



Designation: D5458 – 95 (Reapproved 2020)

Standard Test Method for Peel Cling of Stretch Wrap Film¹

This standard is issued under the fixed designation D5458; 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 test method measures cling between two layers of film, in both a stretched and unstretched condition.

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

D996 Terminology of Packaging and Distribution Environments

D1898 Practice for Sampling of Plastics (Withdrawn 1998)³

D4332 Practice for Conditioning Containers, Packages, or Packaging Components for Testing

E122 Practice for Calculating Sample Size to Estimate, With Specified Precision, the Average for a Characteristic of a Lot or Process

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

¹ This test method is under the jurisdiction of ASTM Committee D10 on Packaging and is the direct responsibility of Subcommittee D10.25 on Palletizing and Unitizing of Loads.

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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 last approved version of this historical standard is referenced on www.astm.org.

3. Terminology

3.1 *Definitions*—General definitions for packaging and distribution environments are found in Terminology D996.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *cling*—the property of a material's ability to adhere to itself.

3.2.2 *stretch wrap material*—a material used for overwrapping which, when applied under tension, elongates, and through elastic recovery, conforms to the item(s) packaged.

4. Summary of Test Method

4.1 This test method is a peel cling procedure. A 1 in. (25 mm) wide film strip is adhered to a flat film attached to an inclined surface. The force required to remove the film strip from the flat film is measured.

5. Significance and Use

5.1 Cling is of critical importance in maintaining a tight wrap after a load is stretch wrapped.

6. Equipment and Preparation

6.1 *Apparatus*—A universal testing machine with a constant rate of grip separation equipped, as follows:

6.1.1 One lightweight jaw equipped with 1 by 1.5 in. (25 by 38 mm) flat rubber-faced grips,

6.1.2 Cling attachment (see Figs. 1-5),

6.1.3 Cling clamp (see Fig. 6),

6.1.4 Load cell, 500-g load capacity,

6.1.5 If using pneumatic grips, air supply, 60 to 70 psi with appropriate filter,

6.1.6 Sample template, picture-frame style with inside dimensions of 5 by 20 in. (125 by 500 mm),

6.1.7 Precision sample cutter, 1 ± 0.001 in. (25.4 ± 0.03 mm) width, with precision of 1 ± 0.001 in. (25.4 ± 0.03 mm),⁴

6.1.8 Single-edged safety razor blade,

6.1.9 Synthetic bristle paint brush, 2 in. (50 mm) wide,

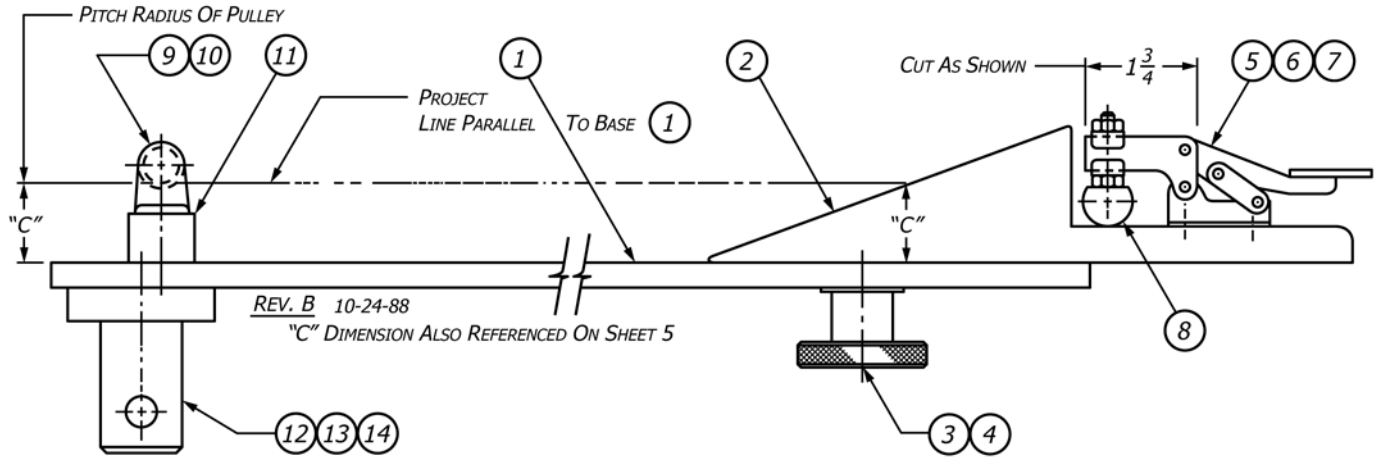
6.1.10 Ruler, 12 in. (approximately 300 mm),

6.1.11 Separation paper, 8.5 by 12 in. (approximately 125 by 280 mm) bond,

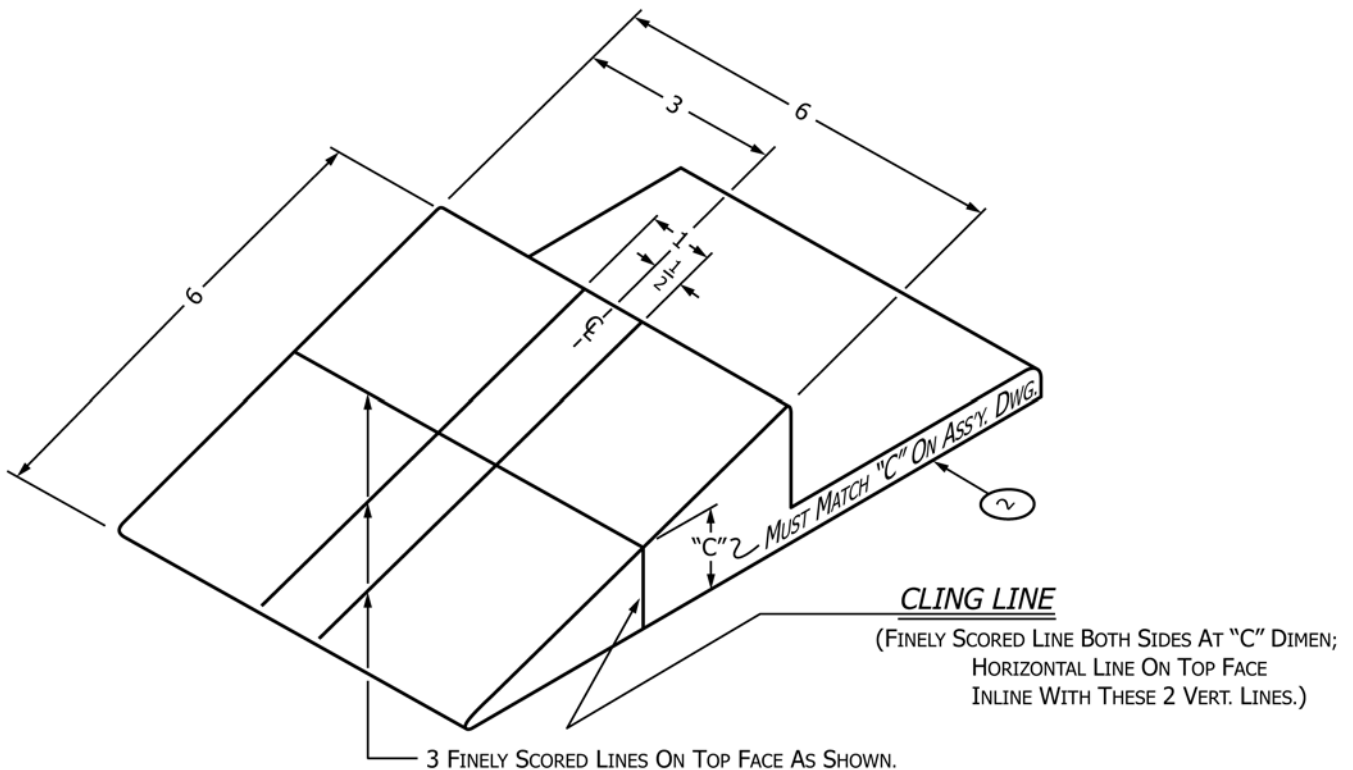
⁴ JDC-1-10 Cutter is available from Thwing-Albert Instrument Co., 10960 Dutton Rd., Philadelphia, PA 19154 or other manufacturers.

Legend for Figures 1–5:

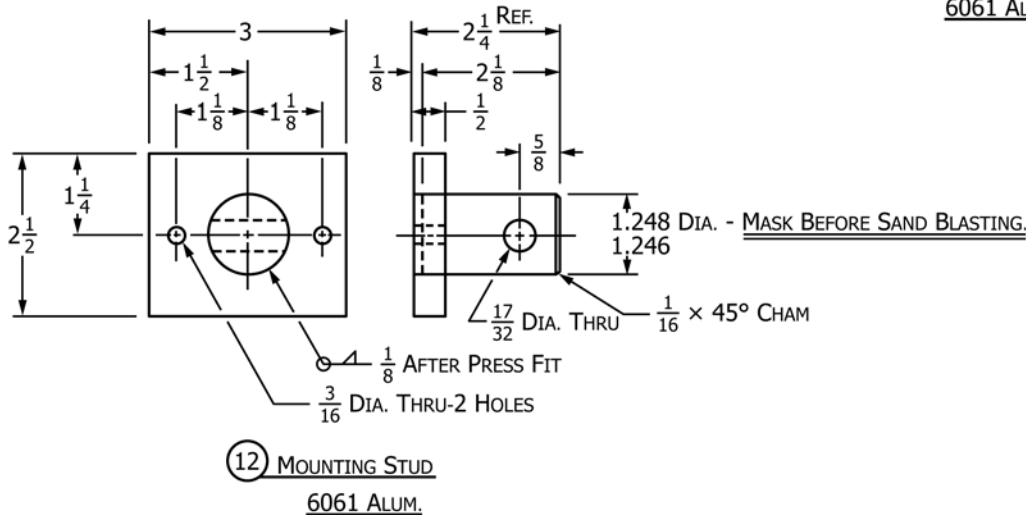
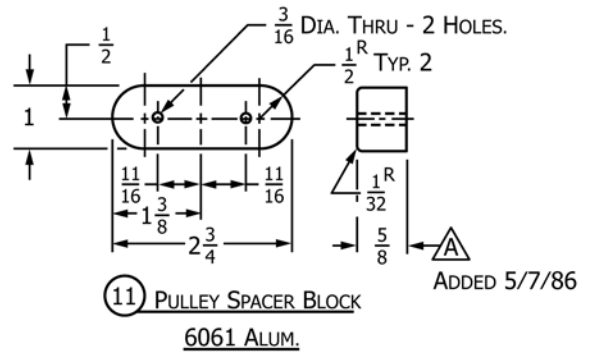
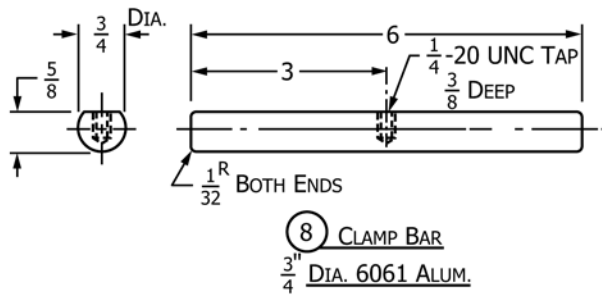
Item	Quantity	Description	See Sheet No.	Item	Quantity	Description	See Sheet No.
1	1	Base Plate	2	10	2	#8-32 UNF × 1 ¼ Lg. Fl. Hd. Mach. Screw	
2	1	Incline	3 and 5	11	1	Pulley Spacer Block	4
3	1	9/16 I.D. × 1 ¼ O.D. × 1/16 Thick Flat Washer		12	1	Mounting Stud	4
4	1	Reid #KKT-4B Steel Knob		13	2	1/4-20 UNC × 1 Large Socket Head Cap Screw	
5	1	KNU-Vise #H-200 Toggle Clamp		14	2	1/4 Lock Washer	
6	4	#8-32 UNF × 3/8 Lg. Rd. Hd. Machine Screw		Finish: All aluminum parts to have fine sandblasted finish.			
7	4	#8 Lock Washers					
8	1	Clamp Bar	4				
9	1	McMaster-Carr #3101T2 Pulley					



NOTE 1—1 in. = 25 mm.
FIG. 1 Overall Fixture



NOTE 1—1 in. = 25 mm.
FIG. 2 Incline Surface



NOTE 1—1 in. = 25 mm.
FIG. 3 Mounting Stud

6.1.12 String, 24 in. (approximately 610 mm) nonelastic, such as dental floss or fishing line,

6.1.13 Steel rod, approximately 0.25 in. (6 mm) in diameter and 10 in. (255 mm) long.

6.1.14 Cutting surface, approximately 36 by 36 in. (approximately 900 by 900 mm) plate glass, 0.25 in. (6 mm) thick.

6.2 Preparation of Apparatus:

6.2.1 Install the load cell on the upper set frame and allow 15-min warm-up period.

6.2.2 Install the upper lightweight jaw.

6.2.3 Remove the lower jaw and install the cling attachment, using the locking pin to secure.

6.2.4 Feed the end of the string not fastened to the clamp through the pulley on the cling attachment and place in the center of the upper jaw.

6.2.5 With the clamp resting at the base of the incline (which is in position on the base plate), adjust the crosshead, or the amount of string pulled through the grips, or both in combination, to achieve a distance of 5 by 7 in. (125 by 180 mm) between the top of the pulley and the bottom of the grips. Tighten the upper jaw. Adjust the crosshead return stop as necessary.

6.2.6 Set the testing machine crosshead speed for 5 in. (125 mm). (Any chart speed is acceptable.)

6.2.7 Zero, balance, and calibrate the tester in accordance with the operator's manual.

7. Sampling

7.1 Acceptance sampling shall be in accordance with Practice D1898.

7.2 *Sampling for Other Purposes*—The sampling and the number of test specimens depends on the purposes of the testing. Practice E122 is recommended. Test specimens should be taken from several rolls of film, and when possible, from several production runs of a product. Strong conclusions about a specific property of a film cannot be based on a single roll of product.

8. Test Specimens

8.1 The roll to be tested must have at least three outer wraps removed just prior to sample selection.

8.2 With the film unwinding from the top of the roll, pull about 30 in. (760 mm) of sample film from the roll at a rate of approximately 8 in./s (approximately 200 mm/s). Some films are sensitive to unwind speed so a consistent rate that does not induce appearance variations, such as stripes or bars, is important.

8.3 Place the film being sampled on the glass cutting surface being cautious not to create wrinkles. Mark the machine direction (MD) of the sample. Do not touch the film test surface.