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An American National Standard

Standard Specification for Engineered Wood Fiber for Use as a Playground Safety Surface Under and Around Playground Equipment[1]

This standard is issued under the fixed designation F 2075; 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.

INTRODUCTION

The need for a systematic means of evaluating engineered wood fiber for use as a playground safety surface from the standpoint of particle size, consistency, purity, and ability to drain, has become a growing concern of the designers, operators, and manufacturers of engineered wood fiber systems. There has been no qualitative method to assess these parameters of engineered wood fiber (that is, particle size, consistency, purity, and ability to drain) to ensure its quality. Therefore, the goal of this specification is to establish a uniform means to measure the characteristics of engineered wood fiber in order to provide the potential buyer with performance specifications to select an engineered wood fiber suitable to meet the needs of playground designers, operators and manufacturers.

1. Scope

1.1 This specification establishes minimum characteristics for those factors that determine particle size, consistency, purity, and ability to drain.

1.2 Engineered wood fiber that meets the requirements of this specification must comply with Specification F 1292, if the surface is in the use zone as defined in Specification F 1487.

1.3 A sample of wood fiber that meets the requirements of this specification may be designated engineered wood fiber and be suitable for playground safety surfacing.

1.4 This specification does not imply that an injury cannot be incurred if the engineered wood fiber complies with this specification.

1.5 The following precautionary statement pertains to the test method portions only, in 7.4, 8.4, and 9.4 of this specification: *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 and health practices and determine the applicability of regulatory limitations prior to use.*

1.6 To meet the requirements of this specification, the material shall perform as follows:

1.6.1 The material shall meet particle size requirements.

1.6.2 The material shall meet the requirement for metal particles.

1.6.3 The material shall meet the allowable heavy metal concentrations considered hazardous to children.

1.6.4 The material shall meet the requirements of Specification F 1292.

1.7 The values stated in inch-pound units are to be regarded as standard. The values in parentheses are mathematical conversions. SI units, which are provided for information, are not considered the standard except in 8.5

2. Referenced Documents

2.1 *ASTM Standards:*

C 136 Test Method for Sieve Analysis of Fine and Coarse Aggregates[2]

D 1193 Specification for Reagent Water[3]

D 2217 Practice for Wet Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants[4]

E 11 Specification for Wire Cloth and Sieves for Testing Purposes[5]

F 963 Consumer Safety Specification on Toy Safety [6]

F 1292 Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment [6]

F 1487 Consumer Safety Specification for Playground Equipment for Public Use[6]

2.2 *Other Standards and Methods:*

[1] This specification is under the jurisdiction of ASTM Committee F08 on Sports Equipment and Facilitiesand is the direct responsibility of Subcommittee F08.63on Playground Surfacing Systems.

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[2] *Annual Book of ASTM Standards* Vol 04.02

[3] *Annual Book of ASTM Standards* Vol 11.01

[4] *Annual Book of ASTM Standards* Vol 04.08

[5] *Annual Book of ASTM Standards* Vol 14.02

[6] *Annual Book of ASTM Standards* Vol 15.07

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Method 6010B Inductively Coupled Plasma-Atomic Emission Spectrometry (for the determination of heavy metal concentrations) as found in the Solid Waste Manual—SW846[7]

Method 7470A Mercury in Liquid Waste (manual cold-vapor technique) as found in the Solid Waste Manual—SW 8464[8]

Handbook for Public Playground Safety U. S. Consumer Product Safety Commission Publication No. 325[9]

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *around playground equipment, n*—the area under and surrounding playground equipment established as protection from falls from equipment.

3.1.2 *engineered wood fiber, n*—processed wood that is ground to a fibrous consistency, randomly sized, approximately ten times longer than wide with a maximum length of 2 in., free of hazardous substances, and meets the criteria of this specification.

3.1.3 *hand manipulation, n*—aligning the engineered wood fiber particles by hand so that the smallest dimensions confront the face of the sieve screen and placing them through the screen without the use of force.

3.1.4 *loose fill system, n*—a surface system consisting of small independent, movable components; that is, engineered wood fiber, sand, gravel, wood chips, etc.

3.1.5 *normal use, n*—play modes that conform to the instruction accompanying the playground surface that have been established by tradition, custom, or that are evident from an examination of the playground.

3.2 Definitions of Terms Specific to Playground Equipment:

3.2.1 *head injury criteria (HIC), n*—a measure of impact severity that considers the duration over which the most critical section of the deceleration pulse persists as well as the peak level of that deceleration.

3.2.2 *impact attenuation, n*—the ability of a surface system to reduce and dissipate the energy of an impacting body.

4. General Requirements

4.1 Playground surfaces represented as complying with this specification shall meet all applicable requirements specified herein. Anyone representing compliance with this specification shall keep such records as are necessary to document any claim that the requirements within this specification have been met.

4.2 For the surface within the fall zone of the surrounding playground equipment, the surface must meet U.S. Consumer Product Safety Commission guidelines minimum requirements at its critical height when tested in accordance with Specification F 1292.

4.3 Certification compliance to this specification shall be conducted by an independent accredited testing laboratory.

4.4 *Performance Requirements for Sieve Analysis*:

4.4.1 When engineered wood fiber is tested in accordance with 7.4 of this specification, it shall meet the following criteria to be considered acceptable engineered wood fiber.

4.4.2 The minimum and maximum percent (%) by weight passing through the three sieves shall be as follows:

Sieve Size	Minimum %	Maximum %
¾ inch	99 %	100 %
⅜ inch	85 %	100 %
No. 16	0 %	15 %

4.5 *Performance Requirements for Hazardous Metals*:

4.5.1 The maximum heavy metal concentration of soluble migrated elements after being corrected for statistical error is shown in Table 1.

4.5.2 The following criteria must be met to be considered acceptable engineered wood fiber:

Maximum Soluble Migrated Element in ppm (mg/L)
Engineered Wood Fiber
(Information in this table taken from Specification F 963)

Antimony (Sb)	Arsenic (As)	Barium (Ba)	Cadmium (Cd)	Chromium (Cr)	Lead (Pb)	Mercury (Hg)	Selenium (Se)
60	25	1000	75	60	90	60	500

4.6 *Performance Requirement for Tramp Metal*:

4.6.1 When wood fiber is tested in accordance with 9.4 and 9.5, the total number of metal particles with a dimension of ½ in. (1.27 cm) or greater shall not exceed 0 per 50 yd^3 (38.23 m^3) pile sampled to be considered acceptable engineered wood fiber.

5. Summary of Methods

5.1 Samples of representative wood fiber are tested in accordance with: Test Method C 136 and Specification F 963, modified for this specification.

5.1.1 Test Method C 136 provides a test method for determination of particle size distribution by passing a sample of dry engineered wood fiber of known mass through a series of sieves of progressively smaller openings.

5.1.2 Specification F 963, hazardous soluble elements are extracted from engineered wood fiber under conditions that simulate the situation in which the engineered wood fiber stays 4 h in the alimentary tract after swallowing. The content of the soluble elements in the extract is determined for antimony (Sb), arsenic (As), barium (Ba), cadmium (Cd), chromium (Cr), lead (Pb), mercury (Hg), and selenium (Se).

5.1.2.1 Method 7470A Mercury in Liquid Waste (manual cold vapor technique) as found in the Solid Waste Manual SW846 is used to determine the levels of mercury in the engineered wood fiber.

5.1.2.2 Method 6010B Inductively Coupled Plasma-Atomic Emission Spectrometry (for the determination of heavy metal concentrations) as found in the Solid Waste Manual SW846 will determine the levels of hazardous heavy metals.

5.1.3 Two methods are used to determine the presence of tramp metal in engineered wood fiber playground surfacing; one is using a powerful rare earth magnet on the end of a probe specifically written for this specification; the other is a visual inspection.

[7] Available from, The American Public Health Association, 1015 Fifteenth St., NW, Washington, D.C. 20005.

[8] SW 846 is found in the manual of "Standard Methods for the Examination of Water and Waste Water," 18th Edition 1992, prepared and published by The American Public Health Association, 1015 Fifteenth St., NW, Washington, D.C. 20005.

[9] Available from, U.S. Consumer Product Safety Commission 4330 East-West Highway Bethesda, Maryland 20814-4408

6. Sampling

6.1 The following procedure will be used to collect the gross wood fiber sample. The sieve test sample and the hazardous substance (heavy metal) sample will be taken from the gross engineered wood fiber sample. The entire gross wood fiber sample will be tested for tramp metal.

6.1.1 The gross sample of engineered wood fiber shall represent a stockpile of 50 yd^3(38 m^3) or greater.

6.1.2 Eight 1-gal (3.8-L) samples shall be taken. They shall be taken from four different quadrants of the stockpile 2 to 4 ft above the base and four different quadrants 4 to 6 ft above the base. Dig 1 to 2 ft into pile at each sample point. Combine and thoroughly mix the 8-gal (15.1-L) sample to achieve a homogeneous blend.

6.1.3 The thoroughly mixed 8-gal (15.1-L) sample will be known as the gross 8-gal (15.1-L) sample.

7. Sieve Test Analysis Method

7.1 *Significance and Use*:

7.1.1 *Sieve Analysis*—This test method is used to determine grading of engineered wood fiber-type material for proposed use as an engineered wood fiber playground safety surface. The results are used to determine compliance of the particle size distribution with applicable specification requirements and to provide necessary data that will indicate sufficient porosity for drainage, and larger particle size to limit compaction and maintain resilience and limit over-size pieces that could cause injury.

7.2 *Test Apparatus*:

7.2.1 *Balances*—Balances or scales used in testing fine and coarse aggregate shall be readable and accurate to 0.5 g or 0.1 % of the test load, whichever is greater, at any point within the range of use.

7.2.2 *Sieves*—The sieve cloth shall be mounted on substantial frames constructed in a manner that will prevent loss of material during sieving. The sieve cloth and standard sieve frames shall conform to the requirements of Specification E 11. Nonstandard sieve frames shall conform to the requirements of Specification E 11 as applicable.

7.2.2.1 Sieve sizes required: ¾ in. (19.05 mm), ⅜in. (9.53 mm) and No. 16, 0.0469 in. (1.19 mm), mounted on standard frame 8 in. (203.20 mm) diameter 2 in. (50.8 mm) height.

7.2.3 *Sieve Shaker*—A mechanical sieving device, if used, shall create motion of the sieves to cause the particles to bounce, tumble, or otherwise turn so as to present different orientations to the sieving surface. The sieving action shall be such that the criterion for adequacy of sieving described in this test procedure is met in a reasonable time period.

7.2.4 *Oven*—An oven of appropriate size capable of maintaining a uniform temperature 60 ± 5°C (140 ± 9°F).

7.3 *Sample Test Preparation*:

7.3.1 From the gross 8-gal (15.1-L) sample of engineered wood fiber, measure a 1-gal (3.8-L) sample for drying.

7.3.2 Dry the sieve test sample of wood fiber in accordance with the following method. (A constant moisture level is necessary to prevent weight changes due to changing moisture levels in the sample).

7.3.3 The wood fiber sample was reduced in overall size to facilitate testing using a standard 2-in.–deep 8-in.–diameter sieve. Because of the light weight of wood fiber, the oven dried sample weight of individual samples to be tested should not generally exceed 0.40 lbs (181 g). Sieve screens, sieve frames, and wire cloth should conform to the requirements of Specification E 11. Samples should be oven dried to a constant weight in general accordance with Practice D 2217 for oven drying of samples following reduction of the mass [oven temperature of 140°F and accuracy to ± 9°F (60 ± 5°C)].

7.4 *Test Preparation for Sieve Analysis*:

7.4.1 Because of the irregular shapes of the wood particles, hand manipulation of the sample through the sieve screens may be necessary.

7.4.2 Nest the three sieves [¾ in. (19.05 mm), ⅜in. (9.53 mm), and No. 16, 0.0469 in. (1.19mm)] in order of decreasing size of opening from top to bottom and place the sample on the top sieve.

7.4.3 Agitate the sieves by hand or by mechanical apparatus for a sufficient period, established by trial or checked by measurement on the actual test sample, to meet the criterion for adequacy of sieving described in 7.4.5.3.

7.4.4 Limit the quantity of material on a given sieve so that all particles have the opportunity to reach sieve openings a number of times during the sieving operation.

7.4.5 Prevent an overload of material on an individual sieve by one of the following methods:

7.4.5.1 Insert an additional sieve with opening size intermediate between the sieve that may be overloaded and the sieve immediately above that sieve in the original set of sieves.

7.4.5.2 Split the sample into two or more portions, sieving each portion individually. Combine the masses of the general portions retained on a specific sieve before calculating the percentage of the sample on the sieve.

7.4.5.3 Continue sieving for a sufficient period and in such manner that, after completion, not more than 1 mass % of the residue on any individual sieve will pass that sieve during 1 min of continuous hand sieving performed as follows: Hold the individual sieve, provided with a snug-fitting pan and cover, in a slightly inclined position in one hand. Strike the side of the sieve sharply and with an upward motion against the heel of the other hand at the rate of about 150 times per min, turn the sieve about one sixth of a revolution at intervals of about 25 strokes. In determining sufficiency of sieving for sizes larger than the 0.19-in. (4.75-mm) (No. 4) sieve, limit the material on the sieve to a single layer of particles. If the size of the mounted testing sieves makes the described sieving motion impractical, use 8-in. (203-mm) diameter sieves to verify the sufficiency of sieving.

7.4.5.4 Hand sieve larger particles by determining the smallest sieve opening through which each particle will pass. Start the test on the smallest sieve to be used. Rotate the particles, if necessary, in order to determine whether they will pass through a particular opening; however, do not force particles to pass through an opening. Hand manipulation should not include forcing of the particles; however, natural breakdown of particles which are semi-attached through this practice is not necessarily detrimental.

7.4.5.5 Determine the mass of each size increment on a scale or balance conforming to the requirements specified in 7.2.1 to the nearest 0.1 % of the total original dry sample mass. The total mass of the material after sieving should check closely with original mass of sample placed on the sieves. If the amounts differ by more than 0.3 %, based on the original dry sample mass, the results should not be used for acceptance purposes.

7.5 *Sieve Test Calculations*:

7.5.1 Calculate percentages passing in various size fractions to the nearest 0.1 % on the basis of the total mass of the initial dry sample.

7.6 *Sieve Test Report*:

7.6.1 Total percentage of material passing each sieve.

7.6.1.1 The total percentage of material that did not pass the ¾–in. (19.05-mm) sieve (top) after hand manipulation is subtracted from 100% and reported as amount passing ¾-in. (19.05-mm) sieve.

7.6.1.2 The total percentage of material that did not pass the ⅜ in. (9.53 mm) sieve (middle) is added to the percentage that did not pass ¾-in. (19.05-mm) sieve in 7.6.1.1 and the sum is subtracted from 100%; report as percent passing ⅜-in. (9.53-mm) sieve.

7.6.1.3 The total percentage of material that did not pass the No. 16, .0469-in. sieve (bottom) is added to the total percent that did not pass the ⅜-in. (9.53—mm) and the ¾-in. (19.05-mm) sieves. Subtract the total percentage from 100%; report as percent passing No. 16 sieve (bottom).

8. Hazardous Metal Test Method

8.1 *Significance and Use*:

8.1.1 *Heavy Metal Limits*—This test method uses the section of Specification F 963 that deals specifically with toxic heavy metals. Since it is possible for children on a playground to handle and place engineered wood fiber particles in the mouth, it is necessary to measure for toxic levels of heavy metals because of possible use of recycled pallets, waste wood, and demolition wood as raw materials used in engineered wood fiber for playground surfacing. Limit for toxic levels of heavy metals are taken from Specification F 963, paragraph 4.3.5.2 and are adjusted with a statistical error correction factor taken from paragraph 8.3 of that specification.

8.2 *Test Apparatus*:

8.2.1 *Metal Sieve*, plain weave wire mesh stainless steel metal sieve with a nominal opening of 0.5 mm (.0197 in.) (No. 35 sieve) and the following specifications:

(a) Nominal wire diameter: 0.315 mm,

(b) Maximum size deviation for an individual opening: +0.090 mm,

(c) Tolerance for average opening: +0.018 mm, and

(d) 6 % or less of the openings to exceed the nominal plus: +0.054 mm.

8.2.2 *pH*, a means of measuring pH with a minimum accuracy of 0.2 pH units.

8.2.3 *Membrane Filter*, with a pore size of 0.45 µm.

8.2.4 *Reagents*, Use only reagents of recognized analytical grade during the analysis.

8.2.5 *Hydrochloric Acid Solution*, 0.07 mol/L.

8.2.6 *Hydrochloric Acid Solution*, approximately 2.0 mol/L (7.3 % m/m).

8.2.7 *Type 3 Water*, in accordance with Specification D 1193.

8.2.8 *Centrifuge*, capable of achieving 5000 ± 500 rpm.

8.2.9 *Container*, of gross volume between 1.6 and 5.0 times that of the volume of HCL extractant.

8.3 *Sample Preparation*:

8.3.1 From the gross 8-gal (15.14-L) sample of engineered wood fiber, measure a 1-gal (3.79-L) sample and air dry sufficiently to eliminate particles sticking together due to moisture.

8.3.2 Using a No. 35 sieve, mechanically agitate sufficient air dried engineered wood fiber through the sieve to obtain 1.06×10^{-1} oz. (3.0 g) of screened engineered wood fiber particles.

8.3.3 The dried wood fiber may be ground through the No. 35 sieve, if necessary.

8.3.4 The screened wood fiber sample will be analyzed for toxic heavy metal content.

8.4 *Test Procedure for Hazardous Metal*:

8.4.1 Prepare a test portion in accordance with 8.3.

8.4.2 Mix the 1.06×10^{-1} oz. (3.0 g) test sample with 50 times its mass of an aqueous solution of 0.08 mol/L hydrochloric acid at 37 ± 2° C. In case of a test portion of less than 1.06×10^{-1} oz. (3.0 g), mix the test portion with 150.0 mL of this solution at the given temperature. Shake for 1 min.

8.4.3 Check the acidity of the mixture. If the pH is greater than 1.5, add drop-wise while shaking, an aqueous solution of 2 mol/L (7.3 %) hydrochloric acid until the pH is between 1.0 and 1.5. Protect the mixture from light. Shake the mixture efficiently for 1 h continuously, and then allow the mixture to stand for 1 h at 37 ± 2° C.

NOTE 1—It has been shown that the extraction of soluble cadmium can reveal a two-fold to five-fold increase when extraction is conducted in the light rather than the dark.

8.4.4 Without delay, separate the solids from the mixture by filtration through a membrane filter with a pore size of 0.45 m. If necessary, centrifuge at 5000 ± 500 RPM for no longer than 10 min. Analyze the solution using methods 7470A and 6010B to determine the presence of the elements identified in 5.1.2.

8.4.5 If it is not possible to analyze the sample within one working day, stabilize by the addition of hydrochloric acid so that the resulting solution is approximately 1 mol/L of HCl; then proceed with methods 7470A and 6010B.

8.4.6 The analytical results as determined in 8.4.4 or 8.4.5 shall be adjusted by subtracting the analytical correction factor in Table 2 using the following method. This is necessary to make statistical correction for interlaboratory error.

TABLE 2 Analytical Correction

Element	Sb	As	Ba	Cd	Cr	Pb	Hg	Se
Analytical Correction	60	60	30	30	30	30	50	60

NOTE 2—Example of Calculations Using Table 2.

Example 1: The analytical result for lead is 120 mg/kg; the correction factor from Table 2 is 30 % (0.30). Adjusted analytical results = 120 –

(120 × 0.30) = 120 – 36 = 84 mg/kg. The result does not exceed the allowed value for lead in the table and therefore is acceptable.

Example 2: The analytical result for chromium is 90 mg/L; the correction factor from the table is 30 % (0.30). Adjusted analytical results = 90 – (90 × 0.30) = 90 – 27 = 63 mg/L. The result exceeds the allowed value for chromium in the table and therefore is not acceptable.

8.5 *Hazardous Metal Analysis Test Report*:

8.5.1 The analytical results obtained shall be adjusted in accordance with the test method in 8.4.6 prior to comparing them to the maximum permissible values of Table 1 to determine conformance to this specification.

8.6 *Performance Requirement for Heavy Metals*—See Table 1.

9. Tramp Metal Test Method

9.1 *Significance and Use*:

9.1.1 *Tramp Metal Limits*—This test method will determine the presence of tramp metal particles in engineered wood fiber. Metal particles embedded in engineered wood fiber can cause injury if a child were to fall or come in contact. The limit for tramp metal was set to reduce the chance of injury.

9.2 *Test Apparatus for Tramp Metal*:

9.2.1 An industrial grade magnetic wand with a probe of 56 ± 4 in. (142.24 ± 10.16 cm). At the end of the probe is a cylindrical 6 in. (15.24 cm) long by 1 in. (2.54 cm) diameter neodymium iron-boron rare earth magnet (40 MGO) drawing of magnetic test probe in Fig. A1.1.

9.3 *Tramp Metal Test Sample*:

9.3.1 The tramp metal test sample shall be the gross sample of engineered wood fiber collected in 6.1.1 (50 yd^3(38.23 m^3) stockpile).

9.4 *Magnetic Tramp Metal Test Procedure*:

9.4.1 With the magnetic wand, probe into the pile (28) times at each quadrant (1.12 total probes).

9.4.1.1 Insert probe into pile 3 ft or greater to retrieve tramp metal particles.

9.4.1.2 Remove metal particles from probe after each insertion.

9.4.2 At each quadrant, at four different heights measured from the base of the stockpile, randomly probe into the stockpile as follows.

9.4.2.1 Randomly probe seven times into the stockpile at or below the 15-in. height level.

9.4.2.2 Randomly probe seven times into the stockpile between 15-in. and 30-in. height level.

9.4.2.3 Randomly probe seven times into the stockpile between 30-in. and 45-in. height level.

9.4.2.4 Randomly probe seven times into the stockpile between 45-in. and 60-in. height level.

9.4.3 Count all magnetic particles retrieved that have any dimension of ½ inch or greater.

9.5 *Nonmagnetic Tramp Metal Test Procedure*:

9.5.1 Visually inspect the gross sample of the engineered wood fiber for any metal particles.

NOTE 3—Pay particular attention to the base of the pile where metal particles will migrate.

9.5.2 Collect all metal particles.

9.6 *Tramp Metal Report*

9.6.1 Record the total number of all metal particles which have any dimension of ½in. (1.27 cm) or greater.

9.6.2 Record the following data from Annex A1:

9.6.2.1 Verification of the magnetic probe strength is within 10 % of its original strength rating in accordance with
Annex A1 original strength _____ date _____
Present Strength _____ date _____

9.6.2.2 The date of the last magnetic probe strength test is within six months of the magnetic tramp metal test.
Last magnetic probe strength test date _____
Magnetic tramp metal test date _____

ANNEX

A1. MAGNETIC TRAMP METAL TEST METHOD VERIFICATION OF ORIGINAL STRENGTH OF MAGNETIC PROBE USING A MAGNETIC PULL TEST

A1.1 *Purpose*—To provide a reliable method of determining the original magnetic strength of the magnetic probe and verify that the present strength is within 10 % of the original strength.

A1.2 Principle magnetic pull strength is determined by using a calibrated scale and a ferrous sphere. The ferrous sphere is attached to the snap swivel hook on a calibrated scale and drawn away perpendicular from the magnet until it is released. The pull strength force or pounds of pull is read off the scale indicator.

A1.3 Procedure:

A1.3.1 Clean the magnetic probe surface of all tramp metal. (Particles, ferrous or nonferrous, will allow an air gap between the pull test piece and the magnet which will reduce the value of the pull test.

A1.3.2 Anchor the magnetic probe in a horizontal position so it will not move during the test.

A1.3.3 Select the hand-held spring pull scale 0-12 lbs.

A1.3.3.1 Zero the scale by holding the scale vertically, then pulling the scale's swivel hook to the 3 to 4-lb range and release.

A1.3.3.2 Reset the maximum read-out pointer (red slide piece) to the zero mark.

A1.3.3.3 Attach the ¼-in. ferrous sphere to the snap swivel hook on the scale.

A1.3.3.4 Adjust the pointer on the scale to the zero mark, using the knurled calibration screw as required with the ¼ in. ferrous sphere hanging free on the bottom of the scale.

A1.3.4 Place the ¼-in. ferrous sphere on the magnetic probe.

A1.3.5 Pull the scale in a perpendicular motion away from the magnetic probe.

A1.3.6 Record the maximum pull strength from the read-out pointer and then reset the pointer to zero.

A1.3.7 Repeat the test two more times in different areas on the magnetic probe (total of three tests) and record the force in pounds necessary to separate the ¼-in. ferrous sphere from the magnetic probe.

A1.3.7.1 Record the three results and average:

Test 1 _____
Test 2 _____
Test 3 _____
Total _____ ÷ 3 = average force _____
Date _____

A1.3.8 The average force is then used as the number to measure the strength of the magnet.

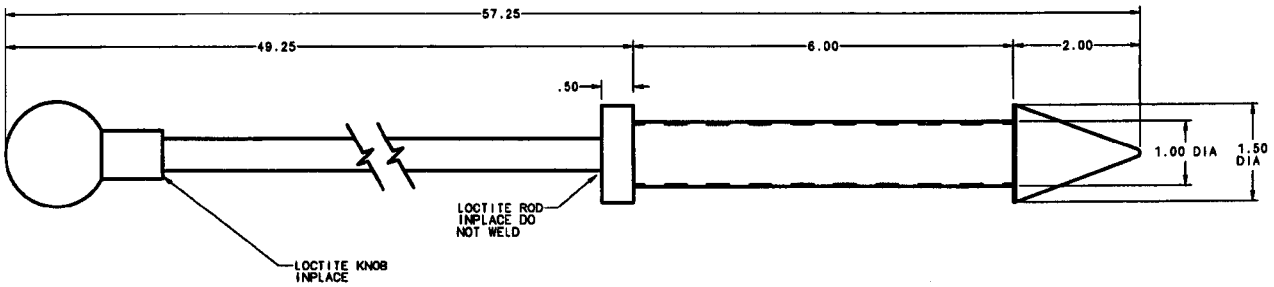
A1.3.9 The average force must be within 10 % of the original average force when the magnetic probe was delivered to the customer.

A1.4 Magnetic Test Probe Information[10]:

A1.4.1 Record the Magnetic Test Probe Serial Number _____

Record the Date of Purchase _____
Record the date and original average force test
Date _____ Original Avg Force 4.75 ± 5 %

[10] The sole source of supply of the magnetic probes and the Magnetic Pull Test Kit known to the committee at this time is Industrial Magnetics, Inc., 1240 M-75S, PO Box 80, Boyne City, MI 49712. If you are aware of alternative suppliers, please provide this information to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend.



NOTE 1—All dimensions are in inches.

FIG. A1.1 Magnetic Test Probe

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