

Recommended Practices for Testing High-Strength Proppants Used in Hydraulic Fracturing Operations

API RECOMMENDED PRACTICE 60
SECOND EDITION, DECEMBER 1995



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Exploration and Production Department

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FOREWORD

These recommended practices for testing high-strength proppants (i.e., proppants stronger than sand) were prepared by the API Subcommittee on Evaluation of Well Completion Materials. This publication is a companion to API RP 56: *Recommended Practices for Evaluating Sand Used in Hydraulic Fracturing Operations*. It is published under the jurisdiction of the Executive Committee on Drilling and Production Practices, American Petroleum Institute's Exploration and Production Department.

The recommended tests have been developed to improve the quality of high-strength proppants delivered to the well site. They are for use in evaluating certain physical properties of high-strength proppants used in hydraulic fracturing operations. These tests should enable users to compare the physical characteristics of various high-strength proppants tested under the described conditions and to select materials useful for hydraulic fracturing operations.

The recommended practices presented in this publication are not intended to inhibit the development of new technology, materials improvements, or improved operational procedures. Qualified engineering analysis and judgment will be required for their application to a specific situation.

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Suggested revisions are invited and should be submitted to the director of the Exploration and Production Department, American Petroleum Institute, 1220 L Street, N.W., Washington, D.C. 20005.

Recommended Practices for Testing High-Strength Proppants Used in Hydraulic Fracturing Operations

1 Scope

1.1 SCOPE

The purpose of these recommended practices is to provide standard testing procedures for evaluating high-strength proppants, that is, proppants stronger than silica sand.

1.2 OBJECTIVE

The objective of these recommended practices is to provide control of high-strength proppant quality at the well site. As a first step in accomplishing this objective, the recommended practices should be applied at the basic point of supply where quality control is first exercised.

1.3 TEST PROCEDURES

The use of good, safe laboratory procedures and maintenance and use of good, calibrated equipment is essential to the accuracy and reproducibility of these tests.

2 References

2.1 STANDARDS

Unless otherwise specified, the most recent editions or revisions of the following standards, codes, and specifications shall, to the extent specified herein, form a part of this standard.

API

RP 56 *Recommended Practices for Testing Sand Used in Hydraulic Fracturing Operations*

ASTM¹

E 11-95 *Specifications for Wire-Cloth Sieves for Testing Purposes*

2.2 OTHER REFERENCES

Krumbein, W.C. and Sloss, L.L., *Stratigraphy and Sedimentation*, Second Edition, 1963, W.H. Freeman and Co., New York, NY.

3 Recommended Proppant Sampling Procedure

3.1 DESCRIPTION

The sampling procedure should provide a representative sample of the high-strength proppant material as provided by the supplier or service company at the time the proppant material is transferred to the bulk transport container or bin. The samples may need to be obtained from three potential sources:

- From the supplier after the proppant material has been initially screened;
- From the service company during filling of the transport container with previously sacked or bulk proppant material;
- On-site at the well where the material is to be used.

When bulk containers are filled from a flowing stream of proppant material, sampling procedures set forth in 3.4 should be applied. If bulk containers are filled using sacked proppant material, sampling procedures set forth in 3.5 should be applied.

3.2 EQUIPMENT

The following equipment should be used to compile representative proppant material samples and conduct physical tests:

- Box sampling device approximately 8 inches × 6 inches × 4 inches with a 1/2-inch opening. Refer to Figure 1.
- Sample reducer (of appropriate size for handling sack-size samples and reducing in one pass to 1/16 original weight). Refer to Figure 2.
- Sample splitter of appropriate size. Refer to Figure 3.
- Set of sieves complying with requirements of the U.S.A. Sieve Series, 8-inch diameter. Refer to *ASTM E 11-95: Specifications for Wire-Cloth Sieves for Testing Purposes*. Refer to Figure 4.
- Testing sieve shaker that provides simultaneous rotating and tapping action and accepts the sieves specified in Item d. Refer to Figure 4.
- Scale (minimum of 100 grams capacity with precision of 0.1 gram or better).

3.3 RECOMMENDED NUMBER OF SAMPLES

At the basic source of supply, a minimum of three samples per truck load should be obtained and tested. These basic source-of-supply samples should be combined and used

¹ASTM, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428.