Designation: C607 – 88 (Reapproved 2016)

Standard Practice for Coking Large Shapes of Carbon-Bearing Materials[1]

This standard is issued under the fixed designation C607; 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 practice covers the preparation of coking of carbon-bearing material for subsequent testing such as modulus of rupture, slag testing, thermal conductivity, and thermal expansion. Test Methods C831 is the specified method for testing residual carbon.

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:*[2]

C133 Test Methods for Cold Crushing Strength and Modulus of Rupture of Refractories

C767 Test Method for Thermal Conductivity of Carbon Refractories

C831 Test Methods for Residual Carbon, Apparent Residual Carbon, and Apparent Carbon Yield in Coked Carbon-Containing Brick and Shapes

C832 Test Method of Measuring Thermal Expansion and Creep of Refractories Under Load

C874 Test Method for Rotary Slag Testing of Refractory Materials

3. Significance and Use

3.1 This practice is useful for preparing coked specimens for subsequent testing where the shapes desired cannot be fitted into the coking box described in Test Methods C831.

3.2 This practice can be very sensitive to heating rates in coking. Thus, strict adherence to the coking procedure is necessary.

4. Apparatus

4.1 *Furnace,* gas-, oil-, or electric-fired, with heating chamber capable of receiving the coking box shown in Fig. 1.

4.2 *Box,* stainless steel, essentially as shown in Fig. 1.

5. Preparation of Samples

5.1 Refer to the appropriate test method(s) or practice (for example, Test Methods C133, Test Method C767, Test Methods C831, Test Method C832, or Practice C874) for sample requirements.

6. Procedure

6.1 Spread a 2-in. (51-mm) layer of dry metallurgical coke, passing a No. 12 (1.70-mm) sieve or a 10-mesh Tyler Standard Series, over the bottom of the coking box.

6.2 Push the sample tray through the coke until it rests on the bottom.

6.3 Set the specimens approximately 1 in. (25 mm) apart in the tray, and uniformly spaced from the box sides.

6.4 Place a protected thermocouple inside the box and near the center specimens for temperature control.

6.5 Secure the lid on the box to prevent excessive leakage.

6.6 Place the loaded box in the furnace heating chamber with the nitrogen inlet, thermocouple, and outlet pipe extending through a bricked-up door.

6.7 Purge the coking box with nitrogen containing no more than 10 ppm (10 mg/L) oxygen and maximum dew point of −76°F (−60°C). Thereafter, provide sufficient flow of 3 to 4 ft ^{3}/h (24 to 32 mL/s) to maintain positive pressure within the box throughout the entire heating and cooling period (Note 1). If desired, the gases and liquids escaping from the coking box through the outlet pipe may be ignited outside the furnace.

NOTE 1—The purpose of the nitrogen is to prevent oxidation of the carbonaceous residues within the brick.

6.8 Heat the furnace so that the thermocouple within the box registers 250°F (120°C) after the first hour; then heat the

[1] This practice is under the jurisdiction of ASTM Committee C08 on Refractories and is the direct responsibility of Subcommittee C08.04 on Chemical Behaviors.

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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.

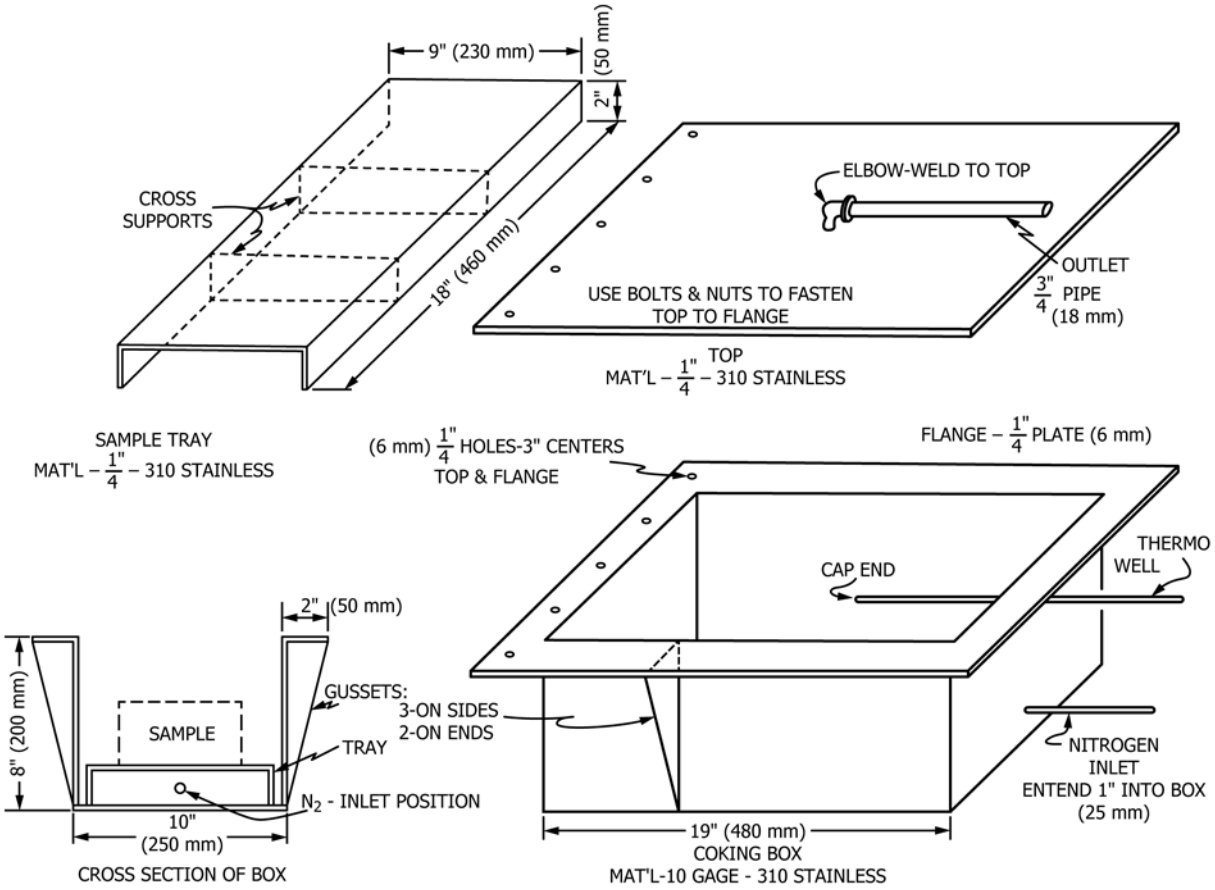

FIG. 1 Coking Box

furnace so that the box is heated at a rate of 400 ± 20°F (220 ± 11°C)/h to 1800 ± 20°F (980 ± 11°C).

6.9 Hold the temperature for 3 ± ½ h, starting from the time 1780°F (970°C) is reached in the box.

6.10 After completing the hold period, shut off the furnace and allow the coking box to cool naturally within the furnace.

6.11 Remove the samples from the coking box after the box has cooled sufficiently to handle.

7. Keywords

7.1 carbon yield; coking; loss of ignition; refractories; residual carbon