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Designation: ~~D1742 – 18~~ D1742 – 20

Standard Test Method for Oil Separation from Lubricating Grease During Storage[1]

This standard is issued under the fixed designation D1742; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope*

1.1 This test method covers the determination of the tendency of a lubricating grease to separate oil during storage in both normally filled and partially filled containers.

1.2 This test method is not suitable for greases softer than NLGI No. 1 grade.

1.3 The values stated in SI units are to be regarded as standard, except for the dimensions in Fig. 2 and Fig. 5, where inch-pound units are standard.

1.4 *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.* For a specific hazard statement, see 7.1.

1.5 *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]

E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves

2.2 *Other Standard:*

NLGI Grease Consistency Classification[3]

3. Terminology

3.1 *Definitions:*

3.1.1 *lubricating grease, n*—a semi-fluid to solid product of a thickener in a liquid lubricant.

3.1.1.1 *Discussion*—

The dispersion of the thickener forms a two-phase system and immobilizes the liquid lubricant by surface tension and other physical forces. Other ingredients are commonly included to impart special properties.

3.1.2 *oil separation, n*—the appearance of a liquid fraction from an otherwise homogeneous lubricating composition.

3.1.3 *thickener, n—in lubricating grease*, a substance composed of finely-divided particles dispersed in a liquid lubricant to form the product's structure.

3.1.3.1 *Discussion*—

The thickeners can be fibers (such as various metallic soaps) or plates or spheres (such as certain non-soap thickeners), which are

[1] This test method is under the jurisdiction of the ASTM Committee D02 on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee D02.G0.03 on Physical Tests.

Current edition approved ~~April 1, 2018~~May 1, 2020. Published ~~May 2018~~June 2020. Originally approved in 1960. Last previous edition approved in ~~2013~~2018 as ~~D1742 – 06 (2013).~~D1742 – 18. DOI: ~~10.1520/D1742-18.~~10.1520/D1742-20.

[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] Available from NLGI, 249 SW Noel, Suite 249, Lee's Summit, MO 64063, http://www.nlgi.org.

***A Summary of Changes section appears at the end of this standard**

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FIG. 1 Pressure Bleeding Test Cell A

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insoluble or, at most, only very slightly soluble in the liquid lubricant. The general requirements are that the solid particles be extremely small, uniformly dispersed, and capable of forming a relatively stable, gel-like structure with the liquid lubricant.

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3.1.3 *oil separation, n*—the appearance of a liquid fraction from an otherwise homogeneous lubricating composition.

4. Summary of Test Method

4.1 The sample of grease, supported on a 75 µm (No. 200) sieve, is subjected to 1.72 kPa (0.25 psi) air pressure for 24 h at 25 °C (77 °F). Any oil seepage that occurs drains into a beaker and is weighed.

5. Significance and Use

5.1 When a lubricating grease separates oil, the remaining composition increases in consistency. This can affect the ability of the product to function as designed.

5.2 It has been found that the results of this test correlate directly with the oil separation that occurs in 35 lb pails of grease during storage.

5.3 This test method is not intended to predict oil separation tendencies of the grease under dynamic conditions.

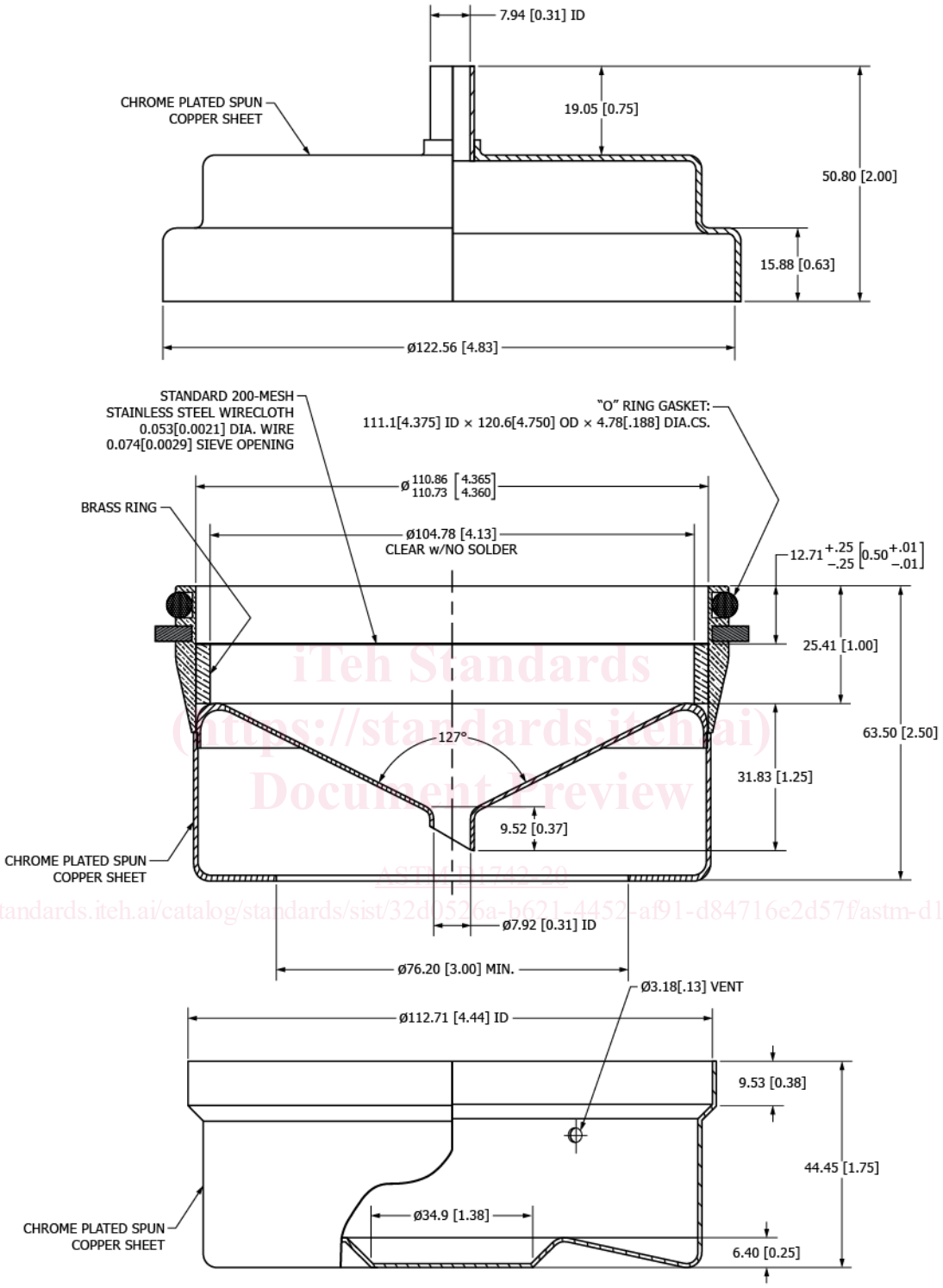
6. Apparatus

6.1 *Test Apparatus*[4-6]—The assembled apparatus consists of a tightly fitting cup and cover which contains a 75 µm (No. 200) sieve strainer for supporting the grease, a funnel for collecting separated oil, and a 20 mL beaker for retaining the separated oil. A fitting is provided in the cover for inlet air (1.72 kPa (0.25 psi)) and a hole is provided in the side of the cup to prevent back

[4] The sole source of supply of Pressure Bleeding Test Cell A known to the committee at this time is Koehler Instrument Company, Inc. 1595 Sycamore Avenue, Bohemia, NY 11716. 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.

[5] The sole source of supply of the Pressure Bleeding Test Cell B known to the committee at this time is Stanhope-Seta, London Street, Chertsey, Surrey, KT16 8AP, UK. 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.

[6] Equipment shown in Fig. 4 and Fig. 5 is no longer available. Other appropriately designed equipment can be used.



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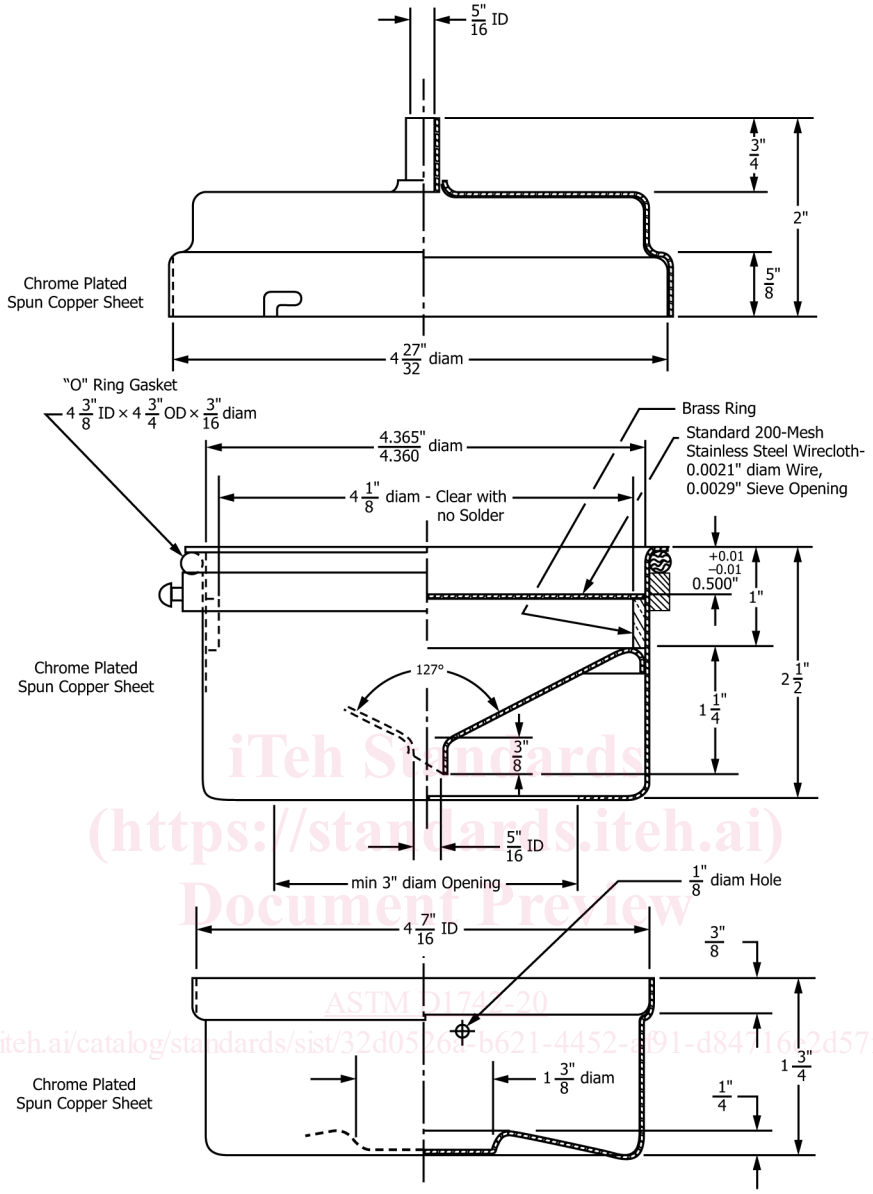
NOTE 1—All dimensions are in millimeters (inches).
NOTE 2—Tolerances are ±0.51 mm (0.02 in.) for 2 place decimals, unless otherwise specified.
NOTE 3—Tolerances are ±0.127 mm (0.005 in.) for 3 place decimals, unless otherwise specified.

FIG. 2 Detailed Drawing of Pressure Bleeding Test Cell A

pressure. Fig. 1 is a photograph of a disassembled apparatus. The details of construction are given in Fig. 2. The 75 µm (No. 200) stainless steel sieve shall conform to the requirements of Specification E11. The diameter of the 75 µm (No. 200) sieve shall be 104.8 mm (4⅛ in.), completely clear with no solder showing.



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in.	mm	in.	mm	in.	mm	in.	mm
0.0021	0.053	1⅝	41.3	0.500	12.70	4⅞	112.7
0.0029	0.074	1¾	44.4	0.510	12.95	4½	114.3
0.010	0.25	2	50.8	0.520	13.20	4 11/16	119.1
1/16	1.59	2½	63.5	⅝	15.87	4¾	120.6
⅛	3.17	3 11/16	93.7	¾	19.05	4 26/32	123.03
3/16	4.76	4⅛	104.8	1	25.4	5¼	133.3
¼	6.35	4.360	110.74	1¼	31.8	6	152.4
5/16	7.94	4.365	110.87	1⅜	34.9	6½	165.1
⅜	9.52	4⅜	111.1	3	76.2		

FIG. 2 Detailed Drawing of Pressure Bleeding Test Cell A

6.2 *Air Pressure Supply and Regulation*—An air pressure supply, controlled by reducing valves or regulators, capable of maintaining air pressure at 1.72 kPa ± 0.07 kPa, should be used. A manometer, or other suitable pressure indicating device, and a pressure relief valve to protect against pressure surge should be included in the pressure system.

7. Reagents

7.1 *Mineral Spirits,* (**Warning—**Combustible. Vapor harmful.)

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FIG. 3 Pressure Bleeding Test Cell B

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8. Sampling

8.1 The sample presented for analysis should be large enough to make possible the selection of a representative portion for testing.

8.2 Examine for any indication of non-homogeneity such as oil separation, phase changes or gross contamination. If any abnormal conditions are found, obtain a new sample.

9. Preparation of Apparatus

9.1 Thoroughly clean the strainer, cup, and oil-collecting beaker with mineral spirits and follow by air drying.

9.2 Carefully inspect the sieve to make certain that there is no build-up which would affect the passage of oil. The sieve must also be free of any surface irregularities such as creases, dents, or punctures. Replace, if necessary.

9.3 The funnel must be clean and free of any residues which can retard the flow of oil.

9.4 Inspect the cover and cup for any dents or distortions to the mating surfaces which can interfere with a tight seal between the units.

9.5 When the O-ring seal shows wear it must be replaced.

10. Procedure

10.1 Place the strainer, screen side up, in the funnel and tare the assembly to the nearest 0.05 g. By means of a spatula, completely fill the space between the screen and the top of the funnel with grease. The volume occupied by the grease shall have a depth of 12.7 mm ± 0.3 mm (0.50 in. ± 0.01 in.). Avoid unnecessary working and entrainment of air. Use a straight edge to remove excess grease and provide a level surface. Avoid forcing any of the grease through the screen. Determine the mass of the sample to the nearest 0.05 g.