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An American National Standard

Standard Specification for Test Carpets and Pads for Vacuum Cleaner Testing[1]

This standard is issued under the fixed designation F655; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification provides construction details and a replacement procedure for the standard carpet and pad to be used when testing vacuum cleaners.

1.2 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

F555 Test Method for Motor Life Evaluation of an Upright Vacuum Cleaner

F608 Test Method for Evaluation of Carpet Embedded Dirt Removal Effectiveness of Household/Commercial Vacuum Cleaners

F922 Test Method for Motor Life Evaluation of an Electric Motorized Nozzle

F1284 Test Method for Evaluating Carpet Embedded Dirt Removal Effectiveness of Residential Central Vacuum Cleaning Systems

F1334 Test Method for Determining A-Weighted Sound Power Level of Vacuum Cleaners

F1409 Test Method for Straight Line Movement of Vacuum Cleaners While Cleaning Carpets

F1411 Practice for Presenting Selected Information on Vacuum Cleaners for Consumer Use

F1601 Test Method for Motor Life Evaluation of an Electric Motorized Nozzle for Central Vacuum Cleaning Systems

F1692 Test Method for Life Evaluation of a Turbine-Powered Nozzle for Household Central Vacuum Cleaning Systems

F2609 Test Method for Litter-Cleaning Effectiveness of Vacuum Cleaners

F2756 Test Method for Determining Energy Consumption of Vacuum Cleaners

F2797 Test Method for Evaluating Edge Cleaning Effectiveness of Vacuum Cleaners

3. Basis of Selection

3.1 These standard carpets and pads are intended to provide a database and shall meet the following requirements:

3.1.1 Representative of carpets currently in popular use in the United States.

3.1.2 Reasonable anticipation of continued availability.

3.1.3 Compatible with other ASTM Committee F11 methods.

3.1.4 Provide a separation of cleaning effectiveness ratings between products with good reliability and repeatability.

4. Classification

4.1 The carpet types shall be classified according to accepted carpet industry practice, such as shag, multilevel, plush, etc.

5. Physical Requirements

5.1 *Carpets*[3]—The following carpet types and construction have been found acceptable for use in vacuum cleaner testing. They shall be made in accordance with the physical requirements given in Table 1, Table 2 and Table 3.

NOTE 1—A variance of ±7 % in face weight is allowable per HUD guidelines. When a new construction is needed, the proposed custom tufted test carpets should be subjected to construction verification as well as cleanability testing prior to acceptance for use.

5.2 *Padding*[4]—Sponge rubber type of waffle construction with a reinforcing skrim. See Table 4 for a description of the construction.

[1] This specification is under the jurisdiction of ASTM Committee F11 on Vacuum Cleaners and is the direct responsibility of Subcommittee F11.21 on Cleanability.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] The central source for the test carpets at this time is SDL Atlas, 3934 Airway Drive, Rock Hill, SC 29732. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,[1] which you may attend.

[4] The sole source of supply of the padding (Grandstand) is General Felt Industries, Co., 80 Park Plaza West-One, Saddlebrook, NJ 07662-5864. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,[1] which you may attend.

TABLE 1 Custom Carpet Construction Specifications

	Plush	Multi-Level	Frieze	Level Loop
Construction	Tufted	Tufted	Tufted	Woven (through back)
Gauge/Pitch	1/9 in., no shift	1/10 in., no shift	1/8 in., no shift	216
Pile Height	0.5 ± 0.02 in. (12.7 ± 0.5 mm)	0.416 ± 0.02 in. (10.6 ± 0.5 mm)	0.919 ± 0.02 in. (23.3 ± 0.5 mm)	0.25 ± 0.02 in. (6.35 ± 0.5 mm)
Stitches/Wires	10 stitches/inch	12.4 stitches/inch	7.6 stitches/inch	8/in. (3.15/cm)
Face Weight	41.9 ± 2.7 oz/yd^2	56.5 ± 2.7 oz/yd^2	76.5 ± 2.7 oz/yd^2	43.5 ± 2.7 oz/yd^2
Finish	Sheared	Sheared/Pure	Sheared	Pure
Backing	15 pick minimum woven polypropylene coated with latex and a synthetic secondary back			15 pick minimum woven polypropylene coated with latex
Yarn	Aquafil 1260 denier (Type 896AS) or equivalent	Invista 1288/2 solution dyed	Invista 1710 denier (Type 896AS) or equivalent	
Ply	2-Ply	2-Ply	2-Ply	3-Ply
Material	Type 6 Nylon	Nylon	Nylon	Wool
Twist	4.25	4.5 by 4.5	6.0 by 6.0	
ASTM Standards where used	F608 F1284 F1409 F1411	F608 F1284 F1334 F1409 F1411	F608 F1284 F1409 F1411	F555 F608 F922 F1284 F1409 F1411 F1601 F1692 F2756

TABLE 2 Wilton Carpet Construction Specifications

Pile Composition	Wool 8,6/2*2
Method of Manufacturing	Wilton Fabric
Color	Dark, one color
Backing	Jute and Cotton + latex
Type	Cut-pile
Total Height	7.5 mm
Pile Height	6.4 mm
Total Weight/m^2	2100 g/m^2
Pile Weight/m^2	1500 g/m^2
Number of Knots/m^2	96 000 knots/m^2
Reed	320 r/m
Shots	300 sh/m
Standard width	400 cm
Tolerances	±5 %

TABLE 3 Extractor Carpet Construction Specification

Style Name	Atherton Plus
Description	Saxony Cut Pile
Fiber Content	100 % Continuous Filament Nylon
Face Weight	25 oz/yd^2
Finished Pile Thickness	0.53 in.
Gauge	5/32
Tufts/in.	8
Primary Backing	Polypropylene
Secondary Backing	Classicbac
Total Weight	56 oz/yd^2
Density	1698 oz/yd^2
Twist	3.4 Fiber
Protection	None

TABLE 4 Carpet Pad Construction Specification

Weight	90 ± 3 oz/yd^2
Material	Waffle Rubber
Density	20 lb/ft^3
Thickness	0.36 in.

6. Carpet and Pad Selection

6.1 A test carpet or pad specified in this specification that does not satisfy the requirements of Section 3 shall be replaced. When the task group has tentatively agreed on a replacement carpet, the proposed carpet shall be evaluated using one of the procedures described in 6.2 or 6.3.

6.2 *Option 1:*

6.2.1 A three-member task group shall be assigned from Subcommittee F11.21.

6.2.2 The laboratories of the three task group members shall gather test data. Testing shall be conducted in accordance with Test Method F608.

6.2.2.1 Testing must be done with at least one agitator-type upright vacuum cleaner, one combination cleaner, and one straight air canister cleaner. The test cleaners selected shall be used for testing in all three task group member laboratories. Additional cleaners may be used at the discretion of the task group members.

6.2.2.2 The proposed replacement test carpet shall be supplied to each of the participating laboratories.

6.2.2.3 Each test laboratory shall make certain that the same intralaboratory technician (or technicians, if more than one is required) conducts the required series of runs to establish the test score for a cleaner type. The runs required for a test score for a cleaner type shall be a continuous series of runs within a single working day.

6.2.3 The carpet being selected shall have a construction similar to that specified in Section 5. The proposed test carpet shall be judged equivalent if the average test score of the participating laboratories for each of the cleaner types falls within the specified limits listed when compared to the carpet it is intended to replace.

Amount of Dirt Picked Up	Specified Limits
10 g or more	10 %
9 g or less	1 g

6.2.3.1 When the subcommittee deems it necessary to replace a specified carpet with a new or different carpet construction, or both, the task group shall conduct a search for the appropriate carpet. Each of the three members of the task group shall be supplied with samples and gather test data in

accordance with Test Method F608. Every effort shall be made to replace the specified carpet with a carpet that meets the limits listed in Section 3. Every effort shall be made to select a carpet that provides pickup performance, cleaner ranking, and ratio of performance between agitator and straight air type vacuum cleaners within 10 % of that measured on the currently specified carpet to be replaced.

6.3 *Option 2:*

6.3.1 When the task group has tentatively agreed on a replacement carpet, the proposed carpet shall be evaluated.

6.3.2 An independent laboratory shall be selected by the custom carpet supplier to evaluate the sample construction.

6.3.3 This laboratory shall be approved by a majority of the F11.21 Cleaning Ability Subcommittee voting members.

6.3.4 When a new, custom tufted carpet is submitted to the approved, independent laboratory for testing, it shall be evaluated in accordance with Test Method F608. Three panels of the existing inventory shall be compared with three panels of the new test panels.

6.3.5 Testing must be done with at least one agitator-type upright vacuum cleaner, one combination cleaner, and one straight air canister cleaner.

6.3.6 The results of the testing must meet the repeatability provisions within Test Method F608 for each vacuum cleaner type tested.

6.3.7 The independent laboratory test report shall include for each panel:

6.3.7.1 The cleaning values for each of the first ten (10) preconditioning test runs,

6.3.7.2 Cleaning efficacy values for each vacuum cleaner on each panel when tested per subsection 9.4 of Test Method F608,

6.3.7.3 A chart comparing the average cleaning efficacy values for each vacuum cleaner across the existing three panels tested to the three proposed test panels.

6.4 When the task group reaches agreement on the proposed carpet, it will submit its recommendation and test data to Subcommittee F11.21 for approval and subsequent ASTM balloting, including amendments to the necessary tables in Section 5. The evaluation carpet panels shall be returned to the carpet supplier for storage in case future retesting is needed.

6.5 If the specified carpet padding becomes obsolete, the procedure specified in Section 6 shall be used to determine an equivalent replacement using all of the standard test carpets listed in Table 1.

7. Carpet Inventory

7.1 To control the variability of the carpeting used within the ASTM test methods, a central source[3] for carpeting has been established by ASTM Committee F11 on Vacuum Cleaners. It is the responsibility of the central source for carpeting to maintain an adequate supply for each carpet type for testing.

7.2 In order to maintain an adequate supply of carpet types, the central source for carpeting is to notify the F11.21.01 carpet standardization task group chairman when the central source[3] supply is reduced to fifty (50) panels of a given carpet type. The F11.21.01 task group chairman will then contact the F11 membership to determine the overall inventory outside the central source and instruct the central source to re-order the carpeting, if necessary. This reorder is subject to task group, subcommittee, and main committee approval.

8. Keywords

8.1 carpets; padding; vacuum cleaners