UL 580

STANDARD FOR SAFETY

Tests for Uplift Resistance of Roof Assemblies

UL Standard for Safety for Tests for Uplift Resistance of Roof Assemblies, UL 580

Fifth Edition, Dated November 2, 2006

Summary of Topics

This revision of ANSI/UL 580 dated April 26, 2024 is being issued to update the title page to reflect the most recent designation as a Reaffirmed American National Standard (ANS). No technical changes have been made.

Text that has been changed in any manner or impacted by ULSE's electronic publishing system is marked with a vertical line in the margin.

The requirements are substantially in accordance with Proposal(s) on this subject dated March 8, 2024.

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UL 580

Standard for Tests for Uplift Resistance of Roof Assemblies

The First and Second editions were titled Test for Wind-Uplift Resistance of Roof Assemblies.

First Edition – August, 1973
Second Edition – November, 1980
Third Edition – May, 1988
Fourth Edition – May, 1994

Fifth Edition

November 2, 2006

This ANSI/UL Standard for Safety consists of the Fifth Edition including revisions through April 26, 2024.

The most recent designation of ANSI/UL 580 as a Reaffirmed American National Standard (ANS) occurred on April 26, 2024. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, and Title Page.

Comments or proposals for revisions on any part of the Standard may be submitted to ULSE at any time. Proposals should be submitted via a Proposal Request in the Collaborative Standards Development System (CSDS) at https://csds.ul.com.

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INTRODUCTION

1 Scope

1.1 The method of test specified in this standard is intended to determine the uplift resistance of roof assemblies consisting of the roof deck and roof covering materials. It is applicable to any type of roof assembly which is adaptable to the test equipment. Tests to evaluate other potential hazards of roof assemblies are not within the scope of these requirements.

1.2 The purpose of this test is to evaluate the comparative resistance of roof assemblies to positive and negative pressures.

1.3 The test evaluates the roof deck, its attachment to supports, and roof covering materials. It does not evaluate roofs adjacent to chimneys, overhanging eaves, or similar construction, connections of the assembly to main structural supports (girders, columns, or other supports), structural integrity of secondary supports (purlins, joists, bulb tees, or the like), or deterioration of roofing materials.

1.4 *Deleted*

2 General

2.1 Units of measurement

2.1.1 If a value for measurement is followed by a value in other units in parentheses, the first stated value is the requirement.

2.2 Undated references

2.2.1 Any undated reference to a code or standard shall be interpreted as referring to the latest edition of that code or standard.

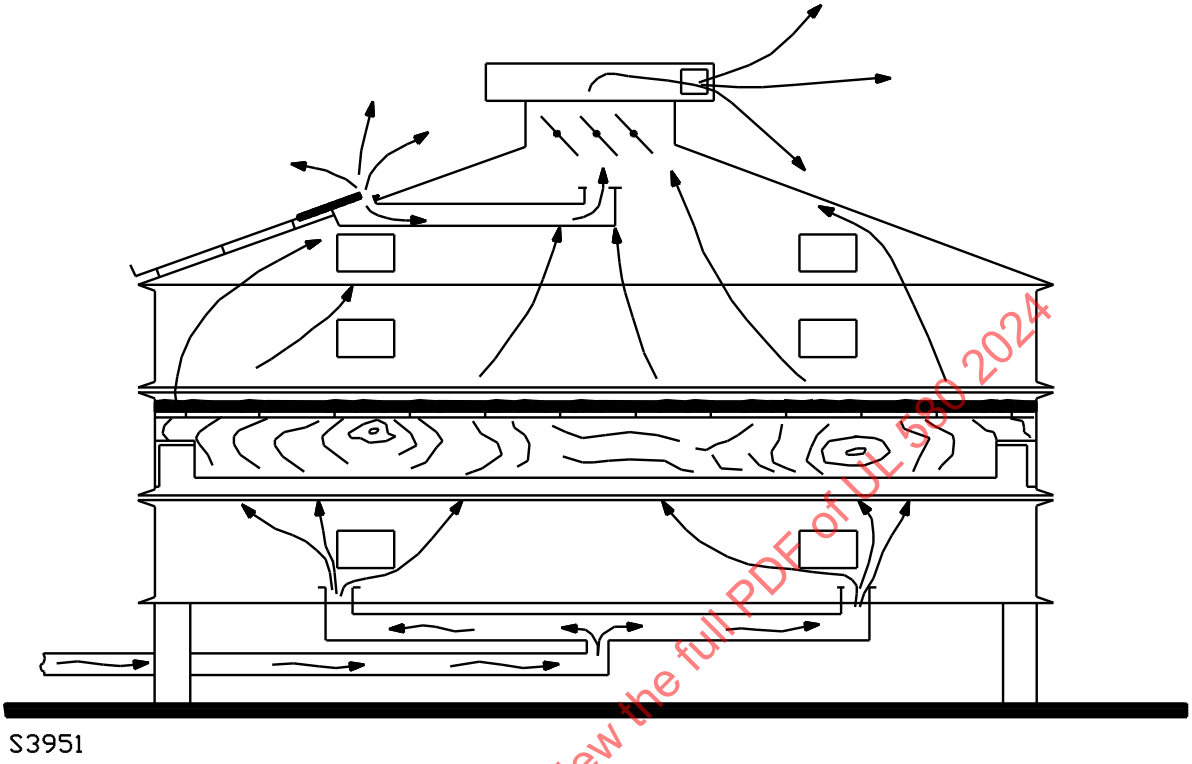
TEST APPARATUS

3 General

3.1 The test apparatus is to consist of three sections which include a top section to create a uniform vacuum, a center section in which the roof assembly is constructed, and a bottom section to create a uniform positive pressure. See Figure 3.1. Each section is to be sealed to maintain the specified pressures.

Figure 3.1

Assembled uplift test apparatus



3.2 The inside dimensions of the test apparatus are to be a minimum of 10 by 10 feet (3.05 by 3.05 m).

3.3 The test chamber is to be capable of applying steady positive pressures on the underside of the test assembly and both steady and oscillating negative pressures, as specified, upon the top surface.

3.4 Recording equipment is to be used to make a permanent record of the pressure levels developed in the test as a function of time.

3.5 Sections 4 – 6 contain a specification of the presently used test apparatus. Design modifications shall not be made unless the test results are equivalent to the results obtained from the specified apparatus.

4 Pressure Chamber

4.1 The pressure chamber is to be formed from C12 x 30 channels and is to measure a minimum of 10 by 10 feet (3.05 by 3.05 m) by 9 inches (229 mm) deep. A 4-1/2 inch (114 mm) wide by 1/4 inch (6.4 mm) thick steel plate is to be welded around the top of the chamber.

4.2 The floor of the pressure chamber is to be fabricated from 1/8 inch (3.2 mm) thick sheet steel, welded at the seams and supported by five 3- by 7.5-inch (76- by 190-mm) steel shapes. The chamber is to be supported by an MC8 x 20 channel at each side and a W8 x 28 beam at each corner.

4.3 Several windows constructed of break-resistant glazing material are to be installed in the chamber walls to allow observation of the underside of the test assembly.

4.4 Flood lights are to be mounted in the chamber for illumination of the under surface of the test assembly.

4.5 Air is to be admitted into the chamber through a 6- by 6-inch (152- by 152-mm) opening cut into the bottom of the chamber.

4.6 A steel baffle is to be placed over the air inlet opening for even distribution of air pressure. The baffle consists of two vanes with the lower vane measuring 22 by 22 inches (559 by 559 mm) and the upper vane measuring 16 by 16 inches (406 by 406 mm). The vanes are set at an angle of 30 degrees from the horizontal.

4.7 Air is to be provided by a blower attached to a 3 horsepower (2.2 kW output) electric motor that is capable of delivering 862 cubic feet (24.4 m^3) of air per minute at a static pressure of 11 inches (2739 Pa) of water.

4.8 The pressure blower starter controls are to be located on the side of the chamber for ease of access and rapid shut down.

4.9 The inlet pressure is to be controlled at the blower by a manually operated steel damper measuring 2 by 18 inches (51 by 457 mm) which is mounted on a sheet steel collar. The chamber pressure is to be controlled by an automatic relief damper measuring 4-3/4 by 11-3/4 inches (121 by 298 mm) located on the bottom of the chamber. The automatic damper is to be controlled by means of an adjustable weight system.

4.10 The air pressure is to be measured at five points by means of 1/4 inch (6.4 mm) outside diameter copper tubing extending from the floor into the chamber at an angle of 45 degrees from the floor. Each of four tubes is to be diagonally located 42 inches (1067 mm) from a corner of the chamber. A fifth tube is to be located 18 inches (457 mm) from the center of the air inlet opening. The end of each tube is to be 7 inches (178 mm) above the chamber floor. The tubes are to be connected through 1/4 inch valves into a manifold that, in turn, is to be connected to a manometer having a range of 0 – 12 inches of water (0 – 2988 Pa), graduated into 0.10 inch (24.9 Pa) increments.

5 Vacuum Chamber

5.1 The vacuum chamber is to be formed from C12 x 30 channels and is to measure a minimum of 10 by 10 feet (3.05 by 3.05 m) by 12 inches (305 mm) high at the base. A 4-1/2 inch (114 mm) wide by 1/4 inch (6.4 mm) thick steel plate is to be welded to the bottom of the channels. A reinforced hood, constructed from 0.105 inch (2.66 mm) thick steel with 2-1/2- by 2-1/2- by 1/2-inch (64- by 64- by 12.7-mm) angles at the corners and 2-1/2- by 2-3/4-inch (64- by 70-mm) tee sections at the center, is to be mounted on the base.

5.2 Several windows constructed of break-resistant glazing material are to be installed in the chamber base to allow observation of the upper surface of the test assembly.

5.3 The hood is to have a 30 degree slope from the horizontal at each side and is to have observation windows constructed of break-resistant glazing material in each wall.

5.4 The hood is to be terminated in a 24- by 24-inch (610- by 610-mm) metal platform constructed from 1/8 inch (3.2 mm) thick steel plate. A 7 inch (178 mm) diameter opening is to be cut into the plate for the blower.

5.5 Negative pressure is to be provided by a blower and a 3 horsepower (2.2 kW output) motor which are to be mounted on top of the chamber with their shafts in a vertical position. The combination is to be

capable of delivering 862 cubic feet (24.4 m^3) of air per minute at a static pressure of 11 inches (2739 Pa) of water.

5.6 The vacuum blower starter controls are to be located on a platform welded to the top of the hood.

5.7 The pressure in the vacuum chamber is to be controlled by an automatic damper measuring 18 by 2-1/4 inches (457 by 57 mm). The damper door is to be moved by means of an air motor hooked to an air line and controlled by pressure switches located in a control console.

5.8 An additional manually controlled sliding damper is to be located on the sloped wall of the chamber. It is to be constructed of 1/8 inch (3.2 mm) thick steel plate and a screw gear which opens or closes the damper by turning. The damper is to measure 6 by 18 inches (152 by 457 mm).

5.9 Sheet metal baffles are to be located on the underside of the damper to prevent direct air flow onto the test assembly.

5.10 The air pressure is to be measured at five points by means of 1/4 inch (6.4 mm) outside diameter copper tubing extending from the floor into the chamber at an angle of 45 degrees from the floor. Each of four tubes is to be diagonally located 18 inches (457 mm) from a corner of the chamber. The ends of these four tubes are to be 8 inches (203 mm) above the chamber floor. The fifth tube is to enter the chamber at a point 12 inches (305 mm) from the center of the exhaust opening, and its end is to be 6 inches (152 mm) below the opening. The tubes are all to be connected through 1/4 inch valves into a manifold that, in turn, is to be connected to a manometer having a range of 0 – 12 inches of water (0 – 2988 Pa) graduated into 0.10 inch (24.9 Pa) increments.

5.11 An additional 1/4 inch (6.4 mm) outside diameter copper tube is to be connected from the manifold to an exterior junction for use of the pressure switches which control the automatic damper.

5.12 Flood lights are to be mounted in the chamber for illumination of the top surface of the test assembly.

5.13 Lifting hooks fabricated from 5/8 inch (15 mm) diameter steel rod are to be welded at each corner of the hood.

6 Test Frame

6.1 *revised and relocated as 6.2.1*

6.2 *relocated as 6.2.2*

6.3 *revised and relocated as 6.2.3*

6.4 *relocated as 6.2.4*

6.1 General

6.1.1 The test frame is to consist of a wood or steel structure that measures a minimum of 10 by 10 feet (3.05 by 3.05 m).