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REPORT

on

ROOFING SYSTEMS, UPLIFT RESISTANCE

Under The

CLASSIFICATION PROGRAM

EcoStar, a Division of Carlisle SynTec Inc.
Vernon Hills, IL

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GENERAL

INVESTIGATION:

The purpose of this investigation was to evaluate a new molded plastic roof covering in accordance with ANSI/UL 1897, "Uplift Tests for Roof Covering Systems."

Prior to the UL 1897 test, pull-through resistance tests were performed in accordance with ASTM D3462 to determine the most critical product with regard to fastener pull-through resistance. Secondly, we determined the tributary area per fastener for each product, which allowed us to determine the most critical product with regard to fastener withdrawal. Based on the fastener pull-through resistance and fastener withdrawal information, we selected the "Majestic Slate Traditional" product as the most critical product and therefore, we concluded that uplift resistance results obtained under this investigation could be extended to the "Majestic Slate Beaver Tail Design", "Majestic Slate Beveled Edge Design", "Majestic Slate Chisel Point Design", "Majestic Colonial Slate", "Celestial Slate Traditional", "Celestial Slate Beaver Tail Design", "Celestial Slate Beveled Edge Design", "Celestial Slate Chisel Point Design" and "Celestial Colonial Slate" products.

DESCRIPTION

PRODUCT COVERED:

The product covered by this Report is the plastic molded tile designated "Majestic Slate Traditional."

The product in this Report is Classified as to uplift resistance only.

USE:

The product is intended for use as a building material as permitted by authorities having jurisdiction.

TEST RECORD NO. 1

UPLIFT TESTS:

MATERIALS

The following is a description of the materials used in the assembly:

Plywood - 15/32 in. thick APA rated, Grade CD-X plywood.

Underlayment - Type 15 asphalt saturated felt.

Plastic - 0.0045 in. thick polyethylene was used to prevent pressure leakage.

Fasteners (Nails) - Fasteners used to attach the tiles to the plywood deck were 1-1/2 in. long, stainless steel, ring-shank nails. The nail diameter was 0.143 in.

Fasteners (Screws) - Fasteners used to attach the plywood deck to the joists were 2-1/2 in. long, No. 8 coarse thread screws.

Roof Covering - 12 by 18 in. plastic molded tiles designated "Majestic Slate Traditional" by the manufacturer. Each tile weighs approximately 1.40 lb.

CONSTRUCTION OF TEST ASSEMBLY:

The assembly was constructed under the observation of members of Underwriters Laboratories' technical staff.

Wood Joist Description - The joists were nominal 2 by 10 in. and were spaced 24 in. OC.

Assembly No. 1

A single layer of 15/32 in. thick, Grade CD-X, APA rated plywood was attached to the wood joists with 2-1/2 in. long, No. 8 coarse thread screws. The screws were spaced 6 in. OC at the joints and 6 in. OC in the field of the plywood. One layer of Type 15 asphalt saturated felt was stapled to the plywood. The "Majestic Slate Traditional" tiles were installed as shown in the installation guide. The tiles were installed with a 7 in. exposure and a minimum 3/8 in. gap between each tile. Two nails, spaced 6-3/4 in. OC, were used to fasten each tile to the plywood deck.

The Classification for uplift resistance, expressed in PSF, is derived from tests conducted in accordance with the Standard, "Uplift Tests for Roof Covering Systems", UL 1897. The test method subjects a minimum 10 by 10 ft test sample to various short-term (1 min increment) static pressures which represent the uplift forces imposed on a roofing system's securement to a specified roof deck when exposed to high velocity winds.

The magnitude of the wind velocity across a roof deck and the resulting uplift pressures on a roof deck are dependent upon many factors such as wind gusts, the shape of the roof deck, edge configuration and the landscape surrounding the roof deck installation. A method to calculate the uplift pressures on roof decks is contained in ASCE 7-98, "Minimum Design Loads for Buildings and Other Structures".

The test apparatus consisted of two sections: a top section measuring 10 by 10 ft to create a uniform vacuum, and a bottom section measuring 11 by 11 ft. The chamber is provided with a static pressure tap located such that the pressure readings are not affected by the velocity of the air into or from the chamber. A manometer is used to determine the vacuum pressure.

The pressure differences were adjusted such that a stabilized 30 psf uplift pressure was exerted upon the roofing system attachment and held for 1 min. This process was repeated with maximum additional 15 psf maximum pressure increments, each held for 1 min.

RESULTS

Assembly No. 1 was subjected to uplift pressure in accordance with the loading schedule through a maximum of 105 psf. Prior to and during the attainment of the 105 psf pressure, there was no sign of fastener withdrawal or fastener pull-through. The mode of failure after 105 psf was fastener withdrawal.

PRACTICABILITY:

The construction materials used in the roofing system were readily installed by qualified workers with tools and methods commonly used for construction work of similar nature. Materials and installation procedures in accordance with those previously described in the Report are significant factors in the uplift resistance performance of the roofing system.

CONCLUSION

The following conclusions represent the judgement of Underwriters Laboratories Inc. based upon the results of the examination, test and data analysis presented in this Report, as they relate to established principles and previously recorded data. Roofing System Classification will be promulgated as shown below:

The "Majestic Slate Traditional" plastic molded tile is judged to be eligible for Classification and Follow-Up Service of Underwriters Laboratories Inc. Under the Service, the manufacturer is authorized to use the Laboratories' Classification Marking on such products which comply with the Follow-Up Service Procedure and any other applicable requirements of Underwriters Laboratories Inc. Only those products which properly bear the Laboratories' Classification Marking are considered as Classified by Underwriters Laboratories Inc.

The Classification Marking to be used for the tile product utilized in the above system is illustrated below:

PREPARED ROOF COVERING MATERIALS FOR
ROOFING SYSTEMS, UPLIFT RESISTANCE
CLASSIFIED BY
UNDERWRITERS LABORATORIES INC.
AS TO UPLIFT RESISTANCE

- 1) Uplift Resistance: 105 psf
Deck: Min 15/32 in. thick, APA rated plywood.
Underlayment: Any UL Classified base or ply sheet, mechanically attached.
Roof Covering: "Majestic Slate Traditional", "Majestic Slate Beaver Tail Design", "Majestic Slate Beveled Edge Design", "Majestic Slate Chisel Point Design", "Majestic Colonial Slate", "Celestial Slate Traditional", "Celestial Slate Beaver Tail Design", "Celestial Slate Beveled Edge Design", "Celestial Slate Chisel Point Design" and "Celestial Colonial Slate" products.
Each roof covering is to be attached to the plywood with two, 1-1/2 in. long, ring shank nails per tile. The nails are to have a minimum shank diameter of 0.143 in. Nails are to be placed at locations that are specified on each tile.

Report by:



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