



Designation: D5154/D5154M – 18

Standard Test Method for Determining Activity and Selectivity of Fluid Catalytic Cracking (FCC) Catalysts by Microactivity Test¹

This standard is issued under the fixed designation D5154/D5154M; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

1. Scope

1.1 This test method covers determining the activity and selectivity of either equilibrium or laboratory deactivated fluid catalytic cracking (FCC) catalysts. The activity is evaluated on the basis of mass percent conversion of gas oil feed in a microactivity unit. The selectivities are evaluated on the basis of mass percent yields of specifically defined products resulting from the catalytic cracking of gas oil feed.

1.2 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the 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. Referenced Documents

2.1 ASTM Standards:²

- D2887 Test Method for Boiling Range Distribution of Petroleum Fractions by Gas Chromatography
- D3907 Test Method for Testing Fluid Catalytic Cracking (FCC) Catalysts by Microactivity Test

¹ This test method is under the jurisdiction of ASTM Committee D32 on Catalysts and is the direct responsibility of Subcommittee D32.04 on Catalytic Properties.

Current edition approved May 1, 2018. Published May 2018. Originally approved in 1991. Last previous edition approved in 2010 as D5154–10. DOI: 10.1520/D5154_D5154M-18.

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.

- D4463 Guide for Metals Free Steam Deactivation of Fresh Fluid Cracking Catalysts
- D7964 Test Method for Determining Activity of Fluid Catalytic Cracking (FCC) Catalysts in a Fluidized Bed
- E105 Practice for Probability Sampling of Materials
- E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods
- E456 Terminology Relating to Quality and Statistics
- E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *activity*—calculated as conversion divided by the difference of 100 minus conversion.

3.1.2 *ASTM reference catalysts*—a set of equilibrium FCC catalysts within the useful range of this test method is used to improve the reproducibility of test results between different laboratories. Each catalyst has a consensus mean conversion value assigned to it by Committee D32. Samples of the ASTM reference catalysts can be obtained through NIST.

3.1.3 *ASTM standard feed*—a specific batch of gas oil that is used as feedstock in the described test method.³

3.1.4 *catalyst/oil (C/O) ratio*—the mass of catalyst used in the test divided by the mass of feed fed to the reactor. In practice, the mass of catalyst is usually maintained at a constant value and the total mass of feed is varied.

3.1.5 *contact time*—calculated as $3600/(WHSV \cdot C/O)$. This is the delivery time, in seconds, during which feed is introduced to the reactor.

3.1.6 *conversion*—calculated as the difference between the mass of feed used and the mass of unconverted material divided by the mass of feed used times 100 %. The unconverted material is defined as all liquid product with a boiling point above 216 °C [421 °F].

3.1.7 *gasoline*—C₅ compounds through compounds boiling at 216 °C [421 °F].

³ Formerly available from National Institute of Standards and Technology (NIST), 100 Bureau Dr., Stop 1070, Gaithersburg, MD 20899-1070, <http://www.nist.gov>.