



# Standard Specification for Dough Divider and Rounding Machines<sup>1</sup>

This standard is issued under the fixed designation F1966; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This specification covers commercial hand operated dough divider machines and semiautomatic and automatic, electrically operated, dough divider and rounding machines with or without interchangeable heads.

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

## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>2</sup>

- A167 Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
- A240/A240M Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
- D3951 Practice for Commercial Packaging
- F760 Specification for Food Service Equipment Manuals
- F1166 Practice for Human Engineering Design for Marine Systems, Equipment, and Facilities

### 2.2 ANSI Standards:<sup>3</sup>

- Z1.4 Sampling Procedures and Tables for Inspection by Attributes

### 2.3 BISSC Standards:<sup>4</sup>

- Basic Criteria
- No. 8 Dividers, Rounders, and Bun Machines
- No. 29 Electrical Motors and Accessory Equipment

### 2.4 NEMA Standards:<sup>5</sup>

- MG 1 Motors and Generators
- WC 5 Thermoplastic—Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy
- WC 7 Cross-Linked-Thermosetting-Polyethylene-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy
- WD 1 General Requirements for Wiring Devices

### 2.5 NSF/ANSI Standards:<sup>6</sup>

- NSF/ANSI No. 2 Food Equipment
- NSF/ANSI No. 8 Commercial Powered Food Preparation Equipment
- NSF/ANSI No. 51 Food Equipment Materials
- NSF/ANSI No. 169 Special Purpose Food Equipment and Devices

### 2.6 ANSI/UL Standards:<sup>7</sup>

- ANSI/UL 763 Motor-Operated Commercial Food Preparing Machines
- ANSI/UL 969 Marking and Labeling Systems

### 2.7 Federal and Military Documents:<sup>8</sup>

- MIL-STD-1399/300 Interface Standard for Shipboard Systems Section 300A Electric Power, Alternating Current
- MIL-STD-167/1 Mechanical Vibrations of Shipboard Equipment (Type I—Environmental and Type II—Internally Excited)
- MIL-STD-461 Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.

<sup>4</sup> Available from Baking Industry Sanitation Standards Committee (BISSC), 1400 W. Devon Ave., Suite 422, Chicago, IL 60660.

<sup>5</sup> Available from Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112-5704

<sup>6</sup> Available from NSF International, P.O. Box 130140, 789 N. Dixboro Rd., Ann Arbor, MI 48113-0140.

<sup>7</sup> Available from comm2000, 1414 Brook Dr., Downers Grove, IL 60515.

<sup>8</sup> Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

### 3. Terminology

#### 3.1 Definitions:

3.1.1 *recovered materials*—materials that have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials.

### 4. Classification

4.1 *General*—Dough dividers and dough divider/rounding machines covered by this specification are classified by type and size.

#### 4.2 Type:

4.2.1 *Type I*—Dough divider machine, manually operated,

4.2.2 *Type II*—Dough divider and rounder, semiautomatic, electrically operated,

4.2.3 *Type III*—Dough divider and rounder, fully-automatic, electrically operated, and

4.2.4 *Type IV*—Dough divider machine, fully-automatic, electrically operated.

#### 4.3 Class:

4.3.1 *Class I*—Fixed head,

4.3.2 *Class II*—Fixed variable head, and

4.3.3 *Class III*—Interchangeable head.

#### 4.4 Size:

4.4.1 *Size 1*—36-part dough divider (part sizes up to 4 oz (113.4 g)),

4.4.2 *Size 2*—18-part dough divider machine (part sizes 2 oz up to 6 oz (56.7 to 170.1 g)), and

4.4.3 *Size 3*—Fixed and interchangeable head assemblies that may include the following approximate ranges of part by weight:

36-part 1 oz up to 3 oz (28.4 g up to 85.2 g)

18-part 3 oz up to 7 oz (85.2 g up to 199 g)

9-part 7 oz up to 1 lb 2 oz (199 g up to 510.3 g)

6-part 1 lb 2 oz up to 1 lb 10 oz (510.3 g up to 737.1 g)

4.4.4 This specification does not purport to address all of the sizes that may be available, but is an overview of the most common sizes used in the industry today (see [Appendix X1](#)).

#### 4.5 Style:

4.5.1 *Style 1*—Countertop or bench mounted,

4.5.2 *Style 2*—Floor mounted, and

4.5.3 *Style 3*—Portable.

### 5. Ordering Information

5.1 *Ordering Data*—Purchasers shall select the dough divider and rounding machine and any preferred options and include the following information in the purchasing document:

5.1.1 Title, number, and date of this specification,

5.1.2 Type, class, size, and style of machine required,

5.1.3 Quantity to be furnished,

5.1.4 Electrical power supply characteristics: voltage, phase, frequency (see [7.4.1](#)),

5.1.5 Accessory equipment, number of heads, options, spare parts, and maintenance parts required,

5.1.6 When Federal/Military procurement is required, review and implement the applicable supplementary requirements (see S1 through S9),

5.1.7 When specified, the purchaser shall be furnished certification that samples representing each lot have been either tested or inspected as directed in this specification and the requirements have been met. When specified, a copy of the test results shall be furnished.

5.1.8 Level of preservation and packing required if other than as stated in Practice [D3951](#) (see [17.1](#)),

5.1.9 Labeling requirements (if different than [15.1](#)), and

5.1.10 Whether the equipment shall meet the requirements of ANSI/NSF, ANSI/UL, or BISSC standards, or a combination thereof.

### 6. Material

6.1 *General*—Dough divider, and dough dividing and rounding machines shall conform to NSF/ANSI No. 8 or BISSC Basic Criteria and Standard No. 8. Materials used shall be free from defects that would affect the performance or maintainability of individual components or of the overall assembly. Materials not specified herein shall be of the same quality used for the intended purpose in commercial practice. Unless otherwise specified herein, all equipment, material, and articles incorporated in the work covered by this specification are to be fabricated using materials produced from recovered materials to the maximum extent possible without jeopardizing the intended use. None of the above shall be interpreted to mean that the use of used or rebuilt products are allowed under this specification unless otherwise specified.

6.1.1 *Stainless Steel*: Stainless steel shall conform to the 300 series of Specification [A167](#) or [A240/A240M](#) as applicable.

### 7. Design and Construction

7.1 *General*—Dough divider and rounding machines shall be delivered assembled, ready for mounting, connection to electricity, and use as applicable.

7.2 *Dough Divider*—The Type I machine shall consist of a base, an operating handle, a manually operated dough dividing mechanism (cutting head with stainless steel knives or other material meeting NSF/ANSI No. 51 or BISSC Basic Criteria and Standard No. 8 requirements, and pressure board meeting the same material requirements), a yoke or support, and a removable dough pan. The base of the Type I machine shall be provided with bolt holes for mounting. The overall dimensions of the machine, excluding operating handle, shall fit into a 17 in. (423 mm) by 18-½ in. (470 mm) square area, 22-½ in. (565 mm) in height, ±3 in. (76.2 mm) for each dimension.

7.2.1 *Pan*—The Type I machine shall be provided with a circular dough pan of one piece, deep drawn stainless steel or other material meeting NSF/ANSI 51 or BISSC Basic Criteria and Standard No. 8 requirements. The pan shall be readily-removable and shall have not less than one handle.

7.3 *Dough Divider and Rounder*—The Type II machine shall be semiautomatic consisting of a floor mounted support or stand with integral housing, a manually operated dough divider mechanism (cutting head with stainless steel knives or other material meeting NSF/ANSI No. 51 or BISSC Basic Criteria and Standard No. 8 requirements, and pressure board meeting the same material requirements), an electric motor operated

rounding mechanism (rounder plate), a yoke or support, and a removable work pallet. The Type II machine shall divide the dough by manual operation and shall round the dough by an automatic operation. The handle shall be fully depressed manually to engage the rounding mechanism for the rounding operation. The return of the handle shall disengage the rounding mechanism. The Type III machine shall be similar in operation to the Type II machine with the exception that the Type III machine is completely automatic, dividing and rounding dough automatically. The base of the Type II and III machines shall be provided with bolt holes for floor mounting. The overall dimensions of the Type II and III machines excluding operating handle, shall fit into a 27 in. (686 mm) by 27 in. (686 mm) square area, 59 in. (1499 mm) in height,  $\pm 2$  in. (51 mm) for each dimension.

**7.3.1 Rounder Plate and Work Pallets**—Type II and III machines shall have a rounder plate and four work pallets constructed of stainless steel or other material meeting NSF/ANSI No. 51 or BISSC Basic Criteria and Standard No. 8 requirements. The rounder plate shall be attached to and driven by an electric motor as specified herein. The pallets shall have recesses of a number corresponding to divider head assembly divisions, embossed on each work pallet for forming the rolls during rounding operation. The pallet design and recesses shall meet NSF/ANSI construction requirements or BISSC Standard No. 8 requirements, or both. Each pallet shall have one handle and shall rest in a fixed position on the rounder plate during operation. Work pallets shall be removable.

#### **7.4 Electrical Requirements:**

**7.4.1 Nominal Input Power**—Unless otherwise specified (see 5.1.4), the machine shall be designed to operate on one of the following:

- 7.4.1.1 120 V, 60 Hz, single phase,
- 7.4.1.2 240 V, 60 Hz, single phase,
- 7.4.1.3 208 V, 60 Hz, three phase, or
- 7.4.1.4 220 V, 60 Hz, three phase.

**7.4.2 Motor**—The electric motor used on the semiautomatic and automatic machines shall be a capacitor type or split-phased type and shall conform to NEMA MG 1 and BISSC No. 29. The motor shall be of sufficient horsepower and speed to meet the production capacity. The motor shall have thermal overload protection of the manual reset type.

**7.4.3 Electrical Components**—Unless designed for permanent electrical connection, these machines shall be provided with a cord and plug meeting the requirements of ANSI/UL 763, and the plug shall conform to the appropriate NEMA WD 1 configuration. The cord shall extend not less than 5 ft (1.52 m) outside the machine. Wiring shall be in accordance with NEMA WC 5 or NEMA WC 7.

## **8. Performance Requirements**

8.1 When tested in accordance with Section 11, the dough divider and rounder shall operate without failure of the major functional components.

## **9. Workmanship, Finish, and Appearance**

9.1 All components and assemblies of the dough divider and rounder shall be free from dirt and other extraneous materials,

burrs, slivers, tool and grind marks, dents, and cracks. Castings, molded parts and stampings shall be free of voids, sand pits, blow holes, and sprues. External surfaces shall be free from kinks, dents, and other deformities. Forming and welding shall not cause damage to the metal and shall be done neatly and accurately.

## **10. Sampling**

10.1 A representative production model shall be selected for performance testing.

10.2 When specified in the contract or purchase order, sampling for inspection shall be performed in accordance with ANSI Z1.4.

## **11. Test Methods**

**11.1 Operational Test**—The dough divider and rounder machine shall be operated, without a load, for not less than 25 cycles and meet the following requirements as applicable. Inability of the machine to operate as specified herein shall constitute failure of the test.

11.1.1 Proper operation of motor starting and stopping devices,

11.1.2 Proper operation of adjusting and operating devices,

11.1.3 Proper operation of parts,

11.1.4 No overheating of bearings, and

11.1.5 No binding.

**11.2 Performance Test**—The dough divider and rounder machine shall be operated to perform the dough dividing and rounding operation on a pan/pallet of dough into separate and equal pieces by weight  $\pm 5\%$ , depending upon the amount of whole dough placed in the dough pan/pallet and size of the machine. Inability of the machine to operate as specified herein shall constitute failure of the test.

## **12. Inspection**

**12.1 End Item Testing**—When specified in the contract or purchase order, one production item, selected at random from each lot, shall be tested by the manufacturer in accordance with the applicable paragraphs of Section 11. Performance results shall be recorded in a permanent file, and the information shall be available to the customer upon demand. Any subsequent change in design that would relate to performance shall require a new test record.

**12.2 Component and Material Inspection**—Incoming components and materials shall be inspected by the manufacturer to the design parameters as specified on drawings or purchase documents, or both.

## **13. Rejection and Rehearing**

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

## **14. Certification**

14.1 When specified in the purchase order or contract, the purchaser shall be furnished certification that samples representing each lot have been either tested or inspected as directed

in this specification and the requirements have been met. When specified in the purchase order or contract, a report of the test results shall be furnished (see 5.1.7).

### 15. Product Marking

15.1 Each dough divider and rounding machine shall be provided with an identification plate securely affixed to the item. The plate shall be molded, die-stamped, etched on metal, or an ANSI/UL 969 Recognized label material. The marking shall be durable and shall be legible and readily visible after the item is installed in the intended manner. The identification plate shall include the name, brand, or trademark of the manufacturer of such known character to be readily traceable to the manufacturer and shall state the electrical characteristics (voltage, amperage, and frequency) of the equipment. The plate shall also bear a distinctive number, letter or number, and letter code that will identify an individual item or production lot of a limited group of items. In addition, such information

required by UL and NSF or BISSC as applicable, shall appear on the identification plate. The plate shall be located on an external surface.

### 16. Manuals

16.1 Format and content of applicable manuals shall be as indicated in Specification F760.

### 17. Packaging and Package Marking

17.1 Unless otherwise specified (see 5.1.8), the complete dough divider and rounder machine shall be packaged and marked in accordance with Practice D3951. In addition, the package shall be marked showing the model number, serial number, and manufacturer's name.

### 18. Keywords

18.1 appliance; bakery equipment; dough divider; dough rounder; food service equipment

## SUPPLEMENTARY REQUIREMENTS

### FEDERAL AND MILITARY PROCUREMENT

S1. The supplementary requirements that follow apply to all Federal and Military procurements. Where provisions of this supplement conflict with the main body of this specification, this supplement shall prevail.

S2. *Manual*—A manual complying with Specification F760 and its supplement shall be provided.

S3. *First Article Inspection*—When required, the first article inspection shall be performed on one unit. The first article may be either a first production item or a standard production item from the supplier's current inventory, provided the item meets the requirements of this specification and is representative of the design, construction, and manufacturing technique applicable to the remaining items to be furnished under the contract.

S4. *Label Plates*—Dough dividers and rounding machines shall be provided with data-name plates and instruction plates.

S4.1 *Data-Name Plates*—In addition to the manufacturer's data plate, machines shall be provided with data-name plates readily visible to the operator during normal operating use and so as to not adversely affect the life and utility of the unit. Plates shall be attached to the front of the unit in such a manner as to meet the applicable NSF International or BISSC sanitation requirements for this equipment. The plate shall contain the following information: National Stock Number and Government Approved Manual Number.

S4.2 *Instruction Plate*—An instruction plate shall be made of corrosion resisting metal or an ANSI/UL 969 Recognized label material and shall be attached to the front of the dough dividing and rounding machine. The instruction plate shall bear instructions for startup, operation, and shutdown.

S5. *Part Identifying Number*—The following part identifying numbering procedure is for government purposes and does not constitute a requirement for the contractor. The PINs to be used for items acquired to this document are created as follows:

ASTM _____	XX	XX	XX	XX
(ASTM Designation)	(Type)	(Class)	(Size)	(Style)

The above is an example of the PIN for an item in accordance with ASTM Standard F1966–03, Type XX, Class XX, Size XX, Style XX.

S6. *Human Factors Criteria*—Human factors engineering criteria, principles, and practices, as defined in Practice F1166, shall be used in the design of all dough dividers and rounders.

S7. *Preservation, Packaging, and Package Marking*—When other than commercial practice or conformance to Practice D3951 is desired, the preservation, packaging, and package marking requirements shall be stated in the purchase order or contract.

S8. *Manufacturer's Certification*—If the manufacturer has successfully furnished the same equipment on a previous contract within the past three years, further inspection shall not be required. The manufacturer shall certify in writing that the equipment to be furnished is the same as that previously furnished and approved, and that no major design changes have been made to the equipment.

S9. *Naval Shipboard Requirements*—The following additional requirements apply when equipment is to be used for shipboard purposes.

S9.1 *Power Compatibility*—Unless otherwise specified (see 5.1), dough divider and rounder machines shall be compatible with 115 Vac, 60 Hz, single phase, alternating current for shipboard as specified in MIL-STD-1399/300.

S9.2 *Access*—Dough dividers and rounding machines for naval surface vessels shall pass through a 26 in. (660 mm) wide by 66 in. (1676 mm) shipboard hatch without major disassembly. Machines for submarines shall pass through a 25 in. (635

mm) diameter circular hatch without major disassembly. When establishing accessibility requirements, both physical and visual access shall be provided along with access for any tools, test equipment, or replacement parts needed.

S9.3 *Mounting*—Dough dividers and rounding machines shall be provided with holes for mounting. The frame shall be provided with four symmetrically spaced, drilled, or threaded bosses or retaining nuts for this purpose.

S9.4 *Environmental Suitability*—Dough dividers and rounding machines shall be capable of withstanding ships vibration and motion. Controls, switches, moving parts, and electrical circuits shall operate under shipboard conditions without malfunction, binding, excessive looseness, or damage (see S9.6.3.).

S9.5 *Inclined Operation*—Dough dividers and rounding machines shall operate satisfactorily on surface ships when inclined at an angle of 15° each side of the vertical in each of two vertical planes at right angles to each other, with no spillage of fluid or product. For submarines the angle of inclination shall be 30°.

S9.6 *Quality Assurance Provisions:*

S9.6.1 *EMI Control Tests*—When specified, dough dividers and rounding machines shall be tested by the contractor in accordance with the test methods of MIL-STD-461 for surface

ships and submarines. The first article or the initial production unit, as applicable, shall be tested. The contractor shall furnish written certification that the equipment meets the requirements of MIL-STD-461. Nonconformance with the requirements specified shall constitute failure of the test.

S9.6.2 *Inclined Operational Test*—The dough divider and rounder shall be bolted to a test platform similar to shipboard installation and inclined at an angle of 15° (30° for submarines). The machine shall be filled to 75 % capacity with product, then be operated for 60 s each at each side of the vertical in each of two vertical planes at right angles to each other. Any nonconformance with specified requirements of S9.5 shall constitute failure of this test.

S9.6.3 *Shipboard Environmental Test*—When specified, the dough divider and rounder, under normal operating conditions, shall be tested in accordance with MIL-STD-167/1, Type I equipment. The machine shall be secured to the test machine in the same manner that it will be secured on shipboard. Failure of the machine to perform its function during or after testing, or meeting the requirements of S9.4, shall constitute failure of this test. The government reserves the right to witness all tests of dough divider and rounders procured for naval shipboard use, whether performed by the supplier or an independent testing agency.

## APPENDIX

### (Nonmandatory Information)

#### X1. ADDED FEATURES

X1.1 Some manufacturers offer additional sizes and features that extend the versatility of the dough divider and rounding machines. The variety of sizes and options vary from manufacturer. A good source of general information can be found in the literature available from bakery or food service equipment

manufacturers and dealers.

X1.2 Typically, these options are added to the basic models at an additional cost. Any additional options that are required can be written into the procurement contract as desired.

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