ICC EVALUATION SERVICE®

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May 1, 2025

TO: **PARTIES INTERESTED IN MOLDED PLASTIC FOOTING PADS**

SUBJECT: Proposed Revisions to the Acceptance Criteria for Molded Plastic Footing Pads (AC49) Subject AC49-0525-R1 (WU/DW)

Dear Colleague:

We are seeking your comments on proposed revisions to the subject acceptance criteria, as presented in the enclosed draft. The revisions, which are being posted on the ICC-ES web site for 30 days of public comment, may be summarized as follows:

1. Renumbering per the news release titled "ICC-ES Updates Acceptance Criteria Numbering System to Safeguard Public Safety and Industry Consistency", dated April 9, 2025. This is noted only as a courtesy and is outside the scope of public comments and balloting by the ICC-ES committee.

2. The flexural strength and flexural modulus requirements in Sections 4.1 and 4.3 are a means to fingerprint products where the design capacity will be determined in accordance with Sections 4.4 and 4.5. These values are then used for ongoing quality control per Section 5.4.4.

   There is not a minimum requirement for flexural strength, and we do not see a need for a minimum requirement for stiffness. Therefore, we propose removing the conditions of acceptance in Section 4.3 for stiffness.

While the Evaluation Committee will be voting on the revised criteria during the 30-day comment period, we will seriously consider all comments from the public and will pull the criteria back for reconsideration if public comments raise major issues. In that case, we would seek a new committee vote; further revise the draft and post it for a new round of public comments; or put the revised criteria on the agenda for a future Evaluation Committee hearing.

If they are of interest, please review the proposed revisions and send us your comments at the earliest opportunity.

To submit your comments, please use the form on the web site and attach any letters or other materials. If you would like an explanation of the "alternate criteria process," under which we are soliciting comments, this too is available on the ICC-ES web site.

Please do not try to communicate directly with any Evaluation Committee member about a criteria under consideration, as committee members cannot accept such communications.

Thank you for your interest and your contributions. If you have any questions, please contact me at (800) 423-6587, extension 5699, or Danny Wong, P.E. Senior Staff Engineer, at extension 5333. You may also reach us by e-mail at es@icc-es.org.

Yours very truly,

Will Utsey, P.E.
Director of Engineering

WU/ls

Encl.

cc: Evaluation Committee

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PROPOSED REVISIONS TO THE ACCEPTANCE CRITERIA FOR MOLDED PLASTIC FOOTING PADS

AC49 (24a)

Proposed May 2025

Evaluation reports issued by ICC Evaluation Service, LLC (ICC-ES), are based upon performance features of the International family of codes, and may include other codes, as applicable.

For alternative materials, design and methods of construction and equipment, see Section 104.2.3 of the 2024 *International Building Code*® (IBC), Section R104.2.2 of the 2024 *International Residential Code*® (IRC), Section 104.11 of the 2021 IBC and earlier editions, and Section R104.11 of the 2021 IRC and earlier editions.

ICC-ES may consider alternate criteria for report approval, provided the report applicant submits data demonstrating that the alternate criteria are at least equivalent to the criteria set forth in this document, and otherwise demonstrate compliance with the performance features of the codes. ICC-ES retains the right to refuse to issue or renew any evaluation report, if the applicable product, material, or method of construction is such that either unusual care with its installation or use must be exercised for satisfactory performance, or if malfunctioning is apt to cause injury or unreasonable damage.

Acceptance criteria are developed for use solely by ICC-ES for purposes of issuing ICC-ES evaluation reports

ACCEPTANCE CRITERIA FOR MOLDED PLASTIC FOOTING PADS AC49 (24a)

1.0 INTRODUCTION

1.1 Purpose: The purpose of this acceptance criteria is to establish requirements for molded plastic footing pads to be evaluated in an ICC Evaluation Service, LLC (ICC-ES), evaluation report under the 2024, 2021, 2018, 2015, and 2012 *International Building Code*® (IBC) and the 2024, 2021, 2018, 2015, and 2012 *International Residential Code*® (IRC). Bases of evaluation are 2024 IBC Section 104.2.3 (2021, 2018, 2015, and 2012 IBC Section 104.11) and 2024 IRC Section R104.2.2 (2021, 2018, 2015 and 2012 IRC Section R104.11). Applicable code sections are: 2024, 2021, 2018, 2015, and 2012 Sections 1808 (Foundations) and 1809 (Shallow Foundations); and 2024, 2021, 2018, 2015, and 2012 IRC Sections R401 (Foundations—General), R402 (Foundations—Materials) and R403 (Foundations—Footings).

The reason for the development of this acceptance criteria is to allow the evaluation of molded plastic footing pads as an alternative footing material, since the codes do not provide requirements for the evaluation of molded plastic footing pads.

1.2 Scope: The molded plastic footing pad is a footing for the support of a wood post or precast concrete post column in buildings of Type V construction. The molded plastic footing pad shall only be used as an individual isolated footing supporting downward compression loads.

1.3 Codes and Referenced Standards: Where standards are referenced in this criteria, these standards shall be applied consistently with the code upon which compliance is based.

1.3.1 2024, 2021, 2018, 2015, and 2012 *International Building Code*® (IBC), International Code Council.

1.3.2 2024, 2021, 2018, 2015, and 2012 *International Residential Code*® (IRC), International Code Council.

1.3.3 ASTM D256-23e1, Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics, ASTM International.

1.3.4 ASTM D570-22, Standard Test Method for Water Absorption of Plastics, ASTM International.

1.3.5 ASTM D746-24, Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact, ASTM International.

1.3.6 ASTM D790-17, Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical insulating Materials, ASTM International.

1.3.7 ASTM D1499-0513(2021), Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Plastics, ASTM International.

1.3.8 ASTM D2565-23, Standard Practice for Xenon-Arc Exposure of Plastics Intended for Outdoor Applications, ASTM International.

1.3.9 ASTM D2990-17, Standard Test Methods for Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics, ASTM International.

1.3.10 ISO 21930-2017 Sustainability in Buildings and Civil Engineering Works - Core Rules for Environmental Product Declarations of Construction Products and Services, International Organization for Standardization (ISO).

1.4 Definition: Molded Plastic Footing Pads: Circular ribbed plastic pads injection-molded from of a mix of virgin or recycled plastic, and used as a shallow rigid footing that transmits design bearing load uniformly to the supporting soil.

2.0 BASIC INFORMATION

2.1 General: The following information shall be submitted:

2.1.1 Product Description: Complete information concerning material specifications, thickness, size and the manufacturing process. This information shall be submitted with the quality documentation required under Section 5.2.

2.1.2 Installation Instructions: Installation details and limitations, include allowable loads based on soil bearing capacity.

2.1.3 Packaging and Identification: A description of the method of packaging and field identification of the molded plastic footing pad. Product identification shall be in accordance with the product identification provisions of ICC-ES Rules of Procedure for the Evaluation Reports and shall include the evaluation report number.

2.1.4 Field Preparation: Field modification or fabrication of this product is not permitted.

2.2 Testing Laboratories: Testing laboratories shall comply with Section 2.0 of the ICC-ES Acceptance Criteria for Test Reports (AC85) and Section 4.2 of the ICC-ES Rules of Procedure for Evaluation Reports.

2.3 Test Reports: Test reports shall comply with AC85. Test reports shall include test specimen description, details of the test method, manner of testing, test results, calculated results, and photographs, when necessary. The test reports shall also include information required by the applicable ASTM standard.

2.4 Product Sampling: Sampling of the molded plastic footing pad for tests under this criteria shall comply with Section 3.2 of AC85.

2.5 Qualification Test Plan: A qualification test plan shall be submitted to and approved by ICC-ES staff prior to any testing being conducted.

3.0 TEST AND PERFORMANCE REQUIREMENTS

The performance characteristics for molded plastic footing pads described in Sections 3.1, 3.2, 3.3, 3.4, 3.5 and 3.6 shall be documented by testing and shall be conducted for each type of plastic material used in manufacturing the pads. Full-size molded plastic footing pads in each size and configuration to be listed in the evaluation report shall be tested to document performance characteristics described in Sections 3.5 and 3.6.

3.1 Exposure to Soil: The test methods are noted in Section 4.1.

3.2 Low-temperature Brittleness: The test methods are noted in Section 4.2.

3.3 Stiffness: The test methods are noted in Section 4.3.

3.4 Allowable Vertical Load Tests: The test methods are noted in Section 4.4.

3.5 Creep Test: The test methods are noted in Section 4.5.

4.0 TEST METHODS

4.1 Exposure to Soil Environment:

4.1.1 General: The following tests are necessary to evaluate the material for resistance to mechanical degradation when exposed to a soil environment:

4.1.1.1 Flexural strength tests conducted in accordance with ASTM D790.

4.1.1.2 Izod impact tests conducted in accordance with ASTM D256, Method A.

4.1.1.3 Water absorption tests conducted in accordance with ASTM D570.

4.1.2 Test Specimen Conditioning: Test specimens shall be injection-molded in accordance with the applicable ASTM specification, or cut from test samples. Each set shall consist of at least five specimens conditioned in accordance with the following:

4.1.2.1 The control set shall be maintained at a room temperature of 73.4°F ± 3.6°F (23°C ± 2°C).

4.1.2.2 The acid-exposed set of specimens shall, for 21 days, be immersed in 73.4°F ± 3.6°F (23°C ± 2°C) sulfuric acid solution having a concentration of pH3.

4.1.2.3 The alkaline-exposed set of specimens shall, for 21 days, be immersed in 73.4°F ± 3.6°F (23°C ± 2°C) sodium hydroxide solution having a concentration of pH12.

4.1.2.4 The immersed set of specimens shall, for 21 days, be immersed in 73.4°F ± 3.6°F (23°C ± 2°C) deionized water.

4.1.2.5 The weathered set of specimens shall be subjected to one of the following weatherometer exposures with water cycles:

4.1.2.5.1 Minimum 2,000 hours in accordance with ASTM D1499, using Type DH or EH apparatus.

4.1.2.5.2 Minimum 2,900 hours of weatherometer exposure in accordance with ASTM D2565, using Type BH apparatus and borosilicate inner and outer filters.

4.1.3 Conditions of Acceptance:

4.1.3.1 Specimens conditioned as described in Sections 4.1.2.2 through 4.1.2.5 (acid, alkaline, deionized water, and weathered with water cycles tests) shall exhibit a minimum of 90 percent of the flexural strength and impact resistance of control specimens conditioned as described in Section 4.1.2.1.

4.1.3.2 Percentage weight change between the control specimens described in Section 4.1.2.1 and the immersed specimens described in Section 4.1.2.4 shall not exceed 1 percent.

4.2 Low-temperature Brittleness:

4.2.1 Procedure: Ten specimens shall be tested in accordance with ASTM D746.

4.2.2 Conditions of Acceptance: The minimum temperature at which 50 percent of the specimens break shall be reported. This minimum temperature will be reported in the evaluation report.

4.3 ~~Stiffness~~Flexural Modulus: Test samples representative of the molded plastic footing pads to be listed in the evaluation report shall be tested for flexural modulus of elasticity in accordance with ASTM D790 to evaluate the molded plastic footing pad as a rigid footing which transmits loads uniformly to the supporting soil. Five identical specimens of footing pad shall be tested.

~~**Conditions of Acceptance:** The average of the five identical test specimens must exhibit a flexural modulus of elasticity of 250,000 psi (1725 MPa) or greater.~~

4.4 Allowable Vertical Load Test:

4.4.1 Purpose: The purpose of this test is to evaluate the strength of the molded plastic footing pad under simulated support conditions. The footing shall be tested on a substrate with the following characteristics: readily definable strength characteristics, relatively uniform stiffness throughout, consistent and/or repeatable stiffness between multiple tests.

4.4.2 Evaluation and Selection of Soil Substrate: A substrate material composed of expanded polystyrene (EPS) or extruded polystyrene (XPS) shall be selected for use as a test substrate. Other materials meeting the basic requirements of Section 4.4.2.1 may also be used for laboratory testing. If actual soil is to be used as the test substrate in laboratory testing, special consideration must be given to the factors influencing soil stiffness and repeatability, such as soil confinement and compaction methods between subsequent tests.

4.4.2.1 Substrate Stiffness Classification: Molded plastic footings pads shall be tested on a Class of Materials 5 substrate (Table 1) having a maximum modified modulus of soil reaction, *k*, not to exceed the values in Table 1. Subsequent testing on stiffer substrates may be performed where increased load capacity on stiffer soils is desired.

4.4.2.2 Substrate Evaluation: The modified modulus of soil reaction of the substrate shall be assessed using the procedure described below. The report shall indicate the test soil classification and the actual modulus of soil reaction, *k*, in psi/in. (kPa/mm).

All substrate material and test specimens shall be conditioned at standard laboratory conditions of 73.4°F ± 3.6°F (23°C ± 2°C) and 50% ± 5% relative humidity for not less than 48 hours prior to testing. Standard laboratory conditions shall be maintained throughout testing.

The configuration (width, depth, thickness, and material lot/batch) of the substrate material during the stiffness evaluation shall be the same size substrate that is to be used during the test of the footing as required in Section 4.4.3.

The modulus of soil reaction, *k*, shall be measured by centering a 1-inch-thick (25.4 mm), 12-inch-diameter (304.8 mm) steel plate on the representative substrate. A

load of 1131 lbf (10 psi) [5090 N (69 kPa)] shall be applied to the center of the plate at a uniform rate. The full load shall be applied over an interval not to exceed 1 minute. The full load shall be maintained for 10 minutes.

A deflection gauge having a resolution of 0.001 inch (0.03 mm) shall be positioned to measure the deflection at the point of load application. Load and deflection readings shall be logged continuously to produce a load-deflection plot for the substrate.

The modulus of soil reaction, *k*, shall be calculated as 10 divided by the total deformation of the plate under the 1131 lbf load (10 psi) [5090 N (69 kPa)]. The total deformation measurement shall be the total deformation measured at 10 minutes of sustained load, including the deflection occurring during the initial loading. A “toe-correction” may be applied to the total deflection value to account for the load required to bring the loading plate into full bearing with the substrate.

The substrate is acceptable for use if the modified modulus of soil reaction, *k*, does not exceed the value in Table 1, for the class of soil being evaluated.

4.4.3 Procedure: The molded plastic footing pad shall be supported on the test substrate while subjected to a concentrated load using the following procedure:

The footing shall be centered on the test substrate material from the same batch qualified for use in accordance with Section 4.4.2.2. The substrate shall not be less than 4 inches (102 mm) thick and shall be of sufficient size to extend beyond the footing by not less than 1.5 inches (38.1 mm) on all sides.

The molded plastic footing pad shall be oriented as required by the manufacturer's installation instructions (i.e., stiffening ribs facing up).

The test load shall be applied to the footing over an area simulating the minimum contact area anticipated in service.

The test load shall be applied with an eccentricity that is to be the maximum permitted in-service eccentricity. The eccentricity shall be taken as the distance from the geometric center of the footing to the center of the applied load. A minimum eccentricity of 0.5 inch (12.7 mm) shall be used.

The rate of loading shall be such that presumptive load-bearing value for the soil class being qualified is reached in approximately 10 minutes [e.g., for Class 5 soil, the loading rate (in lbf/minute) equals the pad area times 1500 psf (72 000 Pa) per 10 minutes]. The load shall be applied at this rate until ultimate is reached.

Deflection gauges having a resolution of 0.001 inch (0.03 mm) shall be positioned to measure the deflection at the point of load application and at two locations along the edge of the footing. The gauges at the edge of the footing shall be positioned along the same line, that which intersects the center of the applied load, on opposite sides of the applied load, with one gauge along the closest edge to the applied load and the other gauge along the edge farthest from the applied load. Load and deflection readings shall be logged continuously to produce a load-deflection plot for each test.

4.4.4 Allowable Vertical Load: The allowable vertical load for the molded plastic footing pad shall be taken as the lesser of the following:

1. Maximum load divided by 3.0.

2. Maximum presumptive load for the soil class being assessed (i.e., presumptive load-bearing value times the area of the plastic footing).

3. Load at which a 0.75-inch (19.05 mm) deflection occurs at the point of load application (total deflection). A "toe correction" may be applied to the deflection measurements to account for the load required to bring the plastic footing pad into full bearing with the substrate.

Three tests of each size of footing are required, with none of the results varying more than 15 percent from the average of the three, unless the lowest test value is used. The average result from a minimum of five tests may be used regardless of the variations. The results from two tests may be used when the higher value does not exceed the lower value by more than 5 percent and the lower value is used.

4.5 Creep Test:

4.5.1 Purpose: The purpose of this test is to evaluate the strength of the molded plastic footing pad under sustained loads.

4.5.2 Procedure: The footing shall be subjected to a sustained concentrated load for 2000 hours in accordance with ASTM D2990 except as modified below:

All test specimens shall be conditioned at standard laboratory conditions of 73.4°F ± 3.6°F (23°C ± 2°C) and 50% ± 5% relative humidity for not less than 48 hours prior to testing. Standard laboratory conditions shall be maintained throughout testing.

Specimens shall be continuously supported around the perimeter of the footing on a rigid support. The support shall have a radius of 0.125 inch (3.18 mm) and shall have a test span equal to the nominal footing dimension minus 1 inch (25.4 mm) in each direction being supported. The circular footings shall be supported on a rigid circular support having a diameter equal to the nominal footing diameter minus 1 inch (25.4 mm). The specimen shall be centered on the support so that the specimen overhangs the support by 0.5 inch (12.7 mm) on all sides.

The footing shall be oriented as required by the manufacturer's installation instructions (e.g. stiffening ribs facing up).

The test load shall be applied to the footing over an area simulating the minimum contact area anticipated in service.

The test load shall be applied with an eccentricity that is to be the maximum permitted in-service eccentricity. The eccentricity shall be taken as the distance from the geometric center of the footing to the center of the applied load. A minimum eccentricity of 0.5 inch (12.7 mm) shall be used.

The average net deflection of the footing under the allowable load must be calculated. The net deflection of the footing shall be calculated as the deflection at the point of load application minus the average of the two deflections

recorded at the edge of the footer. This deflection shall be determined at the allowable load using the load deflection curves generated in accordance with Section 4.4. The allowable load shall be calculated as specified in Section 4.4.4.

The creep test load shall be equal to the applied load required to produce an immediate (short-term) deflection at point of load application that is equal to the net deflection determined in this section. The creep test load shall be determined using the support conditions for the creep test, as required in this section. The purpose of this procedure is to produce the same state of flexural strain when testing according to Section 4.4 (flexible support) except under the support conditions required in this section (rigid support).

A deflection gauge having a resolution of 0.001 inch (0.03 mm) shall be positioned to measure the deflection at the point of load application. Deflection measurements shall be taken at the intervals specified in ASTM D2990, except the interval between readings shall not exceed 1 week (168 hours), or 24 hours where there is evidence of tertiary creep (increasing creep rate).

The deflection data shall be presented in two plots: one plotting the creep deformation (inches) versus time (hours), and the other plotting the creep rate (in./hour) versus time (hours). The report shall indicate clearly whether tertiary creep is evidenced in the data.

4.5.3 Conditions of Acceptance: The molded plastic footing pad shall not exhibit tertiary creep (increasing creep rate) under 2000 hours of sustained load. Upon failure, the footing may be retested under a reduced creep load; however, the immediate deflection produced by the reduced creep load shall be used to calculate the corresponding allowable load from the load deflection plots produced in accordance with Section 4.4. The overall allowable load rating for the footing shall not exceed this reduced load.

5.0 QUALITY CONTROL

5.1 Quality documentation complying with the ICC-ES Acceptance Criteria for Quality Documentation (AC10) shall be submitted for each facility manufacturing or labeling products that are evaluated in the ICC-ES evaluation report.

5.2 Regular, ongoing inspections are not required under this criteria, but the manufacturing facilities may be subject to annual inspections in accordance with Section 9.0 of the ICC-ES Rules of Procedure for Evaluation Reports.

5.3 A qualifying inspection shall be conducted at each manufacturing facility in accordance with the requirements of the ICC-ES Acceptance Criteria for Inspections and Inspection Agencies (AC304).

5.4 Quality Control Tests: Quality control tests shall be conducted during the production of the pads in conformance with procedures set forth in the in-house quality control manual. The quality control tests and conditions of acceptance shall be as follows:

5.4.1 One flexural test in accordance with ASTM D790 shall be performed for every 1,000 pads produced.

5.4.2 The test samples shall be randomly taken from the injection-molded products.

5.4.3 Percentages and types of material used shall be recorded for each day of production. If different material sources, percentages, or types of materials are introduced into any production run, tests noted above shall be performed and documented in accordance with procedures set forth in the in-house quality control manual.

5.4.4 Conditions of Acceptance: The determined flexural strength per Section 4.1 and flexural modulus per Section 4.2 ~~and flexural strength~~ shall not be less than 95 percent of the lowest control sample values reported in the initial qualification test report.

6.0 EVALUATION REPORT REQUIREMENTS

6.1 Installation: The following is information that shall be included in the ICC-ES evaluation report on the molded plastic footing pads:

6.1.1 Table of allowable load capacities of each footing size based on soil bearing capacity.

6.1.2 Figure showing plan and cross-sectional view of footing pad with dimensions noted and rib configuration shown.

6.1.3 Detailed description of installation of molded plastic footing pads.

6.2 Conditions of Use: The following Conditions of Use for molded plastic footing pads shall be included in the evaluation report:

6.2.1 The [name of product defined as molded plastic footing pads] must be installed in accordance with this report and the applicable code.

6.2.2 The [name of product defined as molded plastic footing pads] are used to support wood or precast concrete posts for Type V, construction under the IBC or any construction under the IRC.

6.2.3 The [name of product defined as molded plastic footing pads] must be installed below the frost line of the locality.

6.2.4 The [name of product defined as molded plastic footing pads] are used as individual isolated footings to resist bearing loads only and are not used to resist lateral or uplift loads.

6.2.5 Mechanical fasteners must not be used with the molded plastic footing pads unless the specific fasteners have been evaluated for use in contact with preservative-treated wood posts (AC257), concrete posts, the plastic footing pad and the ground.

6.2.6 Design calculations in accordance with Chapter 18 of the IBC, Chapter 4 of the IRC must be submitted to the code official. The design must take into consideration the spacing of the footings.

6.2.7 The allowable soil bearing pressure and vertical movement for the [trade name of molded plastic footing pad product], must be determined by a site-specific geotechnical investigation or evaluation in accordance with Section 1803 of the IBC or Section R401.4 of the IRC. A geotechnical investigation or evaluation must be submitted to the code official for approval, when required by the applicable code.

7.0 ENVIRONMENTAL PRODUCT DECLARATION (Optional):

Environmental impacts shall be assessed via an Environmental Product Declaration (EPD) based on a Life Cycle Assessment (LCA). The LCA and EPD shall be conducted in accordance with ISO 21930 and the appropriate Product Category Rule(s) for the product type■

TABLE 1—SOIL CLASSIFICATION

CLASS OF MATERIALS	PRESUMPTIVE LOAD-BEARING VALUE (psf)	MINIMUM MODIFIED MODULUS OF SOIL REACTION, *k* (psi/in)
1. Crystalline bedrock	12,000	—
2. Sedimentary and foliated rock	4,000	—
3. Sandy gravel and/or gravel (GW and GP)	3,000	800
4. Sand, silty sand, clayey sand, silty gravel and clayey gravel (SW, SP, SM, SC, GM and GC)	2,000	400
5. Clay, sandy clay, silty clay, clayey silt, silt and sandy silt (CL, ML, MH and CH)	1,500	100

For **SI:** 1 psf = 48 Pa, 1 psi = 6.9 kPa, 1 inch = 25.4 mm.