Designation: C288 – 20

Standard Test Method for Disintegration of Refractories in an Atmosphere of Carbon Monoxide[1]

This standard is issued under the fixed designation C288; 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 test method covers the comparative behavior of refractories under the disintegrating action of carbon monoxide (CO). The test method is an accelerated exposure to CO to determine potential material behavior in a relatively short time.

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, 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. Significance and Use

2.1 This test method is used to determine the relative resistance of various refractories to disintegration caused by exposure to a CO atmosphere. The results obtained by this method can be used to select refractories that are resistant to CO disintegration.

2.2 This test method is suitable for research and development and for establishing CO disintegration criteria for specification acceptance.

2.3 The disintegration of test specimens is accelerated by providing a higher concentration of CO than anticipated in most service environments. The effects on the test specimens may be different than those found for refractories in actual service conditions.

3. Apparatus

3.1 *Heated Chamber*—The chamber shall be gastight and of a suitable size, made of stainless steel, brass, aluminum, or unoxidized Monel metal. A suggested size is 18 in. (460 mm) in diameter and 36 in. (910 mm) long. The unit may be heated by resistance wire or other means, provided that at the temperature of operation the difference in temperature between any two points within the chamber shall not be greater than 20 °F (11 °C). The chamber may be provided with a thermocouple well and shall have a gas inlet and outlet, with a provision for gas sampling at the outlet.

3.2 *Temperature-Control Instrument*—The temperature of the test chamber shall be controlled and recorded by a suitable instrument having the required accuracy.

3.3 *Atmosphere Control*—The CO shall be supplied from a tank, or of the gas, or manufactured by the conversion of carbon dioxide (CO_2). The pressure from a tank supply (caution, see Note 1) shall be reduced by a regulator made for that purpose, and the flow of gas adjusted by means of a sensitive needle or regulating valve. A flowmeter shall be used in the line as an aid for regulating the flow. When CO is used from a tank, iron carbonyl is present in the gas and may cause clogging of the inlet tube, in which case the carbonyl may be removed before the gas enters the chamber. An Ascarite tower in the inlet line will remove the carbonyl, but this should be preceded by a drying tower to prevent moisture from getting into the Ascarite tower.

NOTE 1—As a precaution against the possibility of tank explosions, the tanks should be stored and used outdoors or in a separate building designed to reduce the explosion hazard.

3.4 *Furnace Pressure Control*—The unit shall be equipped with a bubbling bottle or a sensitive gage to control the pressure of the exhaust gas. A positive pressure shall be maintained throughout the test.

3.5 *Gas Analyzer*—Any conventional gas analyzer can be used to periodically determine the CO content of the exhaust gas.

4. Test Specimens

4.1 Ten specimens shall constitute a specimen set.

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

Current edition approved Sept. 1, 2020. Published September 2020. Originally approved in 1952. Last previous edition approved in 2014 as C288 – 87 (2014). DOI: 10.1520/C0288-20.