainer with two $^1/_4$-inch-diameter-by-1.25-inch-long (6.5 by 31 mm) self-tapping sheet metal screws at each end through the metal angle bracket. The sheet metal screws penetrate the retainer and into the top rail and its aluminum insert. Both top and bottom rail brackets are manufactured from stainless steel and are $1^1/_2$ inches (38 mm) wide and 2 inches long (51 mm).

Balusters are installed with a single No. 8 by 2-inch-long (51 mm) stainless steel wood screw through the retainer and a single No. 8 by 3-inch-long (76 mm) stainless steel wood screw installed through the bottom rail. All fasteners are provided by Avesta Profile Systems, Ltd. See Figure 7 for a cross-sectional profile of the rails and baluster showing how they connect together.

Each post sleeve is mounted to the supporting framing by boxing in the nominally 4-inch-by-4-inch (102 mm by 102 mm) post, so there is support on all four sides.

The AvestaRail™ System is limited to the maximum rail length as noted in Table 1 and must be supported by construction capable of withstanding the loads described in the applicable building codes.

5.0 CONDITIONS OF USE

The AvestaRail™ System described in this report complies with, or is a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 The AvestaRail™ System described in this report is limited to guards for balconies, porches, decks and similar appendages of Group R Occupancy buildings of Type V-B (IBC) or Type V-N (UBC) construction and dwellings constructed in accordance with the IRC. The AvestaRail™ System has not been evaluated for use as a handrail or as a guard for stairs.

5.2 Installation must comply with this report, the manufacturer's published installation instructions, and the applicable code. Only those fasteners and fastener configurations described in this report have been evaluated for the installation of the AvestaRail™ System.

5.3 Adjustment factors outlined in the NDS, the IBC, the IRC and the UBC do not apply to the allowable capacity and maximum spans for the AvestaRail™ System.

5.4 The AvestaRail™ System must be directly fastened to supporting construction. Where required by the code official, engineering calculations and construction documents consistent with this report must be submitted for approval. The calculations must verify that the supporting construction complies with the applicable code requirements and is adequate to resist the loads imparted upon it by the products and systems discussed in this report. The documents must contain details of the attachment to the supporting structure consistent with the requirements of this report. The documents must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

5.5 The compatibility of fasteners and other metal hardware with the supporting construction, and with chemically treated wood, is outside the scope of this report.

5.6 The use of wood posts, with or without post sleeves, is outside the scope of this report.

5.7 The AvestaRail™ System is produced by Avesta Profile System, Ltd., at their facility located in Maple, Ontario; under a quality control program with inspections by Intertek Testing Services, NA (AA-688).

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Deck Board Span Ratings and Guardrail Systems (Guards and Handrails) (AC174), dated April 2002 (editorially revised July 2004; corrected December 2004).

7.0 IDENTIFICATION

Each railing component described in this report must be identified by a label on each individual piece, or article of packaging, bearing the name of the product and the manufacturer's name [Avesta Profile Systems, Ltd. (or the listee's name)]; the evaluation report number (ESR-1858); and the name of the inspection agency (Intertek Testing Services).

TABLE 1—MAXIMUM GUARDRAIL SYSTEM SPANS[1]

PRODUCT NAME/COMPONENT	APPLICABLE BUILDING CODE[2]			MAXIMUM SPAN[3,4] (ft-in)
	IBC	IRC	UBC	
AvestaRail™ System	Yes	Yes	Yes	8′ - 2″

For **SI:** 1 inch = 25.4 mm; 1 ft = 305 mm.

[1]The ability of the supporting construction to resist the reactionary loads must be justified to the satisfaction of the code official when required.
[2]Indicates compliance with the respective building codes.
[3]Maximum span is measured from center of post to center edge of post. The posts are 4.28 inches square, which would make the actual rail length 93.72 inches.
[4]Maximum allowable span has been adjusted for durability. No further increases are permitted.

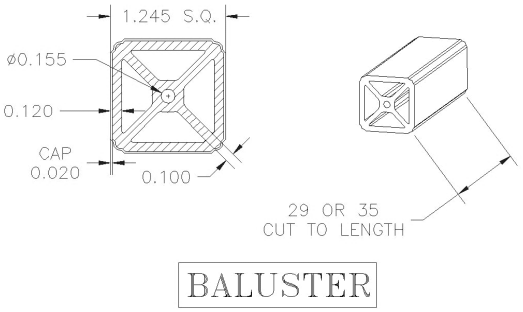


FIGURE 1

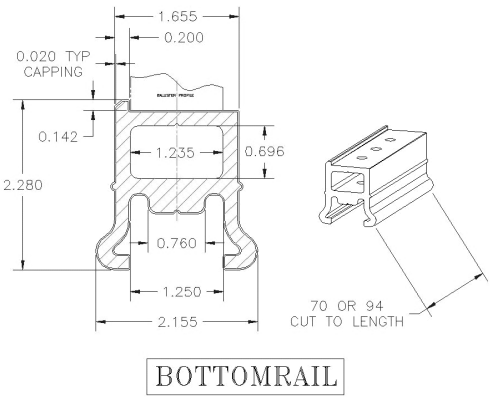
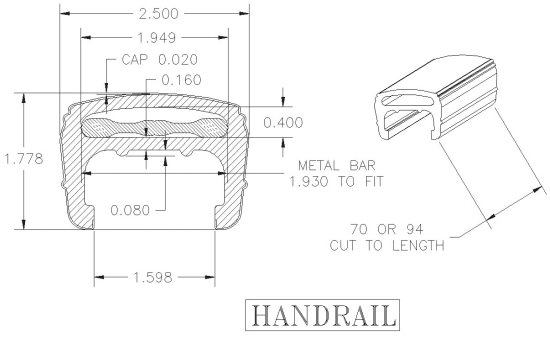


FIGURE 2



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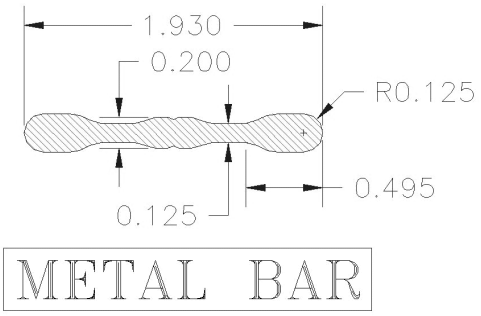

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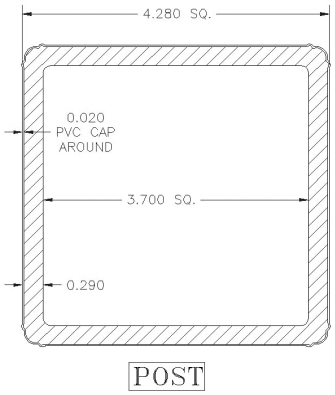

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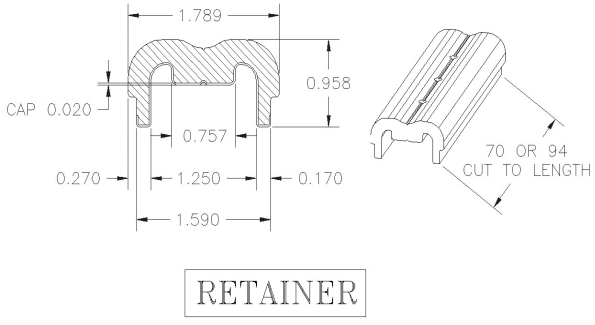

FIGURE 6

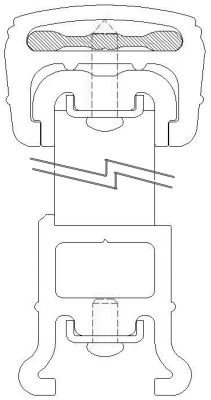

FIGURE 7