

INTERNATIONAL  
STANDARD

**ISO**  
**10431**

First edition  
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**Petroleum and natural gas industries —  
Pumping units — Specification**

**iTeh STANDARD PREVIEW**  
*Industries du pétrole et du gaz naturel — Unités de pompage —  
Spécifications*  
**(standards.iteh.ai)**

ISO 10431:1993

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Reference number  
ISO 10431:1993(E)

## Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 10431 was prepared by the American Petroleum Institute (API) (as Spec 11E, 16th edition) and was adopted, under a special "fast-track procedure", by Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum and natural gas industries*, in parallel with its approval by the ISO member bodies.

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## Introduction

International Standard ISO 10431:1993 reproduces the content of API Spec 11E, 16th edition, 1989 and its supplement 1 (July 1, 1991). ISO, in endorsing this API document, recognizes that in certain respects the latter does not comply with all current ISO rules on the presentation and content of an International Standard. Therefore, the relevant technical body, within ISO/TC 67, will review ISO 10431:1993 and reissue it, when practicable, in a form complying with these rules.

This standard is not intended to obviate the need for sound engineering judgement as to when and where this standard should be utilized and users of this standard should be aware that additional or differing requirements may be needed to meet the needs for the particular service intended.

Standards referenced herein may be replaced by other international or national standards that can be shown to meet or exceed the requirements of the referenced standards.

Appendix G to this document shall not be considered as requirements.

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# Petroleum and natural gas industries — Pumping units — Specification

## 1 Scope

This International Standard lays down specification covering the design and rating of pumping units.

## 2 Requirements

Requirements are specified in:

“API Specification 11E (Spec 11E), Sixteenth Edition, October 1, 1989 — *Specification for Pumping Units*”, which is adopted as ISO 10431. <https://standards.iteh.ai/catalog/standards/sist/1d6026bd-6046-4a87-225767818709e181311893>

For the purposes of international standardization, however, modifications shall apply to specific clauses and paragraphs of publication API Spec 11E. These modifications are outlined below.

Throughout publication API Spec 11E, the conversion of English units shall be made in accordance with ISO 31, parts 1 and 3. In particular,

LENGTH	1 inch (in)	= 25,4 mm (exactly)
	1 foot (ft)	= 304,8 mm (exactly)
MASS	1 pound (lb)	= 0,453 592 37 kg (exactly)
PRESSURE	1 pound-force per square inch (lbf/in <sup>2</sup> )	= 6 894,76 Pa
	or 1 psi	
VOLUME	1 cubic inch (in <sup>3</sup> )	= 16,387 064 · 10 <sup>-3</sup> dm <sup>3</sup> (exactly)
AREA	1 square inch (in <sup>2</sup> )	= 645,16 mm <sup>2</sup> (exactly)
VELOCITY	1 foot per second (ft/s)	= 0,304 8 m/s (exactly)
TORQUE	1 inch pound-force (in·lbf)	= 0,112 985 N·m

Page 11

Information given in the POLICY is relevant to the API publication only.

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## Appendix G

Information relating to the use of API monogram is relevant to the API publication only.

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# Specification for Pumping Units

API SPECIFICATION 11E (SPEC 11E)  
SIXTEENTH EDITION, OCTOBER 1, 1989

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Supplement 1  
(July 1, 1991)

## Specification for Pumping Units

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OFFICIAL PUBLICATION



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**Foreword**

This supplement contains revisions authorized at the 1990 Standardization Conference as reported in Circ PS-1920 and approved by letter ballot.

**Page 5.** Replace Par. 2.4 and Fig. 2.1 with the following:

**2.4 Walking Beam.** The following formula shall be used for rating conventional walking beams as shown in Fig. 2.1.

$$W = \frac{f_{cb}}{A} S_x$$

Wherein:

W = walking-beam rating in pounds of polished-rod load.

$f_{cb}$  = compressive stress in bending in pounds per square inch. See Table 2.1 for maximum allowable stress.

$S_x$  = section modulus in cubic inches. The gross section of the rolled beam may be used except that holes or welds are not permissible on the tension flange in the critical zone. See Fig. 2.1.

A = distance from centerline of saddle bearing to centerline of well in inches. See Fig. 2.1.

C = distance from centerline of saddle bearing to centerline of equalizer bearing in inches. See Fig. 2.1.

**Page 6.** Replace the equation in Column 4, Row 2 of Table 2.1 with:

$$* \frac{\sqrt{E I_y G J}}{S_x l}$$

Delete all the nomenclature at the end of Table 2.1 and replace it with:

\* Where:

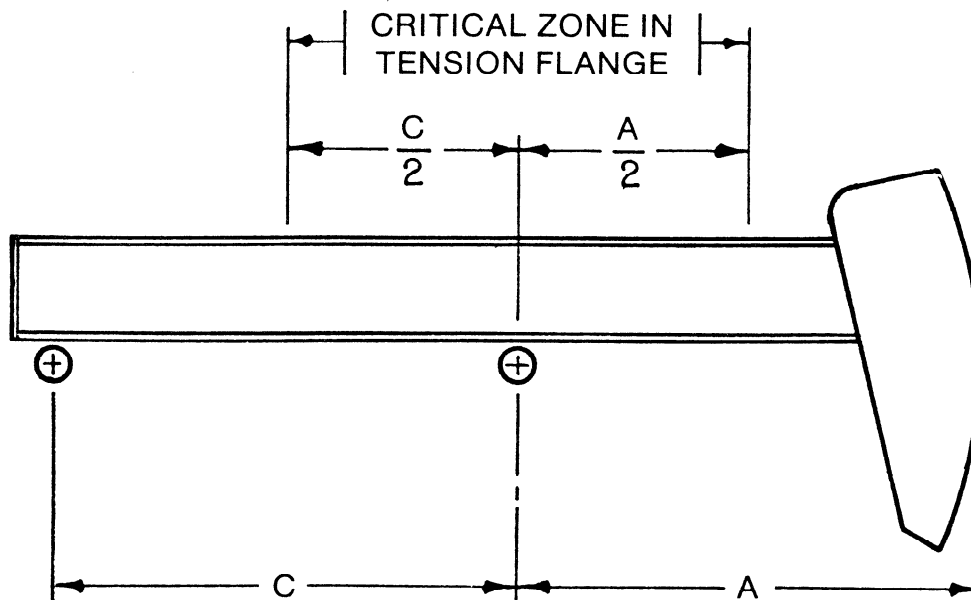
J = Torsional constant, in<sup>4</sup>

l = Longest laterally, unbraced length of beam, inches (longer of A or C (See Fig. 2.1)).

E = Modulus of elasticity; 29,000,000 psi.

$I_y$  = Weak axis moment of inertia, in<sup>4</sup>.

G = Shear modulus; 11,200,000 psi.



**FIG. 2.1**  
**WALKING-BEAM ELEMENTS**

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**Note**

This edition supersedes the fifteenth edition of Spec 11E. It includes changes adopted at the 1988 Standardization Conference as reported in Circ PS-1858 and subsequently passed by letter ballot.

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