

Certifying Roof Deck Constructions for Wind Resistance

An uplifting experience



Building codes often require that roof deck constructions and coverings be designed to resist design wind load pressures in accordance with structural requirements specified in the code. They also require testing of various roof constructions to specific standards. To more effectively enforce these code requirements, it is important to understand two things: the general requirements in the testing standards and the markings that identify certified roof deck constructions.

Section 1504.3 of the 2009 International Building Code requires roof systems with built-up, modified bitumen, fully adhered or mechanically attached single-ply through fastened metal panel roof systems, and other types of membrane roof coverings to be tested in accordance with UL 580, UL 1897 or FM4474. It also requires through fastened

or standing seam metal panel roof systems to be tested in accordance with UL 580.

UL 580 roof deck construction certifications

Roof deck constructions Classified for uplift resistance are covered under the Roof Deck Constructions product category (TGKX) found in the UL Online Certifications

Directory at www.ul.com/database. These roof deck assemblies have been investigated for their ability to resist both external and internal pressures associated with high velocity winds. Uplift Classifications are derived from tests conducted in accordance with UL 580, the Standard for Tests for Uplift Resistance of Roof Assemblies. This test

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method subjects a 10 foot by 10 foot test sample to various static and oscillating air pressures to index performance under uplift loads imposed on roof decks.

The nominal static uplift pressure, oscillating uplift pressures and the maximum static uplift pressure for each Class are as shown in Table 1 (right).

The static pressures are maintained for a 5-minute period and the oscillating pressures are applied at a 10 second frequency and are maintained for a 60-minute period for each Class. An assembly rated Class 60 has successfully withstood pressures imposed during both Class 30 and Class 60 tests. Likewise, an assembly rated Class 90 has successfully withstood pressures imposed during Class 30, Class 60 and Class 90 tests.

The UL 580 test method provides a comparative measure of uplift resistance of roof deck constructions. The test evaluates the roof deck, or the roof deck assembly and its attachment to supports, as well as the attachment of any roof covering.

Some aspects of a roof deck assembly are not evaluated using UL 580, unless specified in the construction. These elements include:

- Secondary supports such as beams, purlins, joists, bulb tees, lateral bracing, etc.
- Connections of the assembly to the main structural members such as girders, columns, etc.
- Construction details along roof edges and around roof openings such as skylights, chimneys, etc.

Constructions with skylights have been evaluated with single-width skylight panels flanked on each side by a metal panel. Constructions including eaves/soffits have been evaluated for resistance to uplift pressures on the underside only.

Roofing systems Classified for uplift resistance related exclusively to the securement of the roof covering to a specified type of roof deck are covered under the Roofing Systems, Uplift Resistance category (TG1K). The sidebar on this page provides more details.

Fire Classifications

For many of the Constructions, the term “Fire Not Investigated” appears. This signifies that the Construction is evaluated for uplift only. However, those Constructions noted as “Fire — Classified” have been evaluated by either the large-scale fire test, or other test procedures having fire exposure conditions related to the large scale fire test

described in the UL 1256, the Standard for Fire Test of Roof Deck Constructions, in addition to wind uplift. This corresponds with Section 1508.1 of the International Building Code which allows the use of above-deck thermal insulation when such insulation is covered with an approved roof covering and complies with UL 1256 when tested as an assembly. Please note that these Fire

Class	Nominal Static Uplift Pressure	Range of Oscillating Pressure	Maximum Static Uplift Pressure
15	15	11 – 21	23
30	30	22 – 42	45
60	60	44 – 83	75
90	90	66 – 90	105

(All measurements in pounds per square foot)

Table 1



UL 1897 roofing systems — uplift resistance certifications

In addition to investigating roof deck constructions to UL 580, UL evaluates uplift resistance of roofing systems in accordance with UL 1897, the Standard for Uplift Tests for Roof Covering Systems. This test method is intended to provide uplift resistance data for the evaluation of the attachment of roof covering systems to roof decks by using differential air pressures.

The test evaluates a roof covering system’s method of attachment, including all components such as base sheets, ply sheets, slip sheets, membranes, etc., and insulation, if used. Supporting roof decks are considered only with respect to span conditions and physical properties such as gauge, yield strength, grade, size and/or

species of lumber, and related factors affecting fastener attachment or bond strength. The UL 1897 test apparatus and methods are similar to those used for UL 580 testing.

Classifications for these systems are included under the Uplift Resistance — Roofing Systems category (TG1K), found in the UL Online Certifications Directory at www.ul.com/database. The UL 1897 Classifications for uplift resistance are expressed in pounds per square foot (psf), which is the maximum load sustained without failure, as compared to the Class 30, 60 and 90 ratings established for roof deck constructions by UL 580 testing.



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Classifications do not involve fire ratings related to surface burning characteristics, fire resistance classifications, or Class A, B or C external fire exposure.

Enforcement considerations

Many jurisdictions require that a contractor identify a roof deck construction by its UL designation (e.g. Construction No. 355 or Construction No. NM533) and to include a copy of the design specifications in the plan review package. UL permits the reproduction of designs contained in its Online Certifications Directory, subject to the limitations shown at the bottom of each design.

The specifications for the assembly, materials and components described in the constructions should be carefully evaluated at the job site to verify that the roof deck constructions are built in accordance with the UL design. Code authorities should pay special attention to ensuring that materials required to be UL Classified have the appropriate ratings and Classification Marks. Many materials and components have their own dedicated UL product categories. Some key examples are Metal Roof Deck Panels (TJPV), Roof Deck Fasteners (TLSX) and Building Units (TIAR). These categories and others for materials and components used within roof deck constructions are shown in the general category for Roof Deck Construction Materials (TGYV).