

TESTING APPLICATION STANDARD (TAS) 124-11

TEST PROCEDURE FOR FIELD UPLIFT RESISTANCE OF EXISTING MEMBRANE ROOF SYSTEMS AND IN SITU TESTING FOR REROOF AND NEW CONSTRUCTION APPLICATIONS

1. Scope:

- 1.1 This protocol covers the determination of the resistance to uplift pressure of newly installed, adhered, built-up, bituminous roofing systems over mechanically attached or adhered rigid board insulation over various deck types.
- 1.2 The test procedures outlined herein are intended to determine the performance of a new roof system assembly when installed over an existing roof system assembly or directly over a roofing substrate.
- 1.3 The test procedures outlined herein are intended to determine whether the uplift resistance performance of a newly installed Roof System Assembly meets the design pressure requirements of ASCE 7, as required in Section 1606 of the *Florida Building Code, Building*. The design pressure requirements for the building in question are listed on Section II of the Uniform Building Permit.
- 1.4 Tests shall be conducted prior to full-scale test assemblies to ensure that the specific maximum pressures set forth in the built-up roofing manufacturer's Product Approval can be achieved utilizing the specified components (i.e., fasteners, insulation, etc.).
- 1.5 When insulation boards are mechanically attached or adhered to the deck, the test shall be conducted not less than 7 days after roofing work is complete. Systems containing cold adhesive shall be in place not less than 14 days prior to conducting the test.
- 1.6 All testing shall be conducted by an approved testing agency and all test reports shall be signed by a Registered Design Professional per F.S., Section 471 or 481 or Registered Roof Consultant.

- 1.7 Design pressures calculated in accordance with ASCE 7 are permitted to be multiplied by 0.6 for the purposes of comparing to tested pressures in TAS 124.

2. Referenced Documents:

2.1 *ASTM Standards*

- D 41 Standard Specification for Asphalt Primer used in Roofing, Damp proofing, and water proofing
- D 1079 Definitions and Terms Related to Roofing, Waterproofing and Bituminous Materials
- E 380 Excerpts from Standard Practice for Use of the International System of Units (SI) (the Modernized Metric System)
- E 575 Practice for Reporting Data from Structural Tests of Building Constructions, Elements, Connections and Assemblies.
- E 907 Test Method for Field Testing Uplift Resistance of Roofing Systems Employing Steel Deck, Rigid Insulation and Bituminous Built-Up Roofing

- #### 2.2 *Factory Mutual Engineering Corporation:*
- Loss Prevention Data Sheet 1-28(S), November, 1991
 - Loss Prevention Data Sheet 1-49, June, 1985
 - Loss Prevention Data Sheet 1-52, February, 1986

- #### 2.3 *National Roofing Contractors Association:*
- NRCA/ARMA Manual of Roof Maintenance and Repair
 - NRCA Roofing and Waterproofing Manual

- 2.4 *The Florida Building Code, Building:*
 - Chapter 16 (High-Velocity Hurricane Zones) Design Loads
 - Chapter 19 (High-Velocity Hurricane Zones) Reinforced Gypsum Concrete and Insulating Concrete
 - Chapter 21 (High-Velocity Hurricane Zones) Masonry
 - Chapter 22 (High-Velocity Hurricane Zones) Steel and Iron
 - Chapter 23 (High-Velocity Hurricane Zones) Wood
 - Chapter 15 (High-Velocity Hurricane Zones) Roof Covering and Application

2.5 *Application Standards:*

- TAS 105 Test Procedure for Field Withdrawal Resistance Testing
- TAS 114 Test Procedures for Roof System Assemblies in the High-Velocity Hurricane Zone Jurisdiction

2.6 *Application Standards:*

- RAS 111 Standard Requirements for Attachment of Perimeter Wood-blocking and Perimeter Flashing
- RAS 117 Standard Requirements for Bonding or Mechanical Attachment of Insulation Panels to and Mechanical Attachment of Anchor or Base Sheets to Various Substrates

2.7 *Roof Consultants Institute:*
Glossary of Terms

3. Terminology & Units:

- 3.1 Definitions—For definitions of terms used in this Protocol, refer ASTM D 1079; Chapter 2 and Section 1513 of the *Florida Building Code; Building* and/or the RCI Glossary of Terms. Definitions from the *Florida Building Code, Building* shall take precedence.
- 3.2 Units—For conversion of U.S. customary units to SI units, refer to ASTM E 380.

4. Significance and Use:

4.1 The field test procedures specified herein provide a means for determining the uplift resistance of a new, adhered, built-up, bituminous roof system assembly, as stated in applicable specification bid documents, installed on a building within the high-velocity hurricane zone. The test procedures are intended to confirm and supplement the uplift resistance performance of roofing systems as determined under laboratory conditions and confirm that a given installation meets the design pressure requirements under ASCE 7, as required in Section 1606 of the *Florida Building Code, Building*.

4.1.1 Field testing of an assembly may be used to support the uplift resistance performance of a specific roof system assembly when the required number of samples noted in Section 7.1 and 7.2 have been tested, and averaged. A margin of safety of 1.45:1 shall be applied to the sample average.

4.1.2 Laboratory conditions may enable uplift investigations to include:

- examination of the critical components and their orientation within the roof system assembly;
- examination of the roof system assembly's long-term uplift resistance; and
- examination of the roof system assembly's uplift resistance from the dynamic affect of variable wind velocities.

4.2 A contractor licensed to install roofing in the high-velocity hurricane zone shall be present during all tests should roof repairs be necessary. Any roofing component damaged during testing shall be repaired immediately subsequent to test completion.

4.3 When new construction will require a tear off of the existing roof system assembly, areas of existing roofing shall be removed to deck level. Sample assemblies shall be applied including a lifting panel, as detailed in Section 5.2 when the bonded pull

test procedure is utilized. Sample panels shall be covered and waterproofed with a membrane roof covering to return the existing assembly to a waterproof condition.

5. Apparatus:

5.1 Bell chamber tests:

5.1.1 Square Uplift Chamber

- The square pressure chamber shall be $60 \pm \frac{1}{2}$ inch (1500 ± 15 mm) in size with a maximum height in the center of the bell of 18 inches.
- The chamber shall be of sufficient strength to withstand not less than 125 pounds per square foot without collapsing.

5.1.2 Pressure measurement device:

- The pressure within the square uplift chamber shall be measured with a manometer which is calibrated to indicate negative pressures in increments of 15 ± 0.5 pound foot per square foot (720 ± 20 Pa).

5.1.3 Vacuum pump:

- Negative pressures shall be created within the pressure chamber with a vacuum pump of sufficient capacity to create the negative pressures specified in Section 8.9.
- The vacuum pump shall also be equipped with controls to maintain a constant pressure at each test pressure increment, as noted in Section 8.9.

5.1.4 Dial indicator:

- Membrane deflections shall be measured using an analog dial indicator with a reset face graduated in units not greater than 0.002 inch (0.05 mm) and having a range not less than 2 inches (50 mm).
- The analog dial indicator shall be mounted at the center of a 2

inch by 2 inch (50 mm by 50 mm) aluminum (or material of equivalent stiffness) bar having a length of 60 inches (1500 mm). The bar shall be supported with support legs which clear the roof membrane by not less than 2 inches (50 mm).

5.2 Bonded pull test:

5.2.1 Load transfer device:

- The load transfer device shall consist of two pieces of 2 feet square, $\frac{7}{8}$ inch thick plywood fastened together using 12 each, $1\frac{1}{4}$ inch long wood screws to form a 2 feet by 2 feet by $1\frac{3}{4}$ inch panel. Screw placement shall be as noted in Figure 1, below.

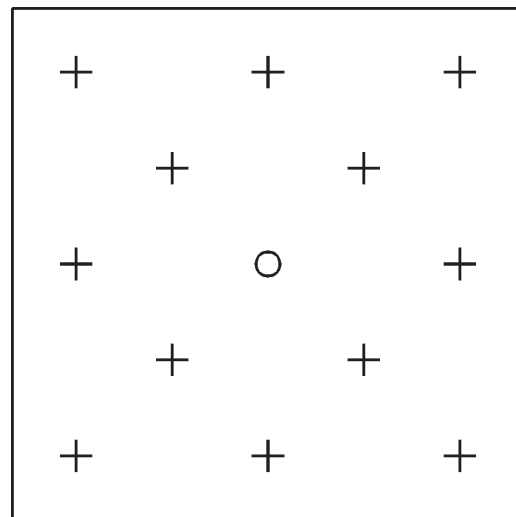


FIGURE 1
SCREW AND EYE-BOLT LOCATIONS

- Alternatively the top plywood panel may be substituted with a $\frac{3}{8}$ inch thick steel panel reinforced with two 2 inch sections of angle iron welded to the top face of the panel. The steel panel shall have $\frac{7}{16}$ inch diameter holes drilled at locations noted in Figure 1, above, through which $\frac{3}{8}$ inch countersunk machine screws shall

be installed through the base of the plywood panel and secured to the steel plate with a washer and wing nut. (See Figure 2, below.)

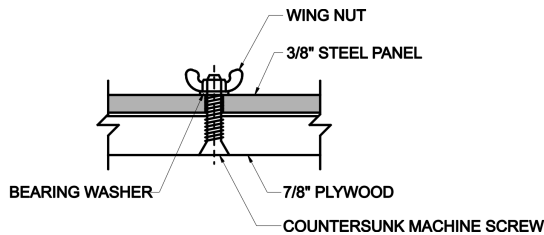


FIGURE 2
ALTERNATE LOAD TRANSFER DEVICE

- One 1/2 inch diameter eye-bolt shall be installed in the center of the test panel and shall be secured to the underside with a lock nut and washers, as noted in Figure 1, above. Alternatively a ring shall be welded to the steel panel.
- A block and tackle or chain hoist shall be attached to the eye-bolt or welded ring with the opposite end attached to the top of a tripod, or equivalent support system, capable of withstanding a minimum of 1200 lbf downward load. The hoist assembly shall be capable of an incremental rise of 1/4 inch.

5.2.2 Load cell:

- A load cell, or equivalent load measurement device, capable of recording loads up to 2000 lbf to an accuracy of 0.5 lbf, shall be attached between the hoist assembly and the eye-bolt or welded ring to measure the applied load.

6. Test Limitations and Precautions:

6.1 General:

- 6.1.1 Conduct tests when the roof's surface temperature is within a range of 40°F to 100°F (4°C to 38°C) as measured by a surface thermometer. The surface temperature shall be noted on the test report.
- 6.1.2 For safety considerations, it is recommended that tests not be conducted when the wind speed at the roof level is greater than 15 miles per hour (6.5 m/s). (A portable anemometer to measure wind speed may be utilized.)

6.2 Bell chamber tests:

- 6.2.1 The manometer shall serve as a safety device to prevent negative pressures that could cause the plastic or fiberglass dome to shatter. The maximum negative pressure for the dome shall be clearly marked on the manometer. Alternatively other safety features shall be added to the test chamber to eliminate negative pressure greater than the design capabilities of the dome.
- 6.2.2 Safety goggles or face shield shall be worn by persons operating the equipment or observing its operation as a precaution against injury that could be caused by sudden failure of the test chamber or roofing system.
- 6.2.3 Care shall be taken to ensure that movement of persons and/or equipment during the test does not lead to movement of the analog dial indicator. During the test, all persons not involved shall stay far enough away from the test area to not influence the analog dial indicators.
- 6.2.4 Testing under this protocol shall be conducted on mechanically attached roof system assemblies.

6.3 Bonded pull test:

- 6.3.1 Testing shall only be conducted on fully adhered roof coverings.
- 6.3.2 Proper safety equipment shall be utilized and proper safety procedures followed during the application of hot asphalt or coal tar pitch. Application of roofing products shall be in compliance with the safety guidelines published and recommended by the roof membrane manufacturer and by the National Roofing Contractors Association.

- structural poured concrete;
- structural concrete plank;
- aggregate lightweight insulating concrete;
- cellular insulating lightweight concrete;
- aggregate/cellular insulating lightweight;
- 18-22 gage steel;
- > 22 gage steel; and
- composite deck system (e.g. load master)

7. Sampling:

- 7.1 The total number of tests to be conducted when testing over an existing roof assembly is listed in Table 1, below. Of these tests, half shall be conducted at selected locations within the perimeter area of the roof and half shall be conducted at selected locations within the field area of the roof.

**TABLE 1
NUMBER OF BELL CHAMBER OR BONDED PULL TESTS
TO BE CONDUCTED PER ROOF AREA**

Roof Area (A)	Number of Tests
10 squares < A < 50 squares (100 m ² < A < 450 m ²)	2
50 squares < A < 100 squares (450 m ² < A < 1000 m ²)	4
A > 100 squares (A > 1000 m ²)	4 plus 1 additional test for each additional 100 squares (1000 m ²) or portion thereof

¹ 1 square = 100 ft² = 9.3 m²

- 7.2 Three test samples are required for all assemblies tested on any size roof deck when the test assembly is applied directly to the substrate for confirmation of design pressure performance. (See Section 4.1.1.)

8. Acceptable Roof Deck Constructions:

- 8.1 Acceptable deck types for testing under this protocol are as follows:
- minimum ¹⁵/₃₂ inch plywood or wood plank;
 - cementitious wood fiber;
 - poured gypsum concrete;

9. Procedure:

- 9.1 Bell chamber tests over an existing roof system assembly:

- 9.1.1 The test area's membrane surface shall be clean, smooth and dry to provide a continuous contact surface for the edges of the pressure chamber. For roof surfaces which contain surfacing such as gravel, slag or granules, the test areas shall be prepared as follows:

- Remove the loose gravel surfacing; sweeping a 12 inch (300 mm) wide square in which the chamber perimeter will be placed.
- Apply a heavy pouring of hot asphalt over the swept area and allow to completely cool.
- This test area preparation is intended to provide a continuous, smooth surface to which the edges of the test chamber make contact such that accurate pressure measurements are taken.

- 9.1.2 Place the bar with attached dial indicator such that the tip of the dial indicator is in contact with the roof membrane at the center of the test area.

- 9.1.3 Place the assembled chamber over the roof test area such that the bar with attached dial indicator is centered within the chamber and is

perpendicular to the sides of the chamber. The edges of the chamber shall be in complete contact with the roof surface. Position the chamber such that its edges are parallel with the direction of the structural framing of the building.

- 9.1.4 Install the pressure measurement device to the uplift pressure chamber and calibrate to zero pressure.
- 9.1.5 Position the vacuum pump over the hole provided in the chamber, insuring that the bypass valve on the pump is open before starting the pump or, if a rheostat is used, that it is in the OFF position.
- 9.1.6 Raise the pressure within the chamber to $15 + 0.5 \text{ lbf/ft}^2$ ($720 + 20 \text{ Pa}$) and hold this pressure level for one minute.
- 9.1.7 Continuously observe the deflection and pressure measurement device throughout the vacuum pumping process for sudden or variable rates of movement.
- 9.1.8 At the end of the first one minute interval, increase the pressure within the chamber in increments of $15 + 0.5 \text{ lbf/ft}^2$ ($720 + 20 \text{ Pa}$), holding each pressure level for a period of one minute, until:
- the roof system assembly fails, as noted in Section 10.1; or,
 - the pressure within the chamber is held at the design pressure for the particular roof area (i.e., field, perimeter or corner area) for a period of one minute. These design pressures are determined in compliance with ASCE 7-98, as specified in Section 1606 of the *Florida Building Code, Building* and are listed on Section II of the Uniform Building Permit.
- 9.1.9 If “failure,” as defined in Section 10.1, occurs, record the applied load and time.
- 9.2 Bell chamber test for a new roof system assembly applied directly to the substrate:
- 9.2.1 Remove the existing roofing membrane to the deck in an area of 8 feet by 8 feet, thoroughly cleaning the deck of all existing roofing material.
- 9.2.2 If the new assembly is to be adhered, prime the deck with ASTM D 41 primer and allow to completely dry.
- 9.2.3 Install the proposed roof system assembly utilizing the precise materials proposed for the reroof application. Install the test assemblies in strict compliance with published application recommendations.
- 9.2.4 Provide the testing agency with two copies of manufacturer’s literature and application instructions.
- 9.2.5 Allow the test panel to cure for 48 hours if applied in hot asphalt or 28 days if solvent or waterbased adhesives are employed.
- 9.2.6 Do not apply aggregate surfacing to the test assembly. If an aggregate surface or coating is to be applied to the final assembly finish the test assembly with a flood coat of asphalt at an application rate of 384 pounds \pm 10 pounds.
- 9.2.7 Seal the test assembly by strip flashing the test panel to the existing roof system assembly.
- 9.2.7.1 If the test assembly is lower than the existing roof system assembly the test assembly area shall be filled with a loose insulation material and the test area shall be covered for the cure period.
- 9.2.8 Testing of the panel shall be as noted in Section 9.1

9.3 Bonded pull test over existing roof system assemblies:

9.3.1 The test area's membrane surface shall be clean, smooth and dry to provide a continuous contact surface for test panel adhesion.

9.3.2 Cut an indentation in the center of the test area to accommodate the nut and washer on the underside of the test panel where a double plywood panel is used. Outline the test area perimeter, assign a reference number and photograph.

9.3.3 Suspend the wood or wood and steel test panel, with eye-bolt or welded ring installed, from the load application apparatus and record the downward load.

9.3.4 Apply a flood coat of hot steep asphalt or coal tar pitch over the marked test area at an application rate of 4 lb/ft² and float the test panel into place. Allow a curing time of 24 hours for hot asphalt and 48 hours for coal tar pitch applications. Curing time may vary due to atmospheric conditions.

9.3.4.1 Report any variation in cure time.

9.3.4.2 The flood coat application rate may be increased for unusual conditions to ensure a complete bond of the test assembly.

9.3.4.3 Report any variation in the adhesive application rate.

9.3.5 Determine the required uplift force (F) to be applied using information determined in Section 9.3.3 and the following equation:

$$F = (4 \text{ by } P) + W \quad \text{where,}$$

F = required uplift force (lbf);

P = design pressure (lbf/ft²);
and

W = weight of test panel (lbf).

9.3.6 When the flood coat, noted in Section 9.3.4, has fully cured, cut a 2 inch to 3 inch wide strip through the roof covering around the test panel down to deck level. The intent is to fully isolate the test sample from surrounding roofing materials.

9.3.7 Position the support system over the test panel and attach the load application and measurement devices to the eye-bolt or welded ring.

9.3.8 Apply an initial load of 40 lbf plus the weight of the test panel ($W + 40$) and hold for 1 minute. After the initial 1 minute, increase the applied load by 40 lbf increments in 1 minute time intervals until the design pressure (P) is attained, as noted in Table 2, below.

TABLE 2
APPLIED LOAD INCREMENTS

Load (lbf)	Pressure (psf)	Hold Time (min)
$W + 80$	20	1
$W + 120$	30	1
$W + 160$	40	1
$W + 200$	50	1
F	P	1

9.3.9 If "failure," as defined in Section 10.2, occurs, record the applied load and time.

10. Interpretation of Results:

10.1 Bell chamber test:

10.1.1 Most roof system assemblies subjected to a negative pressure will exhibit an upward deflection that will increase as the negative pressure increases. Poorly adhered systems will exhibit relatively large increases in upward deflections with relatively small increases in applied pressure. For roof system assemblies that are well adhered, the increase in de-

flexion will be gradual and at a relatively constant rate up to a point at or near failure. The upward deflection may slowly increase while maintaining the pressure within the chamber. When failure occurs due to lack of adhesive or cohesive resistance of the roof system assembly, there will be a sudden increase in the upward deflection, and most likely the deflection will exceed the capacity of the dial indicator.

- 10.1.2 Any roof system assembly which exhibits an upward deflection greater than or equal to 1 inch (25 mm) during any of the tests shall be considered as failing at the point where 1 inch (25 mm) of deflection is recorded.
- 10.1.3 An upward deflection in excess of $\frac{1}{4}$ inch (6 mm) or a sudden increase in deflection, as measured by the dial indicator, may indicate an attachment and/or adhesion problem in the roof system assembly and may require further investigation.
- 10.1.4 Upward deflection of the roof system assembly due to negative pressure may vary at different locations due to varying stiffness of the roof system assembly. Stiffness of a roof system assembly is influenced by the thickness of insulation; stiffness of decking; and by the type, proximity and rigidity of connections between the decking and framing system.

10.2 Bonded pull test:

- 10.2.1 Any roof system assembly which exhibits delamination of any portion of the test sample prior to the full 1 minute duration at an applied load equal to the design load (F) shall be considered as failing the bonded pull test.
- 10.2.2 If delamination occurs between the plywood test panel and the roof covering, the test panel shall

be re-adhered to the test area, increasing the curing period of the hot steep asphalt coal tar pitch or such other adhesive material that may better adhere the test panel to the roof membrane.

11. Report:

- 11.1 Refer to ASTM E 575 for general use in reporting structural performance tests of building assemblies.
- 11.2 For either bell chamber tests or bonded pull tests, the final report shall include the following:
 - 11.2.1 A copy of the roof system assembly manufacturer's Product Approval, indicating the maximum design pressure for the system, product data sheets and published application instructions.
 - 11.2.2 A copy of Section II of the Uniform Building Permit for the project in question indicating design pressures for the field area, perimeter area, and if applicable, corner and extended corner areas of the structure.
 - 11.2.3 The area, height, and plan view of the roof showing the location of the test areas, numbered to correspond with the test report.
 - 11.2.4 A complete detailed description of the roof system assembly construction being tested. Include the type of steel roof deck and method of attachment, deck support spacing, vapor retarder and adhesive (if any), types and thicknesses of insulation and methods of attachment, and the type of adhered roof membrane including surfacing.
 - 11.2.5 Dates of tests, air and roof surface temperatures, wind velocity.
 - 11.2.6 Names, signatures and affiliations of all persons observing the tests.

- 11.2.7 Photographs documenting all pertinent aspects of the test, including test assembly construction, actual testing, failure examination (if applicable), and repair procedures (if applicable).
- 11.3 For bell chamber tests, the final report shall include the following:
- 11.3.1 A brief description of the test procedure, including the negative pressure increments, hold times for each pressure increment and the maximum applied pressure.
- 11.3.2 Tabulated results recorded at each pressure increment including observations and deflection measurements. Deflection shall be recorded at the start and end of each pressure increment.
- 11.3.3 If “failure” occurs during any of the bell chamber tests, the test area shall be cut and thoroughly examined and the complete record should include:
- the negative pressure at which the failure occurred;
 - the type of failure and its location within the roof system assembly; and,
 - other observations of the roof system assembly conditions that may be attributed to the failure.
- The cut area of roofing should be repaired after examination of the failed area or where roofing has been removed to deck level for the purpose of testing. Insulated assemblies shall be filled with like insulation prior to membrane repair.
- 11.3.4 The attached “Bell Chamber Test Results” sheet completed in full. Make photocopies of the “Data Recording Sheet” and indicate on each sheet the “Level #” and the “Test #.”
- 11.4 For bonded pull tests, the final report shall include the following:
- 11.4.1 A brief description of the test procedure, including the applied load increments, hold times for each load increment, the maximum applied load and the calculated maximum applied pressure.
- 11.4.2 Tabulated results recorded at each applied load increment including observations.
- 11.4.3 If “failure” occurs during any of the bonded pull tests, the test area shall be cut and thoroughly examined and the complete record should include:
- the applied load and calculated applied pressure at which the failure occurred;
 - the type of failure and its location within the roof system assembly; and
 - other observations of the roof system assembly conditions that may be attributed to the failure.
- The cut area of roofing should be repaired after examination of the failed area or where roofing has been removed to deck level for the purpose of testing. Insulated assemblies shall be filled with like insulation prior to membrane repair.
- 11.4.4 The attached “Bonded Pull Test Results” sheet completed in full. Make photocopies of the “Data Recording Sheet” and indicate on each sheet the “Level #” and the “Test #.”

TESTING APPLICATION STANDARD (TAS) 124-11

BELL CHAMBER TEST RESULTS

GENERAL INFORMATION

Job Name: _____

Job Address: _____

Job Contact Person: _____

TESTING AGENCY/EQUIPMENT INFORMATION:

Note: The undersigned representative agrees that all testing has been conducted and results have been reported in compliance with TAS 124.

Testing Agency Name: _____

Address: _____

Telephone: () _____

Fax: () _____

Representative Name: _____

Title: _____

Signature: _____

Uplift Chamber (General Description):

BUILDING/ROOF SYSTEM INFORMATION:

Building Height:	height	=	_____	ft
Building Dimensions:	length	=	_____	ft
	second largest dimension	=	_____	ft
	total roof area	=	_____	ft ²
		=	_____	sqs,

Deck Type:	plywood or wood plank	cementitious wood fiber
	poured gypsum concrete	aggregate l/w insulating concrete

structural poured concrete	cellular l/w insulating concrete
structural concrete plank	aggregate/cellular insulating concrete
18 - 22 ga. steel	> 22 ga. steel
composite (e.g. Load Master)	

Insulation:	polyisocyanurate	wood fiber
	glass fiber	perlite
	cellular glass	rockwool
	extruded polystyrene	expanded polystyrene
	none	other: _____
	combination: _____	& _____

Attachment:	mechanically attached	(fasteners per ft ²)
	in hot asphalt	(lbs per square)
	cold applied	

Provide a brief description of the built-up roof system:

TEST INFORMATION:

Number of Tests: $n =$ _____
(see Section 7.1 of TAS 124)
(note the locations of all tests on
“Building Information” Detail #2, attached)

Maximum Uplift Pressure: $P_{max} =$ _____ psf
(as noted on the roof system manufacturer’s Product Approval)

Design Pressures:

Level #1:

Field Area: $P_{f1} =$ _____ psf

Perimeter Area: $P_{p1} =$ _____ psf

Corner Areas: $P_{c1} =$ _____ psf

Extended Corner: $P_{ec1} =$ _____ psf

Design Pressures:

Level #2:

Field Area: $P_{f2} =$ _____ psf

Perimeter Area: $P_{p2} =$ _____ psf

Corner Areas: $P_{c2} =$ _____ psf

Extended Corner: $P_{ec2} =$ _____ psf

Design Pressures:

Level #3:

Field Area: $P_{f3} =$ _____ psf

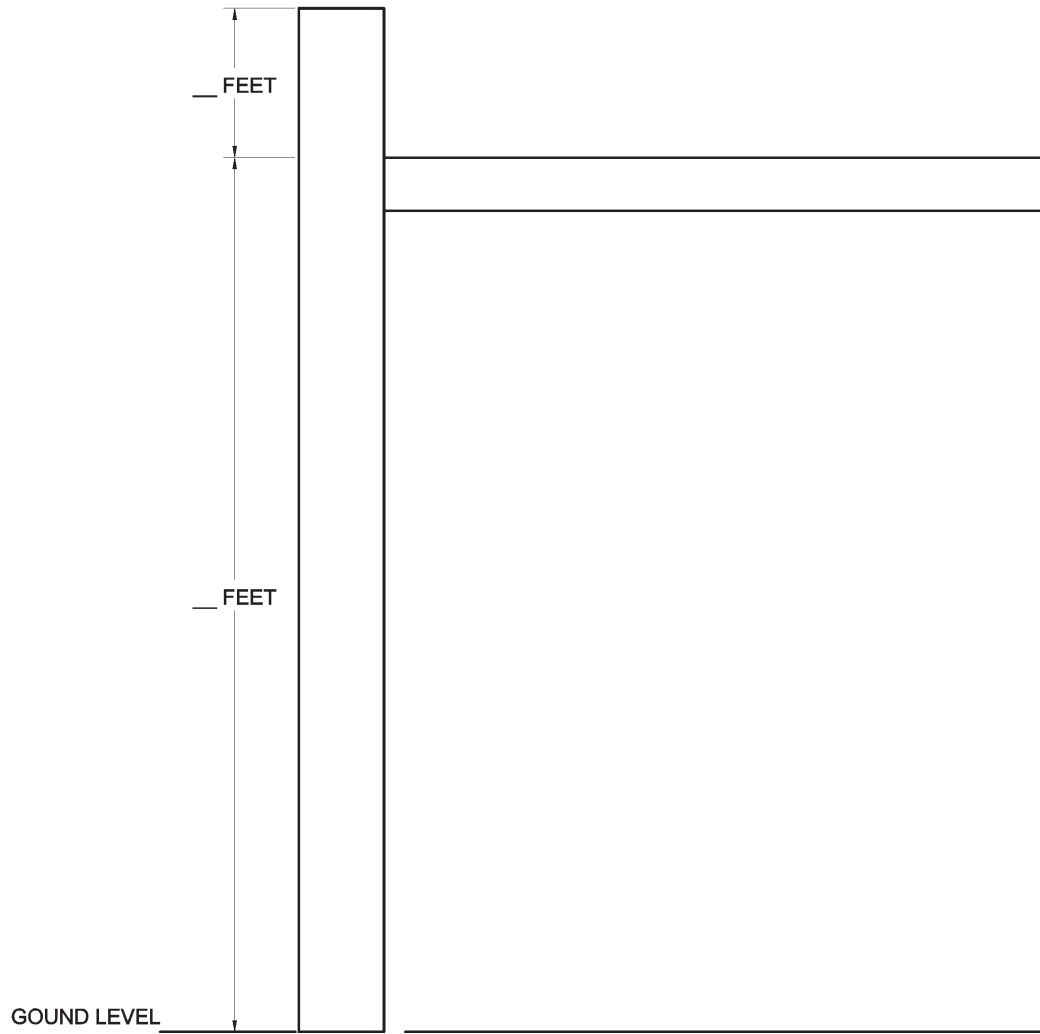
Perimeter Area: $P_{p3} =$ _____ psf

Corner Areas: $P_{c3} =$ _____ psf

Extended Corner: $P_{ec3} =$ _____ psf

Note: If the number of levels on the building/project exceeds three (3), record design pressures for additional levels in a similar format.

INSERT BUILDING AND PARAPET HEIGHTS.
(IF NO PARAPET EXISTS, INSERT "N/A")

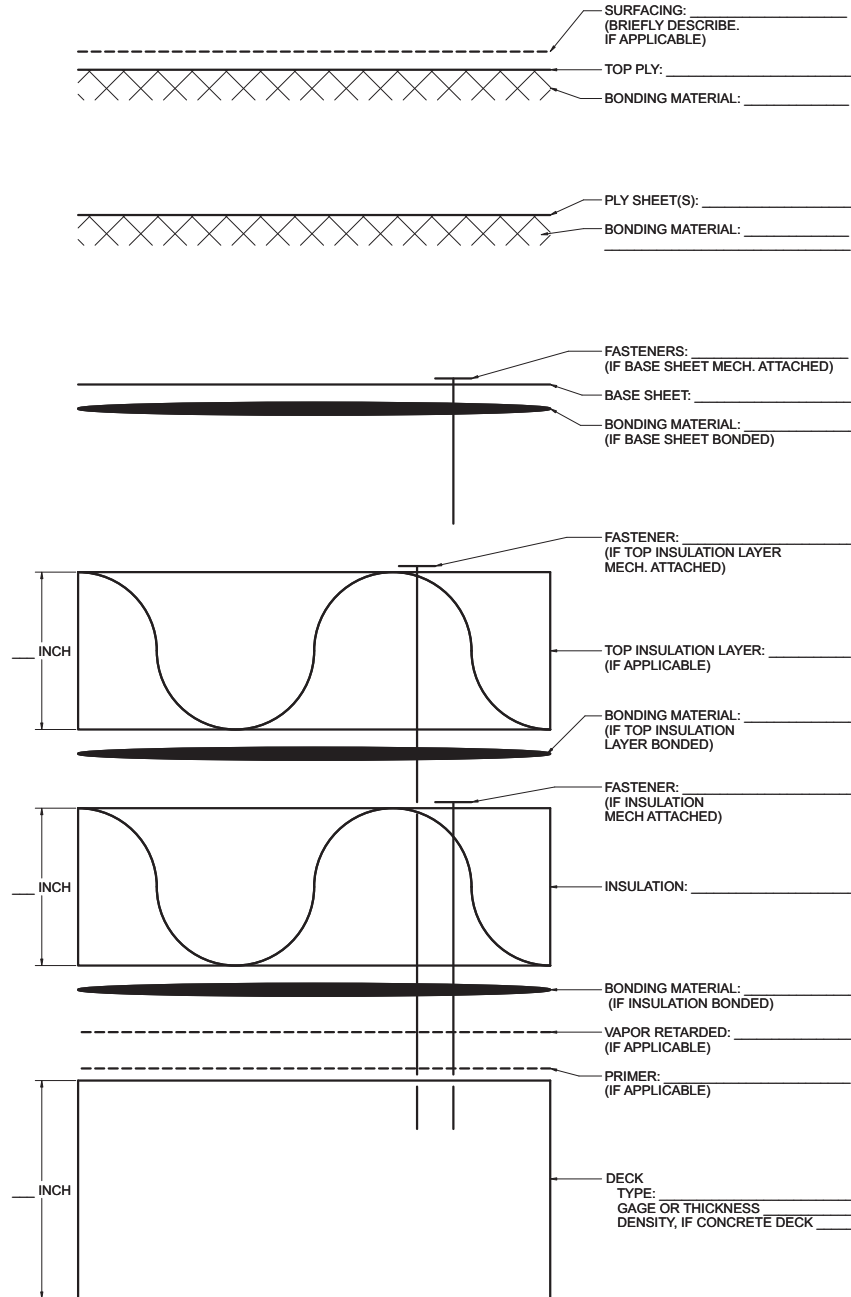


ROOF SYSTEM INFORMATION - DETAIL #1

SKETCH ROOF PLAN INDICATING ALL "LEVEL #'S" AND THE LOCATION OF ALL TESTS CONDUCTED ON EACH LEVEL (i.e. "T1", "T2", ..., "Tn". INCLUDE THE DIMENSIONS OF EACH LEVEL AND ANY ROOF DRAINS, SLOPES, AND/OR ROOF TOP EQUIPMENT WHICH EXISTS ON THE ROOF.

BUILDING INFORMATION - DETAIL #2

FILL IN EXISTING ROOFING COMPONENTS WHICH MAKE UP ROOF SYSTEM ASSEMBLY AND THICKNESS OF DECK AND INSULATION LAYER(S) (WHERE ROOFING COMPONENT NOT USED IN ROOF SYSTEM ASSEMBLY, FILL IN WITH "N/A")



ROOF SYSTEM INFORMATION - DETAIL #3

TESTING APPLICATION STANDARD (TAS) 124-11

BONDED PULL TEST RESULTS

GENERAL INFORMATION

Job Name: _____

Job Address: _____

Job Contact Person: _____

TESTING AGENCY/EQUIPMENT INFORMATION:

Note: The undersigned representative agrees that all testing has been conducted and results have been reported in compliance with TAS 124.

Testing Agency Name: _____

Address: _____

Telephone: () _____

Fax: () _____

Representative Name: _____

Title: _____

Signature: _____

Test Apparatus (General Description):

BUILDING/ROOF SYSTEM INFORMATION:

Building Height: height = _____ ft

Building Dimensions: length = _____ ft

second largest dimension = _____ ft

total roof area = _____ ft²

= _____ sqs,

Deck Type: plywood or wood plank cementitious wood fiber

poured gypsum concrete aggregate l/w insulating concrete

structural poured concrete cellular l/w insulating concrete

	structural concrete plank		aggregate/cellular insulating concrete
	18 - 22 ga. steel		> 22 ga. steel
	composite (e.g. Load Master)		
Insulation:	polyisocyanurate		wood fiber
	glass fiber		perlite
	cellular glass		rockwool
	extruded polystyrene		expanded polystyrene
	none _____		other: _____
	combination: _____	&	_____
Attachment:	mechanically attached		(fasteners per ft ²)
	in hot asphalt		(lbs per square)
	cold applied		

Provide a brief description of the built-up roof system:

TEST INFORMATION:

Number of Tests:
(see Section 7.1 of TAS 124)
(note the locations of all tests on
“Building Information” Detail #2, attached)

n = _____

Maximum Uplift Pressure:
(as noted on the roof system manufacturer’s
Product Approval)

P_{max} = _____psf

Design Pressures:

Level #1:

Field Area: P_{f1} = _____psf

Perimeter Area: P_{p1} = _____psf

Corner Areas: P_{c1} = _____psf

Extended Corner: P_{ec1} = _____psf

Design Pressures:

Level #2:

Field Area: P_{f2} = _____psf

Perimeter Area: P_{p2} = _____psf

Corner Areas: P_{c2} = _____psf

Extended Corner: P_{ec2} = _____psf

Design Pressures:

Level #3:

Field Area: P_{f3} = _____psf

Perimeter Area: P_{p3} = _____psf

Corner Areas: P_{c3} = _____psf

Extended Corner: P_{ec3} = _____psf

Note: If the number of levels on the building/project exceeds three (3), record design pressures for additional levels in a similar format.

DATA RECORDING SHEET:

Level # _____

Bonded Pull Test

Test # _____

Check the appropriate box for field, perimeter, corner or extended corner.

	Field Area	Perimeter Area
	Corner Area	Extended Corner Area
Applied Load (lbf)	Applied Pressure (psf)	Pass 1 minute Hold (“yes” or “no”)
80 lbf	20 psf	_____
110 lbf	30 psf	_____
_____ lbf	_____ psf	_____
_____ lbf	_____ psf	_____
_____ lbf	_____ psf	_____
_____ lbf	_____ psf	_____
_____ lbf	_____ psf	_____
_____ lbf	_____ psf	_____
_____ lbf	_____ psf	_____

Check either “pass” or “fail:” pass fail

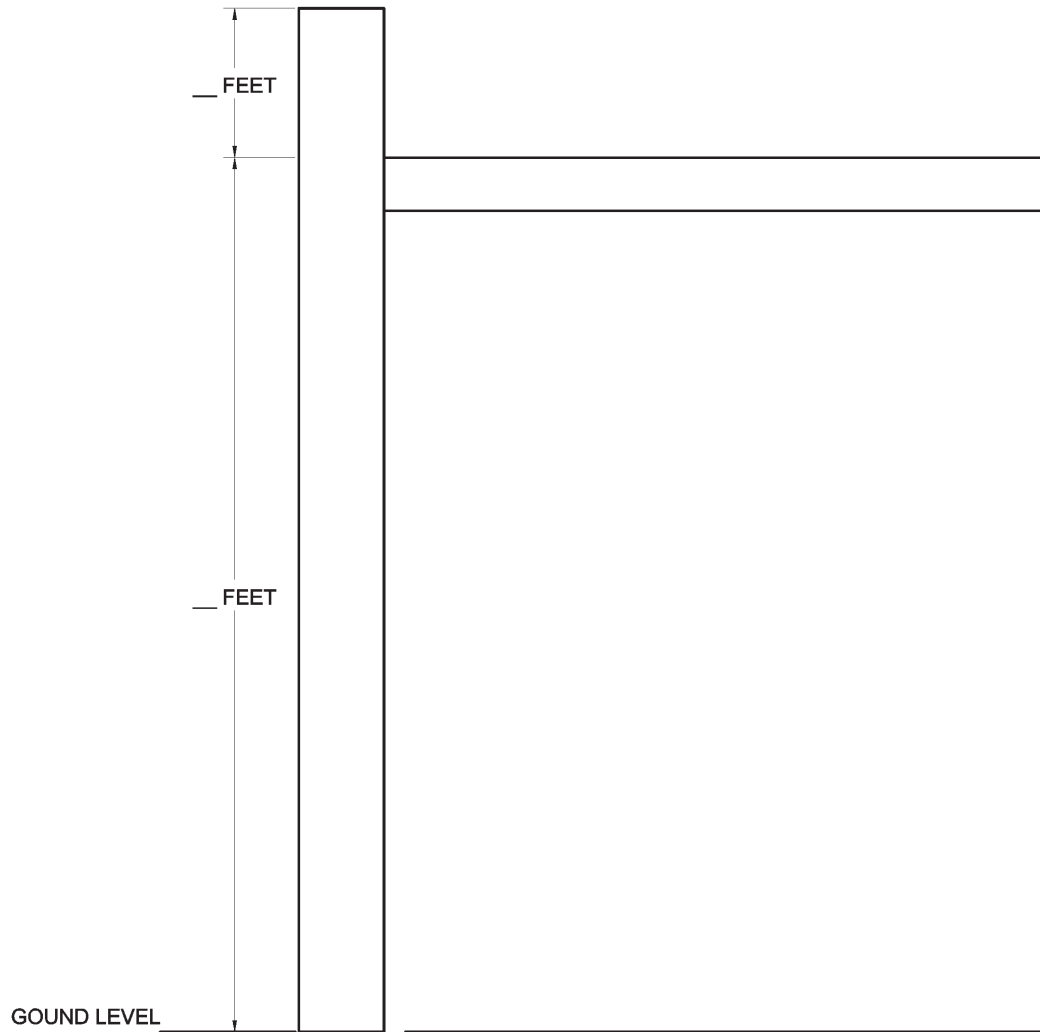
If the test resulted in failure, complete the following:

Suspected mode of failure: _____

Was a test cut taken to confirm the mode of failure? yes no

Notes: Provide one of these “Data Recording Sheets” for each Bonded Pull Test conducted on each roof level. Multiple deck types shall be treated as separate roof levels. Stair towers, mechanical penthouses and mechanical rooms shall have a minimum of one (1) test conducted.

INSERT BUILDING AND PARAPET HEIGHTS.
(IF NO PARAPET EXISTS, INSERT "N/A")



ROOF SYSTEM INFORMATION - DETAIL #1

SKECTH ROOF PLAN INDICATING ALL "LEVEL #'S" AND THE LOCATION OF ALL TESTS CONDUCTED ON EACH LEVEL (i.e. "T1", "T2", ..., "Tn". INCLUDE THE DIMENSIONS OF EACH LEVEL AND ANY ROOF DRAINS, SLOPES, AND/OR ROOF TOP EQUIPMENT WHICH EXISTS ON THE ROOF.

BUILDING INFORMATION - DETAIL #2

FILL IN EXISTING ROOFING COMPONENTS WHICH MAKE UP ROOF SYSTEM ASSEMBLY AND THICKNESS OF DECK AND INSULATION LAYER(S) (WHERE ROOFING COMPONENT NOT USED IN ROOF SYSTEM ASSEMBLY, FILL IN WITH "N/A")

The diagram illustrates a cross-section of a roof system assembly. It consists of several layers, each with a corresponding label and a line pointing to the layer. The layers from top to bottom are:

- SURFACING:** (BRIEFLY DESCRIBE, IF APPLICABLE)
- TOP PLY:**
- BONDING MATERIAL:**
- PLY SHEET(S):**
- BONDING MATERIAL:**
- FASTENERS:** (IF BASE SHEET MECH. ATTACHED)
- BASE SHEET:**
- BONDING MATERIAL:** (IF BASE SHEET BONDED)
- FASTENER:** (IF TOP INSULATION LAYER MECH. ATTACHED)
- TOP INSULATION LAYER:** (IF APPLICABLE)
- BONDING MATERIAL:** (IF TOP INSULATION LAYER BONDED)
- FASTENER:** (IF INSULATION MECH ATTACHED)
- INSULATION:**
- BONDING MATERIAL:** (IF INSULATION BONDED)
- VAPOR RETARDED:** (IF APPLICABLE)
- PRIMER:** (IF APPLICABLE)
- DECK:**
TYPE: _____
GAGE OR THICKNESS _____
DENSITY, IF CONCRETE DECK _____

Vertical dimension lines on the left side of the diagram indicate thicknesses in inches for the Top Insulation Layer, Insulation, and Deck.

ROOF SYSTEM INFORMATION - DETAIL #3

