

# **Measurement of and Specifications for Proppants Used in Hydraulic Fracturing and Gravel-packing Operations**

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## Introduction

The procedures presented in this document have been developed to improve the quality of proppants delivered to the well site. They are for use in evaluating certain physical properties used in hydraulic fracturing and gravel-packing operations. These tests should enable users to compare the physical characteristics of various proppants tested under the described conditions and to select materials useful for hydraulic fracturing and gravel-packing operations. Each section contains proppant specifications and replaces API 19C, First Edition.

The procedures presented in this document are not intended to inhibit the development of new technology, material improvements, and improved operational procedures. Qualified engineering analysis and judgment are required for their application to a specific situation.

As with any laboratory procedure requiring the use of potentially hazardous chemicals and equipment, the user is expected to have received proper training and knowledge in the use and disposal of these potentially hazardous materials. The user is responsible for compliance with all applicable local, regional, and national requirements for worker and local health, safety, and environmental liability.

This document uses a format for numbers that follows the examples given in API Document Format and Style Manual, First Edition, June 2007 (Editorial Revision, January 2009). This numbering format is different than that used in API 19C, Second Edition. In this document, the decimal mark is a period and separates the whole part from the fractional part of a number. No spaces are used in the numbering format. The thousands separator is a comma and is only used for numbers greater than 10,000, i.e. 5000 items, 12,500 bags.

In this document, where practical, U.S. Customary units are included in parentheses for information.

The units do not necessarily represent a direct conversion of metric units (SI) to U.S. Customary units, or U.S. Customary to SI. Consideration has been given to the precision of the instrument making the measurement. Consideration has also been given to the nature of the measurement, determining if it is critical or simply informational. The document was originally based on API RP 56, API RP 58, and API RP 60, which are no longer in effect.

# Measurement of and Specifications for Proppants Used in Hydraulic Fracturing and Gravel-packing Operations

## 1 Scope

This document provides specifications and standard testing procedures for evaluating proppants used in hydraulic fracturing and gravel-packing operations.

The objective of this document is to provide specifications and a consistent methodology for testing performed on hydraulic fracturing and/or gravel-packing proppants. Methodologies and specifications (where applicable) are provided for:

- sieve analysis and median diameter determination;
- sphericity and roundness;
- acid solubility;
- turbidity;
- loose pack bulk density, apparent density, and absolute density;
- crush resistance;
- loss on ignition.

Proppant size designation is as per industry standard. It is based on the maximum and minimum size determination by sieve analysis and ASTM <sup>1</sup> sieve number (and not as per standard opening expressed in micrometers).

Proppants in this document are sand, ceramic media, resin-coated proppants, gravel-packing media, and other similarly used materials for hydraulic fracturing and gravel-packing operations.

## 2 Normative References

The following referenced documents are indispensable for the application of this document. For dated reference, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ASTM E11, *Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves*

## 3 Abbreviations

ANSI <sup>2</sup> American National Standards Institute

API American Petroleum Institute

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<sup>1</sup> ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, [www.astm.org](http://www.astm.org)

<sup>2</sup> ANSI (Operations), 25 West 43rd Street, 4th Floor, New York, NY 10036, [www.ansi.org](http://www.ansi.org)