



Designation: D7708 – 23a

Standard Test Method for Microscopical Determination of the Reflectance of Vitrinite Dispersed in Sedimentary Rocks¹

This standard is issued under the fixed designation D7708; 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 microscopical determination of the reflectance measured in immersion oil of polished surfaces of vitrinite dispersed in sedimentary rocks. This test method can also be used to determine the reflectance of macerals other than vitrinite dispersed in sedimentary rocks.

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

D121 Terminology of Coal and Coke

D388 Classification of Coals by Rank

D2797 Practice for Preparing Coal Samples for Microscopical Analysis by Reflected Light

D2798 Test Method for Microscopical Determination of the Vitrinite Reflectance of Coal

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

E691 Practice for Conducting an Interlaboratory Study to

Determine the Precision of a Test Method

3. Terminology

3.1 *Definitions*—For definitions of terms, refer to Terminology D121.

3.2 *Abbreviations:*

3.2.1 $R_{o,ran}$ —mean random reflectance measured in oil using a fixed microscope stage. Other organizations may use other abbreviations for mean random reflectance.

3.2.2 $R_{o,max}$ —mean apparent maximum reflectance measured in oil using a fixed microscope stage and a rotating polarizer in the incident light path. Other organizations may use other abbreviations for mean apparent maximum reflectance.

3.3 *Definitions of Terms Specific to This Standard:*

3.3.1 *alginate*, n —a primary liptinite maceral occurring in structured morphologies, telalginite, and unstructured morphologies, lamalginite.

3.3.2 *bituminite*, n —an amorphous primary liptinite maceral with low reflectance, occasionally characterized by colored internal reflections in reflected white light and weak orange- to brown fluorescence, derived from bacterial biomass and the bacterial decomposition of algal material and faunal plankton (1). Bituminite is equivalent to the amorphous organic matter recognized in strew slides of concentrated kerogen (2).³

3.3.2.1 *Discussion*—Bituminite may be distinguished from vitrinite by lower reflectance, as well as higher fluorescence intensity if fluorescence is present in vitrinite. Bituminite has poorly-defined wispy boundaries and may be speckled or unevenly colored from dark brown, dark gray, to almost black in reflected white light, whereas vitrinite has distinct boundaries and is blockier and evenly colored. The occurrence of bituminite in association with lamalginite and micrinite is common. Bituminite may be expected to occur in lacustrine or marine settings. It is less commonly present in fluvial or similar proximal depositional environments, where vitrinite may be expected to occur in greater abundance.

¹ This test method is under the jurisdiction of ASTM Committee D05 on Coal and Coke and is the direct responsibility of Subcommittee D05.28 on Petrographic Analysis of Coal and Coke.

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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 boldface numbers in parentheses refer to a list of references at the end of this standard.