

12

MECHANICS OF MATERIALS

PART 1: Strength of Materials

Nomenclature

A	area	in ²
b	width	in
c	distance from neutral axis to extreme fiber	in
C	correction	-
D	diameter	in
e	eccentricity	in
E	modulus of elasticity	psi
F	force, or load	lbf
F.S.	factor of safety	
g	local gravitational acceleration	ft/sec ²
g _c	gravitational constant (32.2)	$\frac{\text{lbf-ft}}{\text{lbf-sec}^2}$
G	shear modulus	psi
I	moment of inertia	in ⁴
J	polar moment of inertia	in ⁴
k	spring constant	lbf/in
K	stress concentration factor, or end restraint coefficient	
L	length	in
m	mass	lbm
M	moment	in-lbf
n	ratio, rotational speed, or number	-, rpm, -
N	number of cycles	-
p	pressure	psi
Q	statical moment	in ³
r	radius, or radius of gyration	in
S	strength, or axial load	psi, lbf
t	thickness	in
T	temperature, or torque	°F, in-lbf
u	virtual truss load	lbf
U	energy	in-lbf
V	shear, or volume	lbf, in ³
w	load per unit length, or width	lbf/in, in

W	work	in-lbf
x	distance, or displacement	in
y	deflection, or distance	in
Z	section modulus	in ³

Symbols

δ	elongation, or displacement	in
θ	angle	degrees
ϕ	angle	radians
σ	normal stress	psi
α	coefficient of linear thermal expansion	1/°F
β	coefficient of volumetric thermal expansion	1/°F
γ	coefficient of area thermal expansion	1/°F
τ	shear stress	psi
ϵ	strain	-
μ	Poisson's ratio	-

Subscripts

a	allowable
b	bending
br	bearing
c	centroidal, or compressive
e	endurance, Euler, or equivalent
ext	external
h	hoop
i	inside
L	long
o	original, or outside
p	pull
s	shear
t	transformed, tension, or temperature
th	thermal
T	torsion
u	ultimate
y	yield

