



Designation: D7085 – 04 (Reapproved 2018)

Standard Guide for Determination of Chemical Elements in Fluid Catalytic Cracking Catalysts by X-ray Fluorescence Spectrometry (XRF)¹

This standard is issued under the fixed designation D7085; 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 guide covers several comparable procedures for the quantitative chemical analysis of up to 29 elements in fluid catalytic cracking (FCC) catalyst by X-ray fluorescence spectrometry (XRF). Additional elements may be added.

1.2 This guide is applicable to fresh FCC catalyst, equilibrium FCC catalyst, spent FCC catalyst, and FCC catalyst fines.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.3.1 The units of ppm (mg/kg) are used instead of wt% in **Tables X2.3-X2.5** for reporting concentration of certain elements because of industry convention and because most of these elements are present at trace levels.

1.4 *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.*

1.5 *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

C982 Guide for Selecting Components for Energy-

Dispersive X-Ray Fluorescence (XRF) Systems (Withdrawn 2008)³

C1118 Guide for Selecting Components for Wavelength-Dispersive X-Ray Fluorescence (XRF) Systems (Withdrawn 2011)³

D1977 Test Method for Nickel and Vanadium in FCC Equilibrium Catalysts by Hydrofluoric/Sulfuric Acid Decomposition and Atomic Spectroscopic Analysis

E1172 Practice for Describing and Specifying a Wavelength Dispersive X-Ray Spectrometer

E1361 Guide for Correction of Inter-element Effects in X-Ray Spectrometric Analysis

E1621 Guide for Elemental Analysis by Wavelength Dispersive X-Ray Fluorescence Spectrometry

E1622 Practice for Correction of Spectral Line Overlap in Wavelength-Dispersive X-Ray Spectrometry (Withdrawn 2006)³

3. Summary of Guide

3.1 The test specimen is prepared with a clean, uniform, flat surface. Two commonly used test methods of preparing test specimens are listed: briquetting a powder (Test Method A, Sections 8 – 15) and fusing a powder into a glass bead (Test Method B, Sections 16 – 23). This surface of the fused or briquetted specimen is irradiated with a primary source of X rays. The secondary X rays produced in the specimen are characteristic of the chemical elements present in the specimen. Two types of XRF instrumentation may be used to collect and process the X-ray spectra. Using a wavelength-dispersive X-ray spectrometer, the secondary X rays produced in the specimen are dispersed according to their wavelength by means of crystals or synthetic multilayers. The X-ray intensities are measured by detectors set at selected wavelengths and recorded as counts (number of X rays impinging on the detector per unit time). Concentrations of the elements are determined from the measured intensities using calibration curves prepared from suitable reference materials. Using an energy-dispersive X-ray spectrometer, the secondary X rays

¹ This guide is under the jurisdiction of ASTM Committee D32 on Catalysts and is the direct responsibility of Subcommittee D32.03 on Chemical Composition.

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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.