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Standard Specification for Industrial Woven Wire Filter Cloth[1]

This standard is issued under the fixed designation E2814; 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

Industrial metal filter cloth is a special type of woven wire cloth that can be produced in many specifications, often proprietary in nature. Sometimes referred to as Dutch weave or Hollander weave, filter cloth can be woven in a variety of metals and is woven with a greater number of wires in one direction than the other, and utilizing two different wire diameters. This specification covers woven wire filter cloth for industrial use, which is commonly rated by its micron retention capability. Its purpose is to introduce standard terms and definitions, to observe common technical considerations that a user should be aware of, and to present alternative acceptance criteria based on a desired pore size, or micron retention filtration rating. It should be noted this specification excludes standard industrial woven wire cloth and sieve cloth from its scope, since these are covered under Specifications E2016 and E11, respectively, as well as excludes plastic and synthetic filter cloth.

1. Scope*

1.1 This specification covers the special grade of industrial woven wire cloth, referred to as filter cloth, for general filtration including the separation of solids from fluids (liquids or gases), based on a desired particle size retention. Filter cloth can be made of any primary metal or metal alloy wire that is suitable for weaving.

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]

A478 Specification for Chromium-Nickel Stainless Steel Weaving and Knitting Wire

A555 Specification for General Requirements for Stainless Steel Wire and Wire Rods

E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves

E1638 Terminology Relating to Sieves, Sieving Methods, and Screening Media

E2016 Specification for Industrial Woven Wire Cloth

E3278 Test Method for Bubble Point Pressure of Woven Wire Filter Cloth

E3315 Specification for Certification of Metallic Materials

3. Terminology

3.1 *Definitions:*

3.1.1 For additional terminology, refer to Terminology E1638.

3.1.2 *bubble point test, n*—a capillary flow test method that measures the pressure required to force an air bubble through a filter cloth sample wetted under a test liquid of known surface tension.

3.1.2.1 *Discussion*—The pressure is inversely proportional to the pore size, should be standardized, and the pressure observed at the first bubble point location is considered the

[1] This specification is under the jurisdiction of ASTM Committee E29 on Particle and Spray Characterization and is the direct responsibility of Subcommittee E29.01 on Sieves, Sieving Methods, and Screening Media.

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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.

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

absolute rating. The test result pressure can be converted to a pore size or micron retention by applying a pore size calculation factor (see Test Method E3278).

3.1.3 *cloth thickness, n*—the cross sectional height of the filter cloth, nominally estimated by adding the warp wire diameter plus two times the shute wire diameter.

3.1.4 *crimp, n*—corrugation in the warp and shute wires.

3.1.4.1 *Discussion*—The crimp in the wires is formed during the weaving process, and the tension existing between the warp and shute wires fundamentally determines the respective amount or depth of crimp, which in part establishes the firmness of the filter cloth. In standard filter cloth the warp wire is tensioned such that it only crimps minimally if at all, and the shute wire crimps predominately around the warp wire. In reverse filter cloth the warp wire is held under reduced tension as it does crimp around the shute wire, but the shute wire remains predominately straight.

3.1.5 *cut point, n*—the particle size above which 97 % of the particles are trapped by the filter.

3.1.6 *filter cake (surface cake), n*—material that is retained on the filter cloth during processing.

3.1.6.1 *Discussion*—The filter cake forms and builds up as particulate is retained, until the increased flow resistance of the filter cake requires it be removed from the filter cloth, typically by back flushing. The deposition of material forming the filter cake can aid in filtration by providing depth filtration, which results in a lower micron retention.

3.1.7 *filter cloth, n*—a special type of woven wire cloth, also referred to as Dutch weave, with a greater number of wires in one direction than the other, and utilizing two different wire diameters.

3.1.8 *glass bead test, n*—method for determining the filtration rating of filter cloth using a set of presorted, precisely sized spherical glass beads, passing them through the filter cloth, and examining the beads passed or captured.

3.1.8.1 *Discussion*—The largest bead passed is considered the absolute micron retention rating.

3.1.9 *mesh, n*—number of wires or openings per linear inch or 25.4 mm counted from the center of any wire to a point exactly 1 in. or 25.4 mm distant, including the fractional distance between either thereof.

3.1.10 *micron, n*—common filtration reference to a particle size, properly defined as a micrometre.

3.1.11 *micron retention, n*—separation particle size of the filter cloth expressed as a diameter in micrometres.

3.1.12 *micron retention, absolute, n*—diameter of the largest spherical particle that will pass through the filter cloth under laboratory conditions representing the maximum pore size.

3.1.13 *micron retention, nominal, n*—subject to user definition, an indication of the average pore size of the filter cloth.

3.1.13.1 *Discussion*—The nominal rating may refer to: *(1)* the glass bead or particle size the filter cloth will retain 90 % of by weight; *(2)* the bubble point pore size when the tenth bubble location appears; or *(3)* the degree of filtration achieved under specific process conditions such as operating pressure, concentration of contaminant, and the buildup of filter cake, such that 94 % to 98 % of all particles of the nominal value will be retained after a given working period.

3.1.14 *percent open area, n*—not applicable; because of the irregular triangular-shaped opening formed at an angle to the plane of the filter cloth surface, the percent open area is generally not a specified parameter.

3.1.15 *shute wires, n*—wires running the short way of, or across the cloth, as woven (also referred to as the shoot, fill, or weft wires).

3.1.16 *types of weaves, n:*

3.1.16.1 *double warp, adj*—filter cloth (either plain or twill) in which two warp wires are used instead of one for each warp pitch thus reducing the micron retention of a similar regular single-warp wire specification (see Fig. 1).

3.1.16.2 *plain, adj*—filter cloth in which the shute wires pass over one and under one warp wire (see Fig. 2).

3.1.16.3 *reverse weave, adj*—filter cloth in which the warp and shute wires are woven in a reverse configuration (see Fig. 3).

3.1.16.4 *twill, adj*—filter cloth in which the shute wires pass over two and under two wires (see Fig. 4).

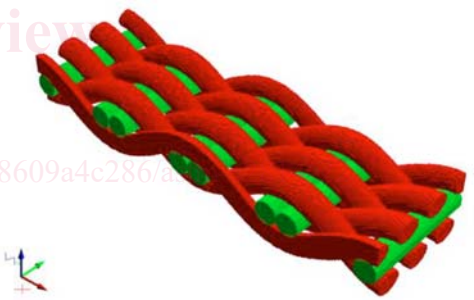

FIG. 1 Double Warp Plain

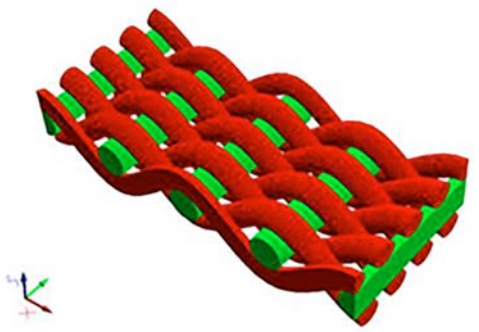

FIG. 2 Plain Weave