Recommended Practice for Drill Stem Design and Operating Limits

API RECOMMENDED PRACTICE 7G
SIXTEENTH EDITION, AUGUST 1998

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Upstream Segment

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FOREWORD

This recommended practice is under the jurisdiction of the API Subcommittee on Standardization of Drilling and Servicing Equipment.

The purpose of this recommended practice is to standardize techniques for the procedure of drill stem design and to define the operating limits of the drill stem.

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Recommended Practice for Drill Stem Design and Operating Limits

1 Scope

1.1 COVERAGE

This recommended practice involves not only the selection of drill string members, but also the consideration of hole angle control, drilling fluids, weight and rotary speed, and other operational procedures.

1.2 SECTION COVERAGE

Sections 4, 5, 6, and 7 provide procedures for use in the selection of drill string members. Sections 8, 9, 10, 11, 12, and 15 are related to operating limitations which may reduce the normal capability of the drill string. Section 13 contains a classification system for used drill pipe and used tubing work strings, and identification and inspection procedures for other drill string members. Section 14 contains statements regarding welding on down hole tools. Section 16 contains a classification system for rock bits.

2 References

(See also Appendix B.)

API

RP 5C1	*Care and Use of Casing and Tubing*
Bull 5C3	*Bulletin on Formulas and Calculations for Casing, Tubing, Drill Pipe, and Line Pipe Properties*
Spec 7	*Specification for Rotary Drill Stem Elements*
RP 7A1	*Recommended Practice for Testing of Thread Compounds for Rotary Shouldered Connections*
RP 13B-1	*Recommended Practice Standard Procedure for Field Testing Water-Based Drilling Fluids*
RP 13B-2	*Recommended Practice Standard Procedure for Field Testing Oil-Based Drilling Fluids*

ASTM[1]

D3370	*Standard Practices for Sampling Water*

NACE[2]

MR-01-75	*Sulfide Stress Cracking Resistant Metallic Material for Oil Field Equipment*

[1]American Society for Testing Materials, 100 Barr Harbor Drive, West Conshocken, Pennsylvania 19428.
[2]NACE International, P.O. Box 218340, Houston, Texas 77218-8340.

3 Definitions

3.1 bending strength ratio: The ratio of the section modulus of a rotary shouldered box at the point in the box where the pin ends when made up divided by the section modulus of the rotary shouldered pin at the last engaged thread.

3.2 bevel diameter: The outer diameter of the contact face of the rotary shouldered connection.

3.3 bit sub: A sub, usually with 2 box connections, that is used to connect the bit to the drill string.

3.4 box connection: A threaded connection on Oil Country Tubular Goods (OCTG) that has internal (female) threads.

3.5 calibration system: A documented system of gauge calibration and control.

3.6 Class 2: An API service classification for used drill pipe and tubing work strings.

3.7 cold working: Plastic deformation of metal at a temperature low enough to insure or cause permanent strain.

3.8 corrosion: The alteration and degradation of material by its environment.

3.9 critical rotary speed: A rotary speed at which harmonic vibrations occur. These vibrations may cause fatigue failures, excessive wear, or bending.

3.10 decarburization: The loss of carbon from the surface of a ferrous alloy as a result of heating in a medium that reacts with the carbon at the surface.

3.11 dedendum: The distance between the pitch line and root of thread.

3.12 dogleg: A term applied to a sharp change of direction in a wellbore or ditch. Applied also to the permanent bending of wire rope or pipe.

3.13 dogleg severity: A measure of the amount of change in the inclination and/or direction of a borehole, usually expressed in degrees per 100 feet of course length.

3.14 drift: A drift is a gauge used to check minimum ID of loops, flowlines, nipples, tubing, casing, drill pipe, and drill collars.

3.15 drill collar: Thick-walled pipe or tube designed to provide stiffness and concentration of weight at the bit.

3.16 drill pipe: A length of tube, usually steel, to which special threaded connections called tool joints are attached.