

STEEL FOUNDERS' SOCIETY OF AMERICA

Standard Specification for

GELATINIZED CEREAL BINDER

SFSA Designation: 1 O-6 1

Issued: 1961

Re-Printed: 1968

1. Scope

1.1 This specification covers gelatinized cereal binder (see notes 1 and 2) for use as a binder in either molding or core sand.

NOTE 1.—The product, gelatinized cereal binder, is produced from cereal grains.

NOTE 2.—Cereal binder is synonymous to the terms corn flour, binder flour, corn binder, process flour, core binder and cereal flours.

2. Acknowledgment

2.1 When specified, a vendor shall indicate this specification number in all quotations and when acknowledging purchase orders.

3. Identification

3.1 All containers of cereal binders shall be identified by the words "Cereal Binder," and the producer's trade name. Both shall be of a contrasting color to the container.

3.2 The designation "Cereal Binder" shall be followed by a letter indicating the weight classification; "H" stands for heavy weight, "M" stands for medium weight and "L" stands for light weight.

4. Quality

4.1 The cereal binder shall be uniform in quality and condition, and free from foreign materials.

5. Sample Preparation

5.1 The number of bags to be sampled by the consumer for a routine check of the technical requirements shall be a minimum of 5 bags taken at random to make a composite sample.

5.2 The number of bags sampled for umpire checks shall be according to ASTM C322-56, procedure C.

5.2.1 The number of samples shall depend on the number of units in a shipment. For carload shipments (100 to 500 bags), 15 bags shall be sampled at random and a composite sample made.

5.3 Reduction of composite sample

5.3.1 Reduction of the sample shall be accomplished by quartering until a 2-pound laboratory sample is obtained.

5.4 Identification of sample shall indicate material, producer, supplier and date shipment was received.

6. Technical Requirements

6.1 Moisture content

6.1.1 The maximum water content shall not exceed 10 percent and the minimum content shall be 4 percent.

6.2 Density (heavy, medium, light cereal binder)

6.2.1 The density of cereal binder need not be specified if the additions are made on a weight basis.

6.2.2 When cereal binder additions are made on a volume basis, the density of the cereal binder shall fall within one of the limits specified in Table 1.

6.3 Soluble Material (dry basis)

6.3.1 The range of soluble material shall be within either of the following limits:

6.3.1.1 5 - 15 percent (see Note 3)

6.3.1.2 16 - 30 percent (see Note 4)

Note 3.—Low soluble material tends to produce cores of uniform hardness.

NOTE 4.-A high soluble material content indicates that the cereal binder tends to migrate to the surface of a mold or core. This makes for a hard surface and leaves the center relatively soft.

6.4 The pH value

6.4.1 The pH range shall be within the limits of 4.5 to 7.0.

6.5 Ash content

6.5.1 The maximum ash content shall not exceed 1.5 percent.

TABLE I—WEIGHTS OF CEREAL BINDER

Heavy Cereal Binder	Medium Cereal Binder	Light Cereal Binder
500-700 g/qt	300-500 g/qt	200-3 00 g/qt
454-636 g/l	272-454 g/l	18 2-272 g/l
17.5-24.5 oz/qt	10.5-17.5 oz/qt	7.0-10.x oz/qt

7. Acceptance Tests

7.1 Moisture

7.1.1 Weigh 5 grams into a tared aluminum moisture dish and dry for 1 hour at 120 degrees C (248 degrees F). Remove the dish from the oven and cover tightly; cool to room temperature in a desiccator and weigh.

7.1.2 Calculation: percent **moisture** = **grams loss in weight** x 20.

7.2 Density or sifted weight per quart or per liter

7.2.1 Equipment (see Figure 1)

7.2.1.1 Flour sifter (4 or 5 cup rotary-crank flour sifter with 18-mesh screen. 16-mesh screen acceptable)

7.2.1.2 Sifter box (see Figure 2 for dimensions)

7.2.1.3 Standard U. S. dry quart container (manufactured by Ohaus Scale Corp., P.O. Box 276, Union, New Jersey)

7.2.1.4 Strike-off bar (ruler or other thin straight-edge, approximately $1\frac{1}{4}$ inches wide and 12 inches long)

7.2.1.5. Suitable balance (± 1 gram sensitivity)

7.2.2 Procedure

7.2.2.1 Fill the sifter with a well-mixed sample of the material to be tested and place the sifter on the funnel. Center the standard dry-quart container under the funnel in the sifter box.

7.2.2.2 The container is filled with the binder by sifting at a uniform, but not too rapid, rate until the

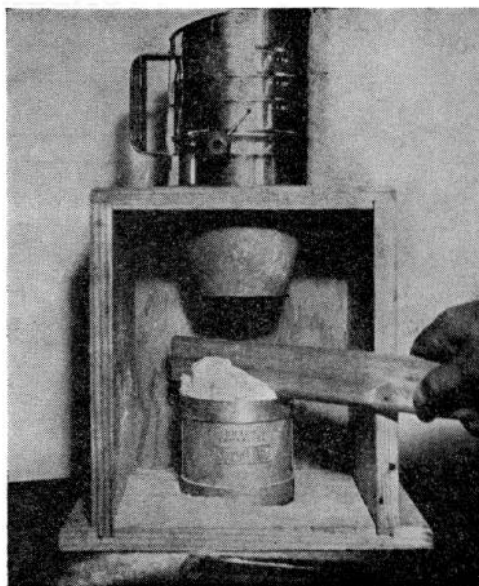


FIG. 1-Photograph of Sifter Box

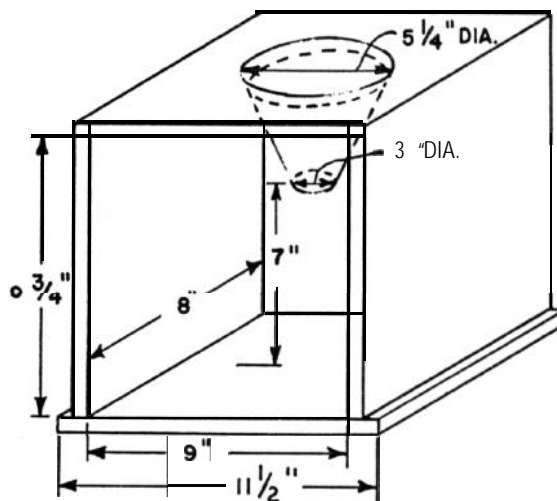


FIG. 2—Dimension of Sifter Box

container is completely full (approximately 100 to 120 rpm is the proper sifting rate). Starting at one edge, strike off the quart container level with the strike-off bar. Weigh the contents on the balance and record the weight in grams.

7.2.3 Calculations

7.2.3.1 The grams per dry quart can be converted to grams per liter by dividing by 1.1. (U.S. Dry Quart = 1.10120 liters)

7.2.4 Precautions

7.2.4.1 Sifting and weighing equipment should be

free from excessive vibration. The sifter should always be in the same position when sifting. Do not move or jar the container until after the excess flour has been leveled off.

7.3 Soluble material

7.3.1 Determine percent of dry substance

7.3.1.1 Weigh 2 grams of sample, transfer to a 200 ml volumetric flask containing about 25 ml of water at 25 degrees C and fill flask with water at 25 degrees C to about 200 ml mark. Let stand for one hour with occasional shaking. Fill flask to mark and shake until thoroughly mixed. Filter at once through a double 18 1/4 cm # 5 88 S & S filter paper. Measure 50 ml of the filtrate and transfer to a weighed evaporating dish. Evaporate to dryness on a steam bath, then one hour in an oven at 105 degrees C. Cool and weigh.

7.3.1.2 Calculations

Soluble (Dry basis) =

$$\frac{\frac{(\text{Gm Residue}) (100)}{\left(\frac{50 \text{ ml}}{200 \text{ ml}}\right) (2 \text{ gm}) \left(\frac{(\% \text{DS})}{100}\right)}}{\frac{(\text{Gm Residue}) (20,000)}{\% \text{ Dry Substance}}}$$

7.4 pH

7.4.1 Weigh 10 gms of the sample, stir into 200 ml of water and shake intermittently for 30 minutes. Determine the pH by electrometric methods using either a Leeds and Northrup pH meter or a Beckman Model H-2 pH Meter employing the #4990-42 Electrode, or a Coleman Model 18A, or other suitable equipment.

7.5 Ash Content

7.5.1 Weigh 5 grams of the sample in a weighed platinum or silica dish. Place in a muffle furnace at 1650 degrees F (900 degrees C) for 1 hour with the door of the muffle furnace propped open to allow excess air to the burning sample. Remove from the furnace, cool in a desiccator and weigh.

7.5.2 Calculations: Percent ash=

$$\frac{\text{grams of ash} \times 100}{5 \text{ grams}}$$

8. Packaging or Bagging

8.1 Packaging shall be accomplished in such a manner as to insure against loss of material as well as undue exposure to moisture, (see Note 5).

NOTE 5.—When cereal binder is packaged in jute bags, it should be remembered that these containers will absorb moisture.

8.2 The flour, when packaged in containers, shall hold a maximum of 105 pounds.

8.3 Each container shall be legibly marked with the following: (see Note 6)

8.3.1 “Cereal Binder” or trade name in contrasting color to bag

8.3.2 Quantity or weight

8.3.3. Manufacturer’s name

8.3.4 Weight classification (see 3.2)

NOTE 6.—If jute bags are specified or used, a legibly marked tag shall be considered as proper identification.

9. Rejection

9.1 Material not conforming to the specification will be subject to rejection by the foundry.