

ASTM D3330 中英文对照版

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Standard Test Method for Peel Adhesion of Pressure-Sensitive Tape1

压敏胶带剥离强度测试标准

This standard is issued under the fixed designation D 3330/D 3330M; 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.

此标准是根据 D 3330/D3330M 整理修订; 名称后面的数字代表首发年份。括号内为最近修订年份。带有上标 ϵ 表示最后一次发行或修订时的改动之处。

1. 1. Scope

1. 1 范围

1.1.1 These test methods cover the measurement of the peel adhesion of pressure-sensitive tapes.

1.1.1 这些测试方法主要是针对压敏胶带剥离强度的测试

1.1.1.1 Test Method A gives a measure of the adherence, when peeled at 180° angle, to a standard steel panel or to other surface of interest for a single-coated tape. (加载板)

1.1.1.1 方法 A 是压敏胶带从一标准金属板 180° 剥离测试方法; -----

2. 1.1.2 Test Method B gives a measure of the adherence to the backing of a single-coated tape.

2.1.1.2 方法 B 是测试单面背衬胶的粘性

3. 1.1.3 Test Method C gives a measure of the adherence of double-coated tape to a standard steel panel or other surface of interest.

3.1.1.3 方法 C 是双面背衬胶与标准金属板的粘性测试方法;

4. 1.1.4 Test Method D gives a measure of the adherence of the release liner to the adhesive of either single-or double-coated tape.

4.1.1.4 方法 D 是测试单面或者双面背衬胶离型纸的粘性

5. 1.1.5 Test Method E gives a measure of the adherence of an adhesive transfer tape to a standard steel panel or other surface of interest.

5.1.1.5 方法 E 是测试无基材胶带与标准金属板之间的粘性

6. 1.1.6 Test Method F gives a measure of the adherence, when peeled at 90° angle, to a standard steel panel or other surface of interest for a single-coated tape.

6.1.1.6 方法 F 是测试胶带 90° 剥离方法;

7. 1.2 These test methods provide a means of assessing the uniformity of the adhesion of a given type of pressure-sensitive adhesive tape. The assessment may be within a roll of tape, between rolls, or between production lots.

7.1.2 这些测试方法, 是胶带的统一的评定方法; -----

8. 1.3 Variations in either the tape backing or the adhesive, or both, affect the response. Therefore, these test methods cannot be used to pinpoint the specific cause(s) of non-uniformity.

9. 1.4 These test methods may not be appropriate to test tapes having relatively stiff backings, stiff liners, or backings showing high stretch at low forces. These characteristics will result in a high variability for the test response which is not a true indication of the real nature of the adhesive bond.

10. 1.5 Values stated in either SI or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents, therefore, each system must be used independently without combining values in any way.

11. 1.6 These test methods are intended to replace AFERA 4001, EN 1939, PSTC-1, PSTC-2, PSTC-3 and PSTC-4.

1.7 This standard does not purport to address all of the 1 These test methods are under the jurisdiction of ASTM Committee D-10

on Packaging and are the direct responsibility of Subcommittee D10.14 on Tape and Labels. Current edition approved Oct. 10, 2000. Published December 2000. Originally published as D 3330 – 76. Last previous edition D 3330/D 3330M – 99. Copyright . ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, United States. safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2. Referenced Documents

2.1 ASTM Standards: A 666 Specification for Austenitic Stainless Steel, Sheet, Strip, Plate and Flat Bar
D 996 Terminology of Packaging and Distribution Environments
D 3715/D 3715M Practice for Quality Assurance of Pressure-Sensitive Tapes
D 4332 Practice for Conditioning Containers, Packages or Packaging Components for Testing
D 5750 Guide for Width and Lengths of Pressure-Sensitive Tape
E 122 Practice for Choice of Sample Size to Estimate a Measure of Quality for a Lot or Process

2.2 AFERA Standard: 5 4001 Self adhesive tapes – Measurement of peel adhesion

2.3 European Norm: 6 EN 1939 Self adhesive tapes – Measurement of peel adhesion from stainless steel or from its own backing

2.4 Pressure Sensitive Tape Council Standards: 7 PSTC-1 Peel Adhesion of Single Coated Pressure-Sensitive Tapes at 180° Angle
PSTC-2 Peel Adhesion for Single Coated Pressure-Sensitive Tapes at 90° Angle
PSTC-3 Peel Adhesion of Double Coated Pressure-Sensitive Tapes at 180° Angle
PSTC-4 Adhesion to Liner of Pressure-Sensitive Tapes at 180° Angle

1. 3. Terminology

2. 3.1 Definitions—Terminology found in Terminology D 996 shall apply. 2 Annual Book of ASTM Standards, Vol 01.03.

3 Annual Book of ASTM Standards, Vol 15.09.

4 Annual Book of ASTM Standards, Vol 14.02.

5 Association des Fabricants Européens de

Rubans Auto Adhésifs (AFERA), LAM, Laan Copes van Cattenburch 79, NL-2858 EW, The Hague, Netherlands.

6 European Norm, (EN); available from Comité Européen de Normalisation (CEN), Rue de Stassart, 36, B-1050, Brussels, Belgium.

7 Pressure Sensitive Tape Council (PSTC),

400 North Michigan Ave., #2200, Chicago, IL 60611-4267.

1. 4. Summary of Test Method

测试方法概要

2. 4.1 Test Method A—Single-Coated Tapes, Peel Adhesion at 180° Angle—A strip of tape is applied to a standard test panel (or other surface of interest) with controlled pressure. The tape is peeled from the panel at 180° angle at a specified rate, during which time the force required to effect peel is measured.

方法 A 是压敏胶带的 180° 剥离。用标准荷重把胶带试样粘加到实验板上。测试当用确定的速度把胶带从同实验板 180 度的角度完全剥离所用的力。

3. 4.2 Test Method B—Adhesion to Backing, Single-Coated Tapes—A strip of the tape under test is applied to a rigid panel. A strip of the tape under test is applied to the backing of the first strip of tape and tested for peel adhesion as described in Test Method A.

方法 B 是测试单面胶的粘性。胶带试样一被固定到金属板上。另取一试样黏贴到第试样一的背面，然后如方法 A 所述进行剥离力的测试。

4.3 Test Method C—Double-Coated Tapes:

方法 C 是双面胶

1. 4.3.1 Face Side Adhesion—The double-coated tape is adhered to a stainless steel panel (or other surface of interest), liner side up. The liner is removed and the exposed adhesive covered with a strip of 0.025-mm [0.001-in.] thick polyester film. The resulting tape is then tested as described in Test Method A.

表面粘力-把胶带固定到不锈钢试验板上，衬纸面向上。除去衬纸后，用厚度为 0.025-mm [0.001-in.] 聚酯薄膜贴在暴露的胶黏面上。接下来用上述方法 A 进行测试即可。

2. 4.3.2 Liner Side Adhesion—The face side adhesive is adhered to a 0.025-mm [0.001-in.] polyester film. The liner is removed

and the tape is applied adhesive down to a stainless steel panel (or other surface of interest). Testing is conducted as described in Test Method A.

衬纸面粘力—粘性面用厚度为 0.025-mm [0.001-in.] 聚酯薄膜贴附上。揭掉衬纸后把胶带黏贴到不锈钢试验板上。按照方法 A 进行剥离力的测试。

3. 4.4 Test Method D—Adhesion to Liner—The tape is adhered to a standard steel test panel with the liner side up. The liner is peeled from the adhesive in the same manner as in peeling a single-coated tape from a standard panel as described in Test Method A.

方法 D 是测试离型纸胶带（单面或者双面）的粘性—胶带被黏着在标准试验板上，衬纸面向上。同方法 A 中把单面胶从试验板上剥离类似，用同样的方法测试把衬纸同胶黏剂进行剥离所用的力值。

4.5 Test Method E—Adhesion of Adhesive Transfer Tapes:

方法 E 无基材胶黏带粘力测试

1. 4.5.1 Face Side—The tape is adhered to a standard panel (or other surface of interest). The liner is removed and a 0.025-mm [0.001-in.] thick strip of polyester is adhered to form a film-backed strip of tape. The adhesion is measured as described in Test Method A.

粘性面-把胶带黏着在标准化试验板上。除去衬纸，贴上厚度为 0.025-mm [0.001-in.] 的聚酯薄膜形成一个背衬薄膜胶带试样。按照方法 A 进行剥离力的测试。

2. 4.5.2 Liner Side—The transfer tape is applied to a strip of 0.025-mm [0.001-in.] thick polyester film, the liner is removed and the resulting tape's adhesion is measured as described in Test Method A.

衬纸面-胶带试样黏着在厚度为厚度为 0.025-mm [0.001-in.] 的聚酯薄膜上，除去衬纸，按照方法 A 进行剥离力的测试。

3. 4.6 Test Method F—Single-Coated Tapes, 90° Peel—A strip of tape is applied to a standard test panel (or other surface of interest) with controlled pressure. The tape is peeled from the panel at 90° angle at a specified rate, during which time the force required to effect peel is measured.

方法 F 单面胶 90° 剥离—用标准荷重把胶带试样黏着在标准实验板上。计算当用确定的速度把胶带从同实验板 90 度的角度（即垂直）进行完全剥离所用的力。

4. 5. Significance and Use

意义和用途

5. 5.1 These test methods are tools for quality assurance use. Given specific pressure-sensitive tape and a requirement in terms of the minimum or maximum peel value expected for this tape, the data from the test can be used in conjunction with acceptance criteria.

诸多测试方法均为保证产品质量所用。特定的胶黏带，有其特定条件下最大和最小剥离力值，其测试结果用于验收标准。

6. 5.2 Test Method A, B, C, E, or F can show the relative bond strength of a given tape to one or more surfaces (material and texture) as compared to the standard stainless steel panel. Substitution of representative samples of materials in question for the standard steel panel would suffice to do this.

方法 A, B, C, E, or F 能测试出除用标准试验板之外，胶带同其它一种或多种试验面（不同材料和质地）所产生的相对粘合力。备选的有代表性替代试样已经足以测试之用。

7. 5.3 Test Methods A, B, C, E or F cannot be used to compare two pressure-sensitive tapes of the same type but of different manufacture for their ability to adhere to a surface. This is because the measured peel force is not normalized for a fixed area of stress. The area under stress varies with backing stiffness and adhesive rheology (firmness). Two different tapes seldom agree in these properties.

方法 A, B, C, E or F 不能被用来对比测试同类但不同粘着力的胶带。这是因为测试的剥离力并没有规范为一定压力范围。压力会因为单面背衬得坚硬和黏着力度而有所不同。两种不同胶带极少有相同此类属性。

1. 5.4 Test Method D can show the amount of force required to remove a liner that covers the adhesive side of a tape at a specified peel rate. The force will be different at other peel rates.

方法 D 可以测试在特定剥离速度下剥离掉黏胶带的离型纸所需要的不同力值。不同的玻璃速度剥离力不同。

2. 5.5 These test methods may not provide design information as there is usually no direct relationship between peel adhesion and

any functional requirement.

这 5 种测试方法没有提供设计信息，原因在于通常粘着力和功能要求之间没有直接关联。

3. 6. Apparatus

装置

4. 6.1 Specimen Cutter⁸—The specimen cutter shall hold two single-edged razor blades in parallel planes, a precise distance apart, to form a cutter of exact specimens widths. Two cutters, 12-and 24-mm [0.05-and 1-in.] cutting width, shall be available.

Appropriate alternates which will not cause edge damage may be used.⁹

取样器 8—取样器应该使用平行的单刃刀片，精确的分开距离，这样可以剪切出宽度精确的试样。两种剪切 12 和 24-mm [0.05-and 1-in.] 剪切宽度都是可用的。为了不引起试样边缘破损，取样器 9 也可以选用。

NOTE 1

—The 12-mm [0.5-in.] cutter shall consist of a 12-mm [0.5-in.] thick by 220-mm [8-in.] length aluminum bar stock 12-mm [0.05-in.] wide. The edges for about 125 mm [5 in.] from one end shall be slightly rounded to form a handle. The width of the bar for 75 mm [3 in.] from the opposite end shall be narrowed to exactly 12 mm [0.5 in.] minus the thickness of a single razor blade (one of two used as cutting edges). The razor blades shall be held in position using side plates. The end of the cutter shall be cut away at 45° angle to expose the cutting edge at one end of the blades. The edges shall be separated by 12.6 ± 0.10 mm [0.5 in.]. The 24-mm [1-in.] cutter shall follow the same description except the bar stock shall be 24.0 mm [1 in.] and shall be narrowed exactly 24 mm [1 in.] minus the thickness of a single razor blade.

12-mm [0.5-in.] 剪切刀规格应为 12-mm [0.5-in.] 的宽度和 220-mm [8-in.] 长度的铝制把柄。刀刃 125 mm [5 in.] 手柄

6.2 Dispensing System—For solvents, such as a wash bottle. 剂量器分配器 溶剂 洗涤瓶

6.3 Panel⁸—A stainless steel panel, 50 by 125 mm [2 by 5 in.] no less than 1.1 mm [0.043 in.] thickness, conforming to Type 302 or 304 of Specification A 666, having a bright annealed finish. The surface roughness height shall be 50.6 ± 25 nm [2.06 ± 1.0 μin.] arithmetical average deviation from the mean line. Panels showing stains, discoloration, or many scratches are not acceptable. New panels should be cleaned prior to use as described in 11.1, except with ten washes of the final solvent. Between uses, the panel test surface shall be protected from scratches and contamination, and the panels stored at conditions described in Section 10.

6.4 Roller—Mechanically or hand operated.

8 压辊-自动和手动

1. 6.4.1 A steel roller 85.6 ± 2.5 mm [3.25 ± 0.1 in.] in diameter and 45.6 ± 1.5 mm [1.75 ± 0.005 in.] in width, covered with rubber approximately 6 mm [0.25 in.] in thickness, having a Shore scale A durometer hardness of 80 ± 5. The surface shall be a true cylinder void of any convex or concave deviations. The mass of the roller shall be 2040.6 ± 45 g [4.5 ± 0.1 lb].

压辊规格为直径 85.6 ± 2.5 mm [3.25 ± 0.1 in.] 轴宽 45.6 ± 1.5 mm [1.75 ± 0.005 in.]，表面橡胶厚度为 6 mm [0.25 in.] 左右，硬度为邵耳 80。压辊表面为无任何凹凸缝隙的光滑圆筒。滚轴克重为 2040.6 ± 45 g [4.5 ± 0.1 lb]。

2. 6.4.2 No part of the apparatus shall increase the mass of the roller during use. The roller shall move either mechanically or cannot have any device parts increase its use load. 压辊可自动或者手动操作。

8 Available from Chemsultants International, 9349 Hamilton Dr., Mentor, OH 44061-1118, and PSTC, 400 North Michigan Ave., #2200, Chicago, IL 60611-4267.

9 These widths correspond to the primary metric (SI) units described in Guide D 5750. These so-called “modular metric” units are used throughout the world, except for Europe. If it is desirable to test slightly different widths (for example, 25 mm) of specimens than those described in 9.1, this should be noted (see 18.1.7) and calculations must also account for the difference (see 17.1). by hand at the rate of 10.6 ± 0.5 mm/s [24.6 ± 0.5 in./min]. A mechanically operated roller is recommended for referee purposes.

这些数据是根据 Guide D 5750 的公制计量单位。除了欧洲外所谓的组合公制世界通用。建议用自动操作的压辊。

NOTE 2—A simple check to determine if the rubber surface is cylindrical is to wrap the roller in a very thin paper (onionskin) and drag it across a flat glass plate on which is placed carbon paper, face up. The carbon rubs off onto the thin paper wrapper to reveal high spots or hollows on the rubber surface.

有一种检测滚筒表面橡胶性能的简易方法。用薄纸包住橡胶层，然后在铺着复写纸（印面向上）的平板玻璃上滑动。

复印纸的颜色就会被拓到薄纸上，这样就能直观的显现出橡胶表面是否有小的凸起或凹洞。

6.5 Adhesion Tester—A constant-rate-of-extension (CRE) tension tester shall be used. It is proposed to use an electronic machine taking at least one reading per mm [0.1 in.] of tape peeled. The tester shall have two clamps with centers in the same plane, parallel with the direction of the motion on the stressing clamp, and so aligned that they will hold the specimen wholly in the same plane; a means of moving the stressing clamp at a uniform rate of 5.0 ± 0.2 mm/s [126 ± 0.5 in./min] and a device for recording load. The instrument shall be calibrated to an accuracy of 0.5 % of full scale and the scale range used for any test shall be such that the mean test level falls within 20 to 80 % of full scale.

粘力检测仪——可能会用到恒速拉力机。在此推荐用电子设备检测每秒的剥离力仪表值。拉力机的工作台中央有两个动力方向平行的夹具，其同试样统一在同一工作台。用恒定速率 5.0 ± 0.2 mm/s [126 ± 0.5 in./min] 拉动夹具然后另一装置做装置下载测试数据。这套装置的精确度达到测量值 0.5%

6.6 Fixture—90° peel for Test Method F.

8 90° 剥离夹具—用于方法 F

2. 7. Reagents and Materials

试剂和材料

3. 7.1 Purity of Reagents—Reagent grade chemicals should be used in all tests. Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening accuracy of the determination.

试剂纯度——试剂的化学等级适用于所以试验。其它可选试剂必须是在保证其纯度不会影响其检测结果精度的情况下使用

7.2 Solvents: 溶剂

7.2.1 Any of the following solvents may be used for cleaning:

以下所有可能用作清洁的溶剂

...7.2.1.1 Diacetone alcohol non-residual, technical grade or better, 双丙酮酒精无残留技术等级或者更高

1. 7.2.1.2 Methanol (95 %), 甲醇

2. 7.2.1.3 Methyl ethyl ketone (MEK), 丁酮

3. 7.2.1.4 n-Heptane, or

4. 7.2.1.5 Acetone. 丙酮

2. 7.2.2 For final cleaning before each test, MEK or acetone shall be used

每次试验的最终清洁会用到丁酮和丙酮

3. 7.2.3 Where toxicity and flammability requirements are paramount, a mixture of n-heptane and a fluorinated hydrocarbon, such as refrigerant, may meet requirements.

当对毒性和易燃性的要求是试验首要问题时，正庚烷和氟化的烃例如制冷剂可能达到标准。

4. 7.3 Cleaning Material—Absorbent, surgical gauze, cotton wool or tissue may be used. To be suitable, materials must be lint-free during use, absorbent, contain no additives that are soluble in the solvents listed in 7.2 and made exclusively from virgin materials.

清洁材料：吸收剂，外科纱布，棉毛或者薄纸。材料必须为无棉绒纸；吸收剂不能含同有 7.2 所列溶剂可溶的添加剂并且取材于原材料。

5. 8. Sampling

6. 8.1 Acceptance Sampling—Sampling shall be in accordance with Practice D 3715/D 3715M.

取样

可选试样——试样必须符合 Practice D 3715/D 3715M 标准

7. 8.2 Sampling for Other Purposes—The sampling and the number of test specimens depends on the purpose of the testing. Practice E 122 is recommended. It is common to test at least five specimens of a particular tape. Test specimens should be taken from several rolls of tape, and whenever possible, among several production runs of tape. Strong conclusions about a specific property of a tape cannot be based on tests of a single unit (roll) of a product.

其它用途试样——试样的选择取决于试验目的。可以参考 PRACTICE E122。通常一种胶带需要至少五个试样。测试试样

必须取自不同的胶带卷，如果有可能取自不同的生产线。单一的产品取样检测不出胶带属性的有力结论。

胶带解卷装置

1. 9. Test Specimen

2. 9.1 The specimen shall be 24-mm [1-in.] wide. If the specimen is of a different width, refer to Note 5. A tolerance of ± 0.5 mm [$\pm 1/64$ in.] shall be allowed. The length shall be approximately 300 mm [12 in.].

试样规格宽为 24mm [1-in.] 如果宽度不同于此，参考 NOTE5. ± 0.5 mm [1/64 in.] 的误差范围是允许的。长度规格为 300 mm [12 in.] 左右。

3. 9.2 Discard at least three but no more than six outer wraps of tape from the sample roll before taking the specimens for testing. 作为试样的胶带，必须先从胶带卷上去掉至少 3-6 圈之后再取材

4. 9.3 Remove one specimen per sample roll for each test to be performed. Remove the specimen from a freely 旋转 rotating roll at the rate of 500 to 750 mm/s [20 to 30 in./s]. Where width or other factors causing a high adherence to backing makes it impossible to remove the specimen at the prescribed rate, remove it at a rate as close to 500 mm/s [20 in./s] as possible.

从每个胶带卷上取下一块试样的方法。以 500 to 750 mm/s [20 to 30 in./s] 的速率从旋转的胶带卷上扯下试样。当由于胶带宽度或某些原因致使粘性过高而不易扯掉试样时，速率可以减少到 500 mm/s [20 in./s]。

5. 9.4 When tape is wider than 24 mm [1 in.], specimens of the widest specified width are to be cut from the center of a strip removed from the roll in accordance with 9.3.

当胶带宽度大于 24 mm [1 in.] 时，多出的那部分宽度依据 9.3 中的方法剪切掉

9.5 Apply specimen within 5 min after unwinding.

解卷后 5 分钟之内进行试样测试。

1. 10. Conditioning

2. 10.1 Condition the sample rolls of tape in the standard conditioning atmosphere as described in Practice D 4332 for a period of not less than 24 h. Test at these conditions.

测试环境

根据 D 4332 把试样放置在标准温度环境下至少 24 小时。在此环境下测试即可。

NOTE 3—Caution: The tester should know that by prolonged handling heat is transmitted to the stainless steel test panel. Therefore, during and after application of the adhesive tape to the test panel, the panel should be handled as little as possible.

注意：试验者应该知道试验产生的热量会传递到不锈钢板上。因此在胶带黏贴到试验板的过程中或者之后，试验板应该尽可能的不接触。

1. 11. Test Method A—Single-Coated Tapes at 180° Angle

方法 A 单面胶带 180° 剥离

2. 11.1 Dispense one of the solvents listed in 7.2.1 onto the panel, wiping it to dryness with fresh absorbent cleaning material. Repeat for a total of three washes with this solvent. Final wipe shall be MEK or acetone. The panel shall be allowed to dry at standard conditions for at least 10 min. If cleaned panel is not used within 10 h, it should be recleaned.

把 7.2.1 所列的一种试剂涂抹在试验板上，用清洁吸水的材料擦拭干净。用此种溶剂擦拭三次，最后一次用丁酮或者丙酮。试验板在标准环境下晾干时间至少需要 10 分钟。如果 10 分钟之内不使用，应该重新清洁再用。

NOTE 4—Discard panels showing stains, discoloration, or many scratches. Avoid contacting panel surface with fingers. During storage, panels should be protected from damage or contamination.

避免使用有污点，色污或划痕的试验板。禁止用手指接触试验板表面。在存储数据过程中，试验板应远离破损或者污染。

11.2 Remove a 300-mm [12-in.] specimen of the tape to be tested, as described in 9.3. Fold 12 mm [0.5 in.] at one end, adhesive to adhesive to form a tab. Touch other end of the specimen to an end of the test panel. Hold the other end of the specimen so that it does not make contact with the panel but is positioned loosely above it. Roll mechanically or by hand twice in each lengthwise direction, causing the roller to apply the tape to the panel. This prevents entrapment of air between the adhesive and the panel. Should this occur, discard the specimen.

按照 9.3 的要求取 300-mm [12-in.] 的胶带试样。在试样一端 12 mm [0.5 in.] 处折叠，粘成标签状。拿住标签端，让试样

的另一端接触试验板，这样试样没有同试验板紧贴而只是轻微的置于其上。自动或者手动的按长度方向滚动压辊，使胶带完全粘附到实验板上，这样可以避免胶黏剂和试验板间有任何空隙。如果真的出现空隙现象，此试样作废。

NOTE 5—Where the width of the specimen is less than 24 mm [1 in.], prior to applying test specimen, apply a strip or strips of the tape, to give an equivalent width of 24 mm [1 in.] for rolling purposes or use roller of appropriate weight to obtain a line pressure equal to 2040 g [4.5 lb] for 24 mm [1 in.] width $\pm 35\%$.

为了试样黏贴时更好的滚压，试样宽度小于 24 mm [1 in.]时，用一段胶带补齐 24 mm [1 in.]或者用 2040 g [4.5 lb] 的线压来操纵压辊。

11.3 Individually prepare each specimen and test within 1 min.

NOTE 6—Longer dwell time will give different results. Peel adhesion increases with dwell time at different rates for various tapes. A longer dwell time may be chosen purposely.

在一分钟之内备齐试样和测试装置

试样搁置时间的长短会带来不同的检测结果。各种胶带因搁置时间的差异而呈现不同速率的剥离力增加。请选择合适的搁置时间。

1. 11.4 Double back the folded end of the tape at an angle of 180° and peel 25 mm [1 in.] of the tape from the panel. Clamp that end of the panel into the movable jaw of the adhesion testing machine and the free end of the tape into the other jaw. Operate the movable jaw at 5.06 $\pm$ 0.2 mm/s [12.6 $\pm$ 0.5 in./s].

把折叠过的胶带解回原状，从试验板上剥离出 25 mm [1 in.]。把试验板的这一端放入粘附检测仪器的活动夹口，另一端置入另一夹口。用 5.06 $\pm$ 0.2 mm/s [12.6 $\pm$ 0.5 in./s]的速度操作活动夹口。

2. 11.5 After the movable jaw is started in motion, disregard the values obtained while the first 25 mm [1 in.] of tape is mechanically peeled. Use the average force obtained during peeling of the next 50 mm [2 in.] as the adhesion value.

启动仪器后，检测出的最初 25 mm [1 in.]的剥离力值不在统计范围之内。用之后的 50 mm [2 in.]的剥离力的平均值作为粘附测定值。

3. 12. Test Method B—Adhesion to Backing of Single-Coated Tapes

方法 B-单面背衬胶的粘性

4. 12.1 Apply a sample of the tape under test to a rigid panel such as the standard stainless steel panel. Roll firmly. Apply a second strip of the tape to the backing of the strip on the test panel as described in 11.2 taking care to align the edges of the second specimen with those of the strip in the test panel. Complete testing as described in 11.3-11.5.

把试样一粘贴到像标准不锈钢的坚硬试验板上，用压辊滚压牢固。另取一试样如 11.2 所述黏贴到试样一得背面，要确保两试样边缘线齐。按照 11.3-11.5 所述操作试验。

5. 13. Test Method C—Adhesion of Double-Coated Tape

方法 C-双面背衬胶的粘性

6. 13.1 Face Side—Follow the procedure of 11.1-11.3, then remove the liner and superimpose on the test strip a strip of 0.025-mm [0.001-in.] thick polyester film, as wide as or slightly wider than the double-coated tape. Apply this film in the manner of applying the double-coated test strip to the panel so that the roller makes the actual application of the film to the double-coated tape.

表面—按 11.1-11.3 步骤进行操作，去掉衬纸。把厚度为 0.025-mm [0.001-in.] 聚酯薄膜叠加在测试样上，薄膜要比试样稍微宽一些。遵循把胶带黏贴到试验板的方法，把薄膜用压辊准确的贴附到胶黏带上。

NOTE 7—The two passes of the roller in applying polyester film may be made using the hand roller. The rolling rate may be increased to 50 mm/s [2 in.]/s. Continue in accordance with 11.4 and 11.5.

薄膜的滚压最好用手动压辊。滚压速度能增加到 50 mm/s [2 in.]/s. 按照 11.4 和 11.5 的方法继续试验。

1. 13.2 Liner Side—Adhere the face side of the specimen to a strip of 0.025-mm [0.001-in.] thick polyester film in the manner described in 11.2 so that the roller makes actual application of the tape to the film. Trim the film to be as wide as or slightly wider

than the tape. Remove the liner. Continue in accordance with 11.1-11.5.

衬纸面—用厚度为 0.025-mm [0.001-in.]的聚酯薄膜按照 11.2 黏贴到胶带表面，把他们充分粘合。修剪薄膜使其比胶带稍微宽一些。取掉衬纸，按照 11.1-11.5 继续试验。

2. 14. Test Method D—Adhesion to Liner of Double-Coated and Single-Coated Tapes

方法 D—单面或者双面背衬胶离型纸的粘性

3. 14.1 Double-Coated Tapes—Follow 11.1.

Apply 125 mm [5 in.] of one end of the specimen to the panel with the adhesive side (face side) down. Make four passes with the roller, twice in each direction at a rate of 10 6 0.5 mm/s [246 0.5 in./min]. Separate the liner from the tape at the free end and cut away the free tape. Do not disturb the line adhered to the tape on the panel. Double back the liner and proceed in accordance with 1. 11.4 and 11.5.

双面背衬胶-遵循 11.1

把试样一端的 125 mm [5 in.]粘到试验板上，胶粘面（表面）向下。用压辊以 10 6 0.5 mm/s [246 0.5 in./min]的速率两个方向共各滚压两次。把试样另一端离型纸剥离掉，保留试验板上的胶带的离型纸。

2. 14.2 Single-Coated Tapes—Follow 11.1.

Apply a strip of double-coated tape as wide as the specimen, the full length of the panel. Remove the liner from the single-coated tape. Superimpose 125 mm [5 in.] of one end of the specimen, backing side down, against the double-coated tape on the panel. Make four passes with the roller, twice in each direction at a rate of 10 6 0.5 mm/s [12 6 0.5 in./min]. Separate the liner from the tape at the free end and cut away the free tape. Do not disturb the liner adhered to the tape on the panel. Double back the liner and proceed in accordance with 11.4 and 11.5.

单面背衬胶-遵循 11.1

把试样一双面背衬胶贴到试验板上，长度和试验板一致。取掉单面背衬胶带的离型纸。把试样一端的 125 mm [5 in.]的光滑面向下，叠贴到试样一上。用压辊以 10 6 0.5 mm/s [246 0.5 in./min]的速率两个方向共各滚压两次。

1. 15. Test Method E—Adhesion of Adhesive Transfer Tapes

2. 15.1 Face Side—Follow procedure of 11.1-11.3, then remove the liner and superimpose on the test strip a strip of 0.025-mm [0.001-in.] thick polyester film, as wide as or slightly wider than the adhesive transfer tape. Apply this film in the manner of applying described in 11.2 so that the roller makes the actual application of the film to the adhesive transfer tape. Proceed as described in 11.4 and 11.5.

方法 E—无基材胶带粘性

胶黏面—按照 11.1-11.3 的步骤取掉离型纸。把厚度 0.025-mm [0.001-in.]的聚酯薄膜黏贴到试样上，其宽度比无基材胶带稍微宽一些。按 11.2 所述黏贴薄膜保证其无缝隙贴附到无基材胶带上。遵循 11.4 和 11.5 继续试验。

3. 15.2 Liner Side—Apply to the face side of the adhesive transfer tape a trip of 0.025-mm [0.001-in.] thick polyester film. Make two passes of the roller using a hand roller of the same size. The roller rate may be increased to 50 mm/s [2 in.]/s. Remove the liner from the tape and apply to a standard test panel as described in 11.2 and 11.3. Proceed as described in 11.4 and 11.5.

离型纸面—在无基材胶带的胶黏面上贴附上厚度为 0.025-mm [0.001-in.]的聚酯薄膜。用适合的压辊滚压两次，滚压速度可能增加到 50 mm/s [2 in.]/s. 去掉试样的离型纸如 11.2 和 11.3 所述把其黏贴到试验板上。如 11.4 和 11.5 的步骤继续试验。

NOTE 8—In spite of its apparent simplicity, the use of this test method is rather delicate and involves the use of great care in following the procedure as written to give coherent and identical results between one laboratory and another, as well as between one operator and another. 清晰一致的

尽管方法操作简易，但其操作需细致，尤其当两个不同的实验室或者操作者按照书面程序的得出清晰一致的结果时要格外注意。

...16. Test Method F—Single Coated Tapes at 90° Angle

...16.1 Prepare specimen for testing as described in 11.1-11.3.

...16.2 Double back the folded end of the tape at a 90° angle and peel 25 mm [1 in.] of the tape from the panel. Place the panel into a fixture clamped to the moving jaw of the adhesion tester so that it will maintain a peeling angle at 90° during the peeling of the next 75 mm [3 in.] of tape and the free end of the tape into the other jaw. Operate the moving jaw at 5.0 6 0.2 mm/s [12 6 0.5

in./min].

...16.3 Proceed as described in 11.5.

方法 F-单面背衬胶的 90 度剥离

按照 11.1-11.3 所述准备测试试样。

把胶带一端 90 度方向折叠。从试验板上剥离 25 mm [1 in.]的胶带。把试验板夹到仪器的活动夹口这样可以在接下来 75 mm [3 in.]的剥离过程中始终保持 90°，这样另一端放置到其它的夹口。按 5.0 6 0.2 mm/s [12 6 0.5 in./min]的速率操作活动夹口。如 11.5 所述继续试验。

2. 17. Calculation

3. 17.1 In the SI system, if observed pull value is not in Newtons (N), convert to N per 10 mm by converting the pull value to N and dividing by the width of the tape, mm, and multiplying by 10. In the English System, if the observed value is not in ounces, convert to ounces and divide by the specimen width.

量算

在 SI 系统中，如果测试力值非牛顿值，请将其除以试样宽度然后乘以 10 转换成牛顿。在英语量制系统中，如果力值非盎司，请用其除以试样宽度后转换成盎司。

4. 18. Report

18.1 Report the following information:

...18.1.1 Statement that these test methods were used and indication of any deviations from the test methods as written,

...18.1.2 Identification of the source of each roll of tape tested,

2. 18.1.3 Description of any anomalous behavior during testing (such as adhesive transfer or splitting), 反常的不规则的 分裂

3. 18.1.4 Peel adhesion value, N/10 mm to the nearest 0.1 N/10 mm [oz/in. to the nearest 1 oz/in.]. Use actual specimen width in calculations,

...18.1.5 Identification of the test method used (A, B, C, D or E) and, if C or E, whether face side or liner side,

1. 18.1.6 Dwell time, if less or greater than the standard 1 min,

2. 18.1.7 Test specimen widths, if different from 9.1, and

4. 18.1.8 Conditions of test, if other than 23 6 1°C [73.4 6 3.5°C] or 50 6 5 % RH.

测试报告

测试报告应包含以下信息：

1. 应陈述各使用方法和其差异性所在

2. 试样压辊的物源识别

3. 描述测试中会出现的异常反应（例如粘附转印或者断裂）

4. 剥离力值精确到 0.1 N/10 mm [oz/in. 到最近的 1 oz/in.]. 运算中运用实际的试样宽度。

5. 识别 A, B, C, D , E 这 5 中测试方法。方法 C,E 还要注意区别其胶黏面和离型纸面。

6. 搁置时间的记录，不管是少于或者多余标准的 1 分钟

7. 测试样的宽度

8. 测试环境 如果不是 23 6 1°C [73.4 6 3.5°C] 或者 50 6 5 % RH

5. 19. Precision and Bias

6. 19.1 Summary—The difference between two single observations should not exceed 18.8 % of the average of the two observations in 95 out of 100 cases when both observations are taken by the same well-trained operator using the same piece of test equipment and the specimens randomly drawn from the same sample of material. Larger differences may occur under all other circumstances. The true value of peel adhesion at 180° angle can only be defined in terms of a specified test method. Within this limitation, Test Methods D 3330/D 3330M has no known bias. The bias for this summary and for evaluations made under other conditions are explained in 19.2-19.5.

精确性和偏差

概要：若是同等取材，熟练程度相当的操作人员用同样的设备做检测试验时，100 组测试中两组结果的不应该超过平均检测值的 18.8%。很多情况可导致结果的不同。只有特定的检测方法才能测定 180°剥离的真正价值。在此限定范围内 D 3330/D 3330M 没有明显偏差。其他情况下对于结论和鉴定的误差在 19.2-19.5 中找到解释。

NOTE 9—Of the six methods in these test methods only Test Method A was used in determining the precision. It is believed that the precision for the other test methods would be similar. It would probably not apply to Test Method C.

此 6 种检测方法中只有方法 A 应用在检测准确度上。当然其他方法的也类似，方法 C 可能不适用。

1. 19.2 Interlaboratory Test Data10—An interlaboratory study was made in 1980 in which randomly drawn samples of two materials were tested in each of six laboratories. Two operators in each laboratory each tested 3 specimens from each of 3 rolls of each material. The components of variance for peel adhesion at 180° results expressed as coefficients of variation (see Note 2. 实验室间的检测数据 10-1980 年 6 个不同的实验室从两个材料中随意取材进行试验。每个实验室的两名检测人员各自从两种材料的三个胶卷中各取出三个试样。这样 180°剥离检测结果的差异要素组合就是其差异程度。

19.3 Critical Differences—For the components of variance reported in 19.2, two averages of observed values should be considered significantly different in the 95 % probability level if the difference equals or exceeds the critical difference shown in Table 1.

绝对差异—对于 19.2 中的差异要素，如差异同表格 1 中的相当或者有超出，则两组检测结果的平均数值被认为存在显著差异

9) and were calculated to be as

follows: Specimens of the Specimens of Same Material Different Material Single-operator component 4.8 % of the average 9.7 % of the average Within-Laboratory component 2.1 % of the average 0 % of the average Between-Laboratory component 9.0 % of the average 3.7 % of the average Replication component 4.9 % of the average 4.9 % of the average

NOTE 10—The tabulated values of the critical differences and confidence limits should be considered to be general statements particularly with respect to between-laboratory precision. Before a meaningful statement can be made about two specific laboratories, the amount of statistical bias between them, if any, must be established with each comparison being based on recent data obtained on specimens randomly drawn from one sample of the material to be evaluated.

绝对差异和可靠极限的列表对比可以作为总体概述，尤其表达对不同实验室检测精度的尊重。在对不同实验室做出判断之前，所参考的数据偏差必须是建立在对同一材料的任意取材的最新监测数据的对比统计上。

19.4 Confidence Limits—For components of variance reported in 19.2, single averages of observed values have the 10 Supporting data are available from ASTM headquarters. Request RR: D-1-1002.

TABLE 1 Critical Difference, Percent of Grand Average for the Conditions NotedA,B

可靠极限—对于 19.2 中的差异要素，ASTM 系统中有 10 条 supporting data 专业间配合资料可作参考。规定 RR: D-1-1002.

Number of Single-

Within-

Between-

Observations in

Operator

Laboratory

Laboratory

Each Average

Precision

Precision

Precision

SpecimensoftheSameMaterial:

A

The critical differences were calculated using $t = 1.960$ which is based on infinite degrees of freedom.

B To convert the values of the critical differences to units of measure, multiply the average of the two specific sets of data being compared by the critical differences expressed as a decimal fraction. following 95 % confidence limits. See Note 10 and

Table 2.

1. 19.5 Bias—No justifiable statement can be made on the bias of Test Method D 3330/D 3330M for testing peel adhesion since the true value cannot be established by accepted referee method.

2. 20. Keywords

3. 20.1 adhesion to backing; adhesion to liner; peel adhesion at 90° angle; peel adhesion at 180° angle; pressure sensitive tape

TABLE 2 Width of 95 % Confidence Limits, Percent of the Grand Average for the Conditions

NotedA,B

Number of

Single-

Within-

Between-

Observations in

Operator

Laboratory

Laboratory

Each Average

Precision

Precision

Precision

SpecimensoftheSameMaterial:

1 613.3 613.9 630.0 5 610.3 611.0 620.8 10 69.8 610.6 620.6 SpecimensofDifferentMaterial:

1 621.3 621.3 622.5 5 619.8 619.8 620.8 10 619.3 619.3 620.6

A The confidence limits are calculated using $t = 1.960$ which is based on infinite degrees of freedom.

B To convert the values of the confidence limits to units of measure, multiply the average

of the specific set of data which is of interest by the confidence limits expressed as

a decimal fraction.

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