Designation: E 956 – 83 (Reapproved 1999)

Standard Classification for Municipal-Mixed Nonferrous Metals (MNM)[1]

This standard is issued under the fixed designation E 956; 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 classification covers municipal mixed nonferrous metals (MNM), not source-separated, that are recovered from municipal waste destined for disposal.

1.2 The mixed nonferrous metals (MNM) have been subdivided according to processing history, nonferrous metal content, size, and moisture content.

1.3 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:* [2]

D 2013 Method for Preparing Coal Samples for Analysis

E 11 Specification for Wire-Cloth Sieves for Testing Purposes

E 34 Test Methods for Chemical Analysis of Aluminum and Aluminum Base Alloys

E 35 Test Methods for Chemical Analysis of Magnesium and Magnesium Alloys

E 47 Test Methods for Chemical Analysis of Zinc Die-Casting Alloys

E 54 Test Methods for Chemical Analysis of Special Brasses and Bronzes

E 101 Test Method for Spectrographic Analysis of Aluminum and Aluminum Alloys By the Point-to-Plane Technique

E 122 Practice for Choice of Sample Size to Estimate a Measure of Quality for a Lot or Process

E 227 Test Method for Optical Emission Spectrometric Analysis of Aluminum and Aluminum Alloys By the Point-to-Plane Technique

E 276 Test Method for Particle Size or Screen Analysis at No. 4 (4.75-mm) Sieve and Finer for Metal Bearing Ores and Related Materials

E 478 Test Methods for Chemical Analysis of Copper Alloys

E 753 Specification for Municipal Aluminum Scrap (MAS)

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *loose combustible material (organic)*—loose combustible organics (LCO) that consist of, but are not limited to, nonmetallic materials such as paper, rags, plastic, rubber, wood, food wastes, and yard or lawn wastes, etc., which are not permanently attached to noncombustible objects. The LCOs are defined as material larger than No. 12 Mesh (U.S. Standard Sieve) as stated in Specification E 11. A determination of LCOs is best done by sampling the material and handpicking, handcleaning, and visually identifying the materials described previously.

3.1.2 *mixed nonferrous metal content*—mixed nonferrous metals remaining after removal of magnetics, combustibles, and other nonmetals (for example, glass, rock, etc.). Further methods of separation and identification may be agreed upon between purchaser and seller and can include picking or dense-media separation.

3.1.3 *moisture percent—liquid content,* as determined by weight loss when sample material is dried to a constant weight at 110° ± 5°C.

3.1.4 *total combustibles*—materials that include paints, lacquers, coatings, plastics, etc., associated with the original nonferrous products, as well as combustible materials (paper, plastic, textile, etc.) which become associated with the nonferrous product after it is manufactured.

4. Significance and Use

4.1 This classification is intended for use in the marketing of mixed nonferrous metals.

4.2 Mixed nonferrous metals covered by this classification are suitable for use by one or more of the following industries:

4.2.1 Secondary aluminum smelters,

4.2.2 Primary aluminum producers,

4.2.3 Scrap dealers and processors,

4.2.4 Zinc refiners, and

[1] This classification is under the jurisdiction of ASTM Committee D34 on Waste Management and is the direct responsibility of Subcommittee D34.03.02 on Municipal Recovery and Reuse.

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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.

4.2.5 Copper refiners.

5. Basis of Classification (refer to Table 1)

5.1 This classification covers material, either processed to recover aluminum or not processed to recover aluminum.

5.2 This classification consists of four types of MNM, based on nonferrous metal content. The four types of MNM are further subdivided into three grades, based on size. The three grades of MNM are further subdivided into two classes, based on moisture content.

6. Ordering Information

6.1 Mixed nonferrous metals may be identified using the criteria in Table 1. This is an unusual material, and the table is included for information purposes rather than to establish limits. The unit operations used to recover MNM may aid the purchaser and seller in establishing a classification. Some of the more common unit operations used to recover MNM include the following:

6.1.1 *Wet Processing*—water elutriators, dense media, and mineral jig.

6.1.2 *Dry Processing*—air classifier, air knife, gravity or concentrating table, Humphrey Spiral, eddy-current separator, electrostatic separator, and handpicking.

6.2 It is recognized that variations in the MNM may occur due to the heterogeneous nature of the solid waste stream. The criteria indicated are intended as a means for the purchaser and the seller to establish the value and quality of the MNM.

6.3 Mixed nonferrous metals shall be considered to be of a particular classification if the value for each component specified, as obtained by the test method agreed upon between the purchaser and seller, shall not exceed any of the limits for that grade.

TABLE 1 Classification of Municipal Mixed Nonferrous Metals (MNM)[A]

Classification	Type I Over 90 % MNM	Type II 50 to 90 % MNM	Type III 30 to 50 % MNM	Type IV Less Than 30 % MNM
Grades	1 over 6 in. (150 mm)	2 2 to 6 in. (50 to 150 mm) incl		3 under 2 in. (50 mm)
Class	A high (5 % moisture and over)		B low (under 5 % moisture)	

[A] It is important for both purchaser and seller to note whether material *had been* processed to recover aluminum or whether it *had not been* processed to recover aluminum and what, if any, procedures where used.

7. Physical Requirements

7.1 In addition to Table 1, the MNM physical requirements include the following:

7.1.1 *Bulk Density*—The density for MNM is not specified and shall be agreed upon between the purchaser and the seller.

7.1.2 *Fineness*—Acceptability of contained fines shall be determined by the purchaser and seller.

7.1.3 *Loose Combustibles*—As agreed upon between purchaser and seller.

7.1.4 *Magnetics*—The presence of free magnetic material is not specified and shall be as agreed upon between the purchaser and seller as part of the purchase contract.

8. Sampling

8.1 Sampling shall be in accordance with the procedures described in Annex A1 or Annex A2. Either procedure may be used, as determined by agreement between the purchaser and the seller.

8.1.1 Annex A1 covers sampling at the point of origin.

8.1.2 Annex A2 covers sampling at the point of receipt.

9. Test Methods

9.1 Determine the properties of fineness, moisture, and metal recovery in accordance with the procedures described in Annex A3.

10. Rejection and Rehearing

10.1 Material that fails to conform to the requirements of this classification may be rejected. Rejection should be reported to the seller promptly and in writing. In case of dissatisfaction with the results of the test, the seller may make claim for a rehearing.

11. Shipping

11.1 Mixed nonferrous metals shall be shipped in rail cars, trailers, or other containers as agreed upon between the purchaser and the seller. The shipping equipment shall be sufficiently water-tight to prevent the MNM from becoming wet during shipment.

ANNEXES

(Mandatory Information)

A1. TEST METHOD FOR COLLECTION OF A SAMPLE OF MNM SCRAP RECOVERED FROM MUNICIPAL SOLID WASTE AND ITS PREPARATION FOR ANALYSIS