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ERRATA 2
(Includes Errata 1)

This errata corrects editorial errors in the 18th Edition of API Spec 11E.

* Indicates a new errata item since the publishing of Errata 1.

* *Section 4, change:*

θ angle of crank rotation viewed with the wellhead to the right and with zero degrees occurring at 6 o'clock, in degrees

to

θ angle of crank rotation viewed with the wellhead to the right

NOTE The zero degree origin for θ changes with respect to the class of pumping unit.

and

ϕ angle between the 6 o'clock position and K, in degrees

to

ϕ angle between K and the θ ordinate that represents θ = 0 degrees

NOTE The zero degree origin for θ changes with respect to the class of pumping unit.

* NOTE: Changes to Section 4 of API 11E in Errata 2 correct previous revisions made in Errata 1.

* *Throughout document and in subsequent definitions, change:*

Ψ

to

Ψ_g

* *Section 7.2.3.2.2, Equation (14) and in subsequent definition, change:*

$\boldsymbol{\Psi}$

to

$\boldsymbol{\Psi_g}$

** Section 7.2.3.2.3, Equation (26) and in subsequent definition, change:*

Ψ

to

Ψ_g

** Section B.4, Figure B.3 under the "helix angle and normal pressure angle or transverse pressure angle (degrees)" section, change:*

Ψ

to

Ψ_g

* NOTE: Change to Figure B.3 in Errata 2 corrects previous revision made in Errata 1.

The changes listed below were issued with Errata 1 (March 2009).

Section 4, replace the ENTIRE section with:

The symbols and definitions used in this specification may differ from other specifications. Users should assure themselves that they are using these symbols and definitions in the manner indicated herein. See Annex C, Annex D, Annex E, and Annex F for additional symbol definitions that are exclusive to those annexes.

a	area of cross section, in square inches (in.^{2})
A	distance from the center of the saddle bearing to the centerline of the polished rod, in inches (in.)
A_t	tensile area of fastener, in square inches (in.^{2})
B	structural unbalance, in pounds (lb)
C	distance from the center of the saddle bearing to the center of the equalizer bearing, in inches (in.)
C_1	pitting velocity factor, unitless
C_2	pitting contact width factor, unitless
C_3	pitting stress for external helical gears, unitless
C_5	velocity factor for pitting resistance, unitless
C_b	bearing manufacturer's specific dynamic rating, in pounds (lb)
CB	counterbalance effect, in pounds (lb)
$C.D.$	standard center distance between gear shafts, in inches (in.)
C_m	load-distribution factor for pitting resistance, unitless
C_p	elastic coefficient, unitless
d	operating pitch-diameter of pinion, in inches (in.)
d_e	outside diameter minus two standard addendums for enlarged pinions, in inches (in.)
D	operating pitch diameter of gear, in inches (in.)

D_m major diameter of fastener, in inches (in.)

d_s shaft diameter, (for tapered shaft use mean diameter), in inches (in.)

E modulus of elasticity, in pounds per square inch (psi)

E_g modulus of elasticity for gears, in pounds per square inch (psi)

E_p modulus of elasticity for pinions, in pounds per square inch (psi)

F net face width, in inches (in.)

f_{cb} allowable compressive stress in bending, in pounds per square inch (psi)

$f_{s,b}$ maximum stress due to bending, in pounds per square inch (psi)

$f_{s,t}$ maximum stress due to torsion, in pounds per square inch (psi)

G height from the center of the crankshaft to the bottom of the base beams, in inches (in.)

G_τ shear modulus, in pounds per square inch (psi)

H height from the center of the saddle bearing to the bottom of the base beams, in inches (in.)

h_1 height of key in the shaft or hub that bears against the keyway, in inches (in.)

h_e minimum effective case depth, in inches (in.)

$H_{B,g}$ Brinell hardness for gears, unitless

$H_{B,p}$ Brinell hardness for pinions, unitless

I horizontal distance between the centerline of the saddle bearing and the centerline of the crank shaft, in inches (in.)

I_p geometry factor for pitting resistance, unitless

I_y weak axis second moment of inertia, in inches to the power four (in.^{4})

J Distance from the center of the crankpin bearing to the center of the saddle bearing, in inches (in.)

J_b geometry factor for bending strength, unitless

J_t torsional constant, in inches to the power four (in.^{4})

K distance from the center of the crankshaft to the center of the saddle bearing, in inches (in.)

k bearing rating factor, unitless

k_h factor applied to account for any uncorrected distortion due to hardening the gears, unitless

K_1 strength velocity factor, unitless

K_2 strength contact number, unitless

K_4 strength geometry number, unitless

K_5 velocity factor for bending strength, unitless

K_m helical gear load distribution factor, unitless

K_{ms} load distribution factor, static torque, unitless

K_y yield strength factor, unitless

l un-braced length of column, in inches (in.)

L length of key, in inches (in.)

L_{min} minimum total length of lines of contact in contact zone, in inches (in.)

M maximum moment of the rotary counterweights, cranks, and crankpins about the crankshaft, in inch-pounds (in.-lb)

M_a geometry constant for a given unit, in square inches (in.^{2})

m_g gear ratio, unitless

n end restraint constant, unitless

n_O rotational speed of output shaft, equal to the pumping speed, in revolutions per minute (rpm)

n_P pinion rotational speed, in revolutions per minute (rpm)

N_g number of teeth on gear, unitless

N_p number of teeth on pinion, unitless

N_t threads per inch of fastener

P effective length of the pitman, in inches (in.)

p thread pitch of metric fastener, in millimeters (mm)

P_a pressure in air counterbalance tank for a given crank position θ, in pounds per square inch (psi)

p_N normal base pitch, in inches (in.)

P_d diametral pitch in plane of rotation (transverse), in inverse inches (in.$^{-1}$)

P_{nd} the normal diametral pitch (the number of teeth per inch of diameter of the gear), in inverse inches (in.$^{-1}$)

P_R polished rod load, in pounds (lb)

PRP polished rod position for each crank position expressed as a fraction of the stroke above the lowermost position, unitless

r radius of gyration of section, in inches (in.)

R radius of the crank or of large sprocket, in inches (in.)

R_1 bearing load ratio, unitless

S ultimate tensile strength of chain, in pounds (lb)

S_{ac} allowable contact stress, in pounds per square inch (psi)

S_{at} allowable bending stress, in pounds per square inch (psi)

S_{ay} allowable yield strength of the gear or pinion material, in pounds per square inch (psi)

S_c compressive stress of key, in pounds per square inch (psi)

S_s shear stress of key, in pounds per square inch (psi)

S_x section modulus of walking beam, in inches cubed (in.^{3})

S_y yield strength of material, in pounds per square inch (psi)

T peak torque rating, in inch-pounds (in.-lb)

T_{ac} allowable transmitted torque at output shaft, based on pitting resistance, in inch-pounds (in.-lb)

$T_{as,i}$ allowable static torque at the gear or pinion being checked, in inch-pounds (in.-lb)

T_{at} allowable transmitted torque at output shaft based on bending strength, in inch-pounds (in.-lb)

T_n net torque at the crankshaft, in inch-pounds (in.-lb)

TF Torque Factor, in inches (in.)

T_r torque due to the rotary counterweights, cranks, and crank pins for a given crank angel θ, in inch-pounds (in.-lb)

T_t transmitted shaft torque, in inch-pounds (in.-lb)

T_{wn} torque, due to the net polished rod load for a given crank angle θ, in inch-pounds (in.-lb)

v_t pitch-line velocity, in feet per minute (fpm)

w width of key, in inches (in.)

W walking beam rating, in pounds (lb)

W_1 maximum load on bearing, in pounds (lb)

W_2 maximum applied load on column, in pounds (lb)

W_c counterbalance at the polished rod, determined using a dynamometer with crankpin at 90 degrees, in pounds (lb)

W_n net polished rod load, in pounds (lb)

Z length of line of action in the transverse plane, in inches (in.)

α angle between P and R measured clockwise from R to P, in degrees

β angle between C and P, in degrees

θ angle of crank rotation viewed with the wellhead to the right and with zero degrees occurring at 6 o'clock, in degrees

ρ angle between K and J, in degrees

τ angle of crank counterweight arm offset for front mounted geometry (Class III lever systems), in degrees

ϕ angle between the 6 o'clock position and K, in degrees

ϕ_n normal operating pressure angle, in degrees

ϕ_t operating transverse pressure angle, in degrees

f_{tb} tensile stress in extreme fibers in bending, in pounds per square inch (psi)

χ angle between C and J, in degrees

Ψ operating helix angle, in degrees

Ψ_b angle between C and K, at bottom (lowest) polished rod position, in degrees

Ψ_t angle between C and K, at top (highest) polished rod position, in degrees

Figure 2, ordinate value, use:

C_m

Figure 2, abscissa value, change:

W

to

F

Equation (30) change:

W_f

to

F

Figure 7, ordinate value, use:

P_{nd} in^{-1}

Section 7.4.8, change:

(A_s)

to

(A_t)

Figure B.3, change:

H.A.

to

Ψ

Equation (C.3), Equation (C.4), Equation (C.9), Equation (C.10), change:

W_2

to

P

Section C.4.4, Example 3, change:

β

to

B

Figure C.4a, NOTE, change:

M is the [P_{CB} at 90° – B (TF at 90°)]=

to

M = TF $_{\text{at } 90^\circ}$(CB $_{\text{at } 90^\circ}$ – B)=

and

TF is thetorque factor

to

TF is the torque factor

Figure C.4b, NOTE, change:

M is the [P_{CB} at 270° – B (TF at 270°)]=

to

M = $TF_{\text{ at 270°}}$($CB_{\text{ at 270°}}$ – B)=

Equation (D.3), Equation (D.4), Equation (D.9), Equation (D.10), change:

W_2

to

P

Section D.4.4, line 9 of the page, change:

P_{Rn}

to

W_n

Equation (E.3), Equation (E.4), Equation (E.9), Equation (E.10), change:

W_2

to

P

Section E.4.2, EXAMPLE 1, change:

C_2

to

W_c

Figure E.2, change:

P_{CB}

to

CB

Equation (F.3), Equation (F.4), Equation (F.9), Equation (F.10), change:

W_2

to

P

Equation (F.11), change:

W_2

to

P_R

Equation (F.12), change:

P_R

to

90°

Section F.4.4, EXAMPLE 1, change:

P_{Rn}

to

W_n

Figure F.2, change:

P_{CB}

to

CB

Figure F.4, change:

F_T

to

TF

Figure F.4 NOTE, change:

$= M =$

to

$M =$

Section G.1, Equation (6), change:

C_1

to

C_5

Section G.2.2, Equation (22), change:

J

to

J_b

Section G.2.3, Equation (22), change:

J

to

J_b