Drop-Weight Tear Tests on Line Pipe

API RECOMMENDED PRACTICE 5L3
FOURTH EDITION, AUGUST 2014

ADDENDUM 1, OCTOBER 2020

ERRATA 1, MARCH 2021

REAFFIRMED, MAY 2025

American Petroleum Institute

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Foreword

This standard is under the jurisdiction of the API Subcommittee on Standardization of Tubular Goods and includes changes approved by letter ballot in 2013.

The need for a determination of the fracture toughness of line pipe was considered in 1964 and at the midyear meeting in 1965. Certain ground rules were submitted at the 1965 meeting for the development of a specification on fracture toughness.

As a result of the information obtained through the research efforts of the American Gas Association, methods for conducting drop-weight tear tests for line pipe were developed. The methods of conducting this test and evaluating the results are described in this recommended practice.

The verbal forms used to express the provisions in this recommended practice are as follows:

— the term “shall” denotes a minimum requirement in order to conform to the recommended practice;

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Suggested revisions are invited and should be submitted to the Standards Department, API, 200 Massachusetts Avenue, NW, Suite 1100, Washington, DC 20001, standards@api.org.

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Drop-Weight Tear Tests on Line Pipe

1 Scope

These procedures describe a recommended method for conducting Drop-Weight Tear Tests to measure the fracture appearance or fracture ductility of the pipe as referenced in API 5L.

2 Normative References

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

API Specification 5L, *Line Pipe*

3 Abbreviations

For the purposes of this document, the following abbreviations apply.

D/t	diameter-to-thickness ratio
DWTT	Drop-Weight Tear Test
t	pipe wall thickness
T	neglected regions for shear area evaluation
t_s	DWTT specimen thickness

4 General Information

4.1 Apparatus

4.1.1 The testing machine may be of any configuration that has sufficient energy to completely break the specimens in one impact.

4.1.2 The velocity of the hammer at impact shall be in the range of 16 ft/sec to 30 ft/sec (5 m/sec to 9 m/sec).

4.1.3 The specimen shall be inserted in the testing machine so that the notch is lined up with the centerline of the hammer tip within $^1/_{16}$ in. (1.59 mm). The notch should also be centered between the supports of the anvil.

4.1.4 The radius of the anvil supports for the specimen should not be larger than $^5/_8$ in. (15.9 mm). Larger radii have been found to contribute to specimen jamming.

4.2 Metric Units

Metric conversions of US customary units are shown in parenthesis in the test, figures, and tables. See Annex A for metric conversion factors.

NOTE Drop-Weight Tear Testing pipe with upper shelf Charpy impact energies greater than 148 ft-lb (200 J) often results in invalid tests, making the test method ineffective.