



Standard Specification for Combination Oven Electric or Gas Fired¹

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1. Scope

1.1 This specification covers commercial combination, atmospheric pressure steaming, which includes low or high temperature steaming, baking, roasting, and rethermalizing forced-air electric and gas-fired ovens.

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 The following safety hazards caveat pertains only to the test methods portion, Section 8, 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, 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

- A36/A36M Specification for Carbon Structural Steel
- A167 Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip (Withdrawn 2014)³
- A176 Specification for Stainless and Heat-Resisting Chromium Steel Plate, Sheet, and Strip (Withdrawn 2015)³
- A276 Specification for Stainless Steel Bars and Shapes

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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.

³ The last approved version of this historical standard is referenced on www.astm.org.

A366/A366M Specification for Commercial Steel (CS) Sheet, Carbon, (0.15 Maximum Percent) Cold-Rolled (Withdrawn 2000)³

A569/A569M Specification for Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip Commercial (Withdrawn 2000)³

D3951 Practice for Commercial Packaging

F760 Specification for Food Service Equipment Manuals

F1166 Practice for Human Engineering Design for Marine Systems, Equipment, and Facilities

F1217 Specification for Cooker, Steam

F2861 Test Method for Enhanced Performance of Combination Oven in Various Modes

2.2 ANSI Standards:⁴

ANSI B1.1 Unified Inch Screw Threads (UN and UNR Thread Form)

NSF/ANSI 2 Food Equipment

NSF/ANSI 4 Commercial Cooking, Rethermalization and Hot Food Holding and Transport Equipment

ANSI/UL No. 197 Commercial Electric Cooking Appliances

ANSI Z83.11 Gas Food Service Equipment

2.3 Military Standards:⁵

MIL-STD-167/1 Shipboard Equipment (Type I-Environmental and Type II-Internally Excited)

MIL-STD-461 Electromagnetic Emission and Susceptibility Requirements for the Control of Electromagnetic Interference

MIL-STD-1399/300 Shipboard Systems Section 300A Electric Power, Alternating Current

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *combination oven, n*—as used in this specification, a device that combines the function of hot convection air or steam, or the combination of both, to perform steaming, which includes low or high temperature steaming, baking, roasting, rethermalizing, and proofing of various food products. In

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

⁵ Available from Standardization Documents Order Desk, DODSSP, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5098, or Acquisition Streamlining and Standardization Information System (ASSIST), which is the official source of all documents listed in the DoD Index of Specifications and Standards. The ASSIST can be located at <http://dodssp.daps.dla.mil/>.

general, the term combination oven is used to describe this type of equipment which is self-contained.

3.1.2 *oven cavity*, *n*—portion or area of the combination oven in which food products are heated or cooked.

3.1.3 *pans*, *n*—containers used to hold the food product in the oven cavity:

3.1.3.1 *full-size bake or sheet pan*—nominally 18 by 26 by 1 in. (457 by 660 by 25 mm).

3.1.3.2 *half-size bake or sheet pan*—nominally 18 by 13 by 1 in. (457 by 330 by 25 mm).

3.1.3.3 *full-size perforated steam pan*—nominally 12.7 by 20.8 by 2.5 in. (323 by 523 by 64 mm).

3.1.3.4 *full size shallow perforated steam pan*—normally 12.7 by 20.8 by 1-¼ (323 by 528 by 32 mm).

3.1.3.5 *two-thirds size steam pan*—nominally 13.8 by 12.7 by 2.5 in. (352 by 323 by 64 mm).

3.1.3.6 *shallow two-thirds size perforated steam pans*—13.8 by 12.7 by 1-¼ in. (351 by 323 by 32 mm).

(1) *Discussion*—Perforated holes to be ¼ in. in diameter, pan material to be non-carbon stainless steel.

3.1.4 *steam generation*, *n*—as used in this specification, can be produced through three distinct methods which all conform to Grade classification in Specification **F1217**, 0 to 2.9 psig maximum compartment pressure.

3.1.4.1 *Method 1*—Injection refers to direct placement of water onto a hot surface in the cavity for steam production.

3.1.4.2 *Method 2*—Boiler or steam generator refers to a compartment outside the oven cavity through which water is heated for steam production.

3.1.4.3 *Method 3*—Water bath refers to a compartment inside the oven cavity through which water is heated for steam production.

4. Classification

4.1 Combination ovens covered by this specification are classified by type, style, size, class, grade, and group. The capacity of the combination oven is determined by the number of bake or sheet pans, or steam table pans, or both, the oven is designed for cooking or rethermalizing. For capacity classification, the minimum vertical spacing between pan supports shall be as follows: bake or sheet pans, 1 in. (25 mm); and steam pans, 2.5 in. (64 mm).

4.1.1 Type:

4.1.1.1 *Type I*—Table, countertop, and stand mounted units.

4.1.1.2 *Type II*—Floor and roll-in units.

4.1.2 Style:

4.1.2.1 *Style 1*—Gas-fired combination oven.

4.1.2.2 *Style 2*—Electric combination oven.

4.1.3 Size:

4.1.3.1 *Size i*—Half-size.

4.1.3.2 *Size ii*—Full-size.

4.1.3.3 *Size iii*—Two-thirds size.

4.1.4 Class:

4.1.4.1 *Class a*—208 V, 60 Hz, 1 phase.

4.1.4.2 *Class b*—208 V, 60 Hz, 3 phase.

4.1.4.3 *Class c*—240 V, 60 Hz, 1 phase.

4.1.4.4 *Class d*—240 V, 60 Hz, 3 phase.

4.1.4.5 *Class e*—480 V, 60 Hz, 3 phase.

4.1.4.6 *Class f*—120 V, 60 Hz, 1 phase.

4.1.4.7 *Class g*—230 V, 50 Hz, 1 phase.

4.1.4.8 *Class h*—400 V, 50 Hz, 3 phase.

4.1.4.9 *Class i*—440 V, 60 Hz, 3 phase (shipboard use).

4.1.5 Grade:

4.1.5.1 *Grade A*—Steam Generator/Boiler.

4.1.5.2 *Grade B*—Spritzer/Injector.

4.1.5.3 *Grade C*—Water Bath.

4.1.6 Group:

4.1.6.1 *Group a*—Minimum 3 half size bake sheets or 3 steam pans (for Type I, Size i).

4.1.6.2 *Group b*—Minimum 20 half size bake sheets or 20 steam pans (for Type II, Size i).

4.1.6.3 *Group c*—Minimum 5 full size bake sheets or 10 steam pans (for Type I, Size ii).

4.1.6.4 *Group d*—Minimum 12 full size bake sheets or 24 steam pans (for Type II, Size ii).

4.1.6.5 *Group e*—Minimum 3 ⅔ size steam pans (for Type I, Size iii).

5. Ordering Information

5.1 Orders for combination ovens in accordance with this specification shall include the following information:

5.1.1 ASTM specification number and date of issue.

5.1.2 Quantity to be furnished.

5.1.3 Type.

5.1.4 Style; if Style 1, specify gas type (see **5.2.2**).

5.1.5 Size.

5.1.6 Class.

5.1.7 Grade.

5.1.8 Group.

5.2 The following options should be reviewed and, if desired, they should be included in the order.

5.2.1 When Federal/Military procurement(s) is involved, refer to the supplement pages.

5.2.2 Type of gas, if applicable: natural, propane, or other (specify heating value in BTU/ft³ specific density and constituents).

5.2.3 When other than manufacturer's standard, commercial, domestic packaging is required, specify packaging requirements.

5.2.4 When special or supplementary requirements, such as inspections, options, accessories, modifications, changes for correctional facilities use, additional nameplate data, etc., are required.

5.2.5 When specified, certify that samples representing each lot have been either tested or inspected as directed and required. When specified, furnish a copy of the certification, or test results, to the purchaser.

5.2.6 When specified, with a quick-disconnect gas supply.

5.2.7 When specified, provide separate water inlets for treated water (typically used for steam generation) and for untreated water (typically used for condensate cooling).