

# ICC-ES Evaluation Report

**ESR-2151**

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**DIVISION: 07 00 00—THERMAL AND MOISTURE  
PROTECTION**
**Section: 07 18 13—Pedestrian Traffic Coatings**  
**Section: 07 54 00—Thermoplastic Membrane Roofing**  
**Section: 07 54 19—Polyvinyl-Chloride Roofing**
**REPORT HOLDER:**
**DURADEK U.S. INC.**  
 8288 129<sup>TH</sup> STREET  
 SURREY, BRITISH COLUMBIA V3W 0A6  
 CANADA  
 (604) 591-5594  
[duradek@duradek.com](mailto:duradek@duradek.com)  
[www.duradek.com](http://www.duradek.com)
**EVALUATION SUBJECT:**
**DURADEK ULTRA ROOF AND WALKING DECK  
MEMBRANE**
**1.0 EVALUATION SCOPE**
**Compliance with the following codes:**

- 2009 *International Building Code*® (IBC)
- 2009 *International Residential Code*® (IRC)

**Properties evaluated:**

- Physical properties
- Wind resistance
- Fire classification

**2.0 USES**

The Duradek Ultra system is a walking deck and classified (rated) roof covering system for use directly over USG Durock cement board Next Gen and plywood substrates, as described in Section 3.2.3 of this report.

**3.0 DESCRIPTION**
**3.1 General:**

The Duradek Ultra system consists of a membrane and deck adhesive. See Section 4.0 of this report for recognized Duradek configurations and corresponding component requirements.

**3.2 Materials:**

**3.2.1 Membrane:** Duradek Ultra membrane is a calendered polyvinyl chloride (PVC) film laminated to a woven, heat-set polyester fabric. The surface of the PVC film is factory-printed and top-coated with a PVC/acrylic finish. The membrane is produced in a variety of colors and patterns and is available in rolls of various widths and lengths. The membrane weighs approximately 55 ounces

per square yard (1864 g/m<sup>2</sup>) and is nominally 0.060 inch [60 mils (1.5 mm)] thick.

**3.2.2 Adhesives:**

**3.2.2.1 Duradek D763:** A white-colored, water-based, liquid adhesive with a shelf life of six months when stored at temperatures between 45° and 80°F (10° and 26.7°C).

**3.2.2.2 Duradek D811:** A yellow-colored, liquid contact adhesive with a shelf life of six months when stored at temperatures between 45° and 80°F (10° and 26.7°C).

**3.2.2.3 Mapei Ultra Flex 2:** A single-component, polymer-modified thin-set mortar with a shelf life of one year when stored at 73°F (23°C) and 50 percent relative humidity.

**3.2.3 Substrates:**

**3.2.3.1 Plywood:** Minimum <sup>5</sup>/<sub>8</sub>-inch-thick (15.9 mm) exterior-grade with tongue-and-groove edges, complying with US Department of Commerce Product Standard PS-1 or PS-2.

**3.2.3.2 USG Durock Cement Board Next Gen:** Minimum nominally <sup>1</sup>/<sub>2</sub>-inch-thick cement panel, manufactured by United States Gypsum Company.

**4.0 INSTALLATION**
**4.1 General:**

Installation of the Duradek Ultra system must be in accordance with the manufacturer's published installation instructions, the applicable code and this report. The manufacturer's installation instructions must be available on the jobsite during application. Installation is limited to conditions when the weather is dry and the ambient air temperature is a minimum of 45°F (7.2°C). Materials must not be applied if precipitation is occurring or expected during application.

**4.2 Preparation of Substrates:**

Substrates must be structurally sound, clean and dry, and shall be sloped a minimum of <sup>1</sup>/<sub>4</sub> inch per foot (2 percent slope).

**4.2.1 Plywood:** Plywood must be applied to framing in accordance with the requirements of the applicable code. All unsupported edges must be blocked. All penetrations through and terminations of the sheathing must be protected with metal flashing in accordance with the requirements of the applicable code and the manufacturer's published installation instructions.

**4.2.2 USG Durock:** Where USG Durock is used as a substrate, it must be installed over a plywood substrate complying with, and installed in accordance with, Sections 3.2.3.1 and 4.2.1. See Footnote 3 of Table 1 for additional installation details.

**4.3 Membrane Installation:**

The membrane must be adhered to the substrate with either Duradek D763 or Duradek D811 adhesive. Duradek D763 must be applied to the substrate with either a U-notched trowel having 1/32-inch-deep-by-1/16-inch-wide (0.8 by 1.6 mm) notches spaced 1/32 inch (0.8 mm) apart or a textured roller. The minimum coverage is 1 gallon per 190 square feet (1L/4.66 m<sup>2</sup>). Duradek D811 must be applied with either a brush or a roller at a coverage rate of 1 gallon per 95 square feet (1L/2.33 m<sup>2</sup>). The minimum application temperature for both adhesives is 45°F (7.2°C).

A minimum 2-inch (51 mm) width of Duradek D811 adhesive must be used at the perimeter of the deck and on walls, edges and right-angle corners. Membrane seams must be overlapped a minimum of 3/4 inch (19.1 mm) at edges and ends, and heat-fused with a hot-air seaming tool. Exposed edges, posts and trim strips must be sealed with sealant.

**4.4 Method of Repair:**

A portion of the membrane larger than the affected area must be removed and a new piece of material must be prepared that is 1 1/2-inch (38 mm) larger in dimension than the piece removed. Duradek D763 adhesive must be applied to the substrate and the patch must be placed into the space so it overlaps the existing sheet by 3/4 inch (19 mm). The patch must be welded to the existing sheet using a hot-air seaming tool. When substrate damage occurs, the retention of the fire classification and wind-resistance properties of the system must be demonstrated to the satisfaction of the code official.

**4.5 Wind Resistance:**

The roof deck construction over which the Duradek Ultra system is installed must be designed to resist the minimum design wind pressures set forth in the applicable code.

The allowable wind uplift pressures for the roof assemblies are noted in Table 1. Metal edge securement of the membrane must be designed in accordance with ANSI/SPRI ES-1, and must comply with IBC Section 1504.5.

**4.6 Roof Covering Classification:**

See Table 1 for fire-classified assembly details.

**5.0 CONDITIONS OF USE**

The Duradek Ultra walking deck and roof covering 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** Installation must comply with this report, the manufacturer’s published installation instructions and the applicable code. If there is a conflict between the installation instructions and this report, this report governs.

**5.2** The Duradek Ultra system must not be installed adjacent to swimming pools or spas, or in areas subject to related chemical exposure.

**5.3** Wind uplift pressure on any roof area, including edge and corner zones, must not exceed the allowable wind pressure for the roof covering installed in that particular area. Refer to Table 1.

**5.4** The allowable wind uplift pressures listed in Table 1 are for the roof covering system only. The deck and framing to which the system is attached must be designed for the applicable components and cladding wind loads in accordance with the applicable code.

**5.5** The membrane is manufactured under a quality control program with inspections by Quality Auditing Institute Ltd. (AA-635).

**6.0 EVIDENCE SUBMITTED**

**6.1** Data in accordance with the ICC-ES Acceptance Criteria for Walking Decks (AC39), dated April 2011 (editorially corrected August 2011).

**6.2** Data in accordance with the ICC-ES Acceptance Criteria for Membrane Roof Covering Systems (AC75), dated July 2010.

**6.3** Report of fire classification testing in accordance with ASTM E108.

**6.4** Report of simulated wind uplift testing in accordance with FM 4474 Appendix B.

**7.0 IDENTIFICATION**

Each roll of membrane is identified with the Duradek U.S. Inc. name and address, the evaluation report number (ESR-2151) and the name of the inspection agency (Quality Auditing Institute Ltd.). The Duradek D763 and D811 adhesives are identified with the Duradek U.S. Inc. name and address, the product designation, batch number keyed to the date of manufacture, and product expiration date.

The Mapei Ultraflex 2 mortar, USG Durock cement board Next Gen and the Rock-on Hi-Lo thread screws are identified with their product name and company name.

**TABLE 1—FIRE CLASSIFICATION AND WIND RESISTANCE ASSEMBLIES**

SYSTEM NO.	FIRE CLASSIFICATION	MAXIMUM ALLOWABLE WIND UPLIFT (psf)	SUBSTRATE <sup>2</sup>	ADHESIVE (membrane to substrate)	MEMBRANE
1	A <sup>1</sup>	200	Plywood/cement board <sup>3</sup>	Duradek D763	Duradek Ultra
2	A <sup>1</sup>	200		Duradek D811	
3	Nonclassified	200	Plywood	Duradek D763	
4	Nonclassified	240		Duradek D811	

For SI: 1 inch = 25.4 mm; 1 psf = 47.8 Pa.

<sup>1</sup>Maximum slope for fire classification assemblies is 1/4:12 (2 percent slope).

<sup>2</sup>See Section 3.2.3 for additional substrate specifications.

<sup>3</sup>USG Durock cement board Next Gen attached to plywood substrate with Mapei “Ultraflex 2” polymer modified mortar, troweled down with a 1/4-inch-by-1/4-inch square-notched trowel, with notches spaced 1/4 inch on center; and screwed to plywood with 1 1/4-inch-long Rock-on #9 Hi-Lo thread screws spaced 6 inches on center around the perimeter of the cement board.