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Loaded pins in axially loaded bars. Maximum elastic stress at hole boundary

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LOADED PINS IN AXIALLY LOADED BARS. MAXIMUM ELASTIC STRESS AT HOLE BOUNDARY

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1. NOTATION

Both SI and British units are quoted but any coherent system of units may be used.

D	width of bar	m	in
d	hole diameter	m	in
$d + \varepsilon$	pin diameter	m	in
E	Young's modulus of bar material	N/m^2	lbf/in^2
E_1	Young's modulus of pin material	N/m^2	lbf/in^2
f_{ref}	$\dfrac{P_{pin} + \alpha P_{pl}}{(D - d)t}$	N/m^2	lbf/in^2
P_{pin}	load applied by pin to bar acting along bar axis	N	lbf
P_{pl}	total axial load in bar excluding P_{pin}	N	lbf
q	maximum shear stress on transverse diameter of hole in joint with push-fit pin (see Section 2.2)	N/m^2	lbf/in^2
q'	maximum shear stress on transverse diameter of hole in joint with interference-fit pin	N/m^2	lbf/in^2
q'_0	maximum shear stress on transverse diameter of hole due to interference alone*	N/m^2	lbf/in^2
t	thickness of bar	m	in
α	proportion of plate load treated as equivalent pin load		
ν	Poisson's ratio for bar material		
ν_1	Poisson's ratio for pin material		

* q'_0 is obtained from ESDU 71011 "Stresses due to interference-fit pins and bushes in plates, strips or lugs", and is equivalent to q of that Item obtained using E_1 and ν_1 in place of E_1 and ν_1 respectively.

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