

DIN 2413:2020-04 (E)

Seamless steel tubes for oil- and water-hydraulic systems - Calculation rules for pipes and elbows for dynamic loads

Contents

Page

7.2.6	Circumferential bending stresses as a result of out-of-roundness	31
7.3	External pressure	31
7.4	Classification and assessment of stresses	31
7.4.1	General	31
7.4.2	Stress categories	32
7.4.3	Plastic theory	33
7.4.4	Reference stresses	33
7.4.5	Limitation of stresses	33
	Bibliography	34
	Figures Figure 1 -- Schematic representation of an elbow with dimensions, notation	13
	Figure 2 -- Decreased fatigue strength of elbows with non-round cross-section	18
	Figure 3 -- BI and BA for a known inside diameter	19
	Figure 4 -- BI and BA for a known outside diameter	20
	Figure 5 -- Design factor B for elbows where the wall thickness $s_{vi} = s_{va}$ with outside diameter = nominal diameter	21
	Figure 6 -- Fatigue strength of seamless steel pipes with an outside diameter $d_a > 114,3$ mm	26
	Figure 7 -- Fatigue strength of seamless steel pipes with an outside diameter $d_a \leq 114,3$ mm, quality characteristics as in DIN EN 10216-1 or comparable standards and codes of practice	26
	Tables Table 1 -- Units	6
	Table 2 -- Symbols	6
	Table 3 -- Determining the design wall thickness s_v and test pressure p'	10
	Table 4 -- Mechanical characteristics of the relevant materials	12
	Table 5 -- Analysis of stress (reference stresses based on the maximum shear theory)	17
	Table 6 -- Maximum number of load cycles for seamless steel pipes with an outside diameter $>$ $114,3$ mm (determined with $SL = 10$ as in Figure 6)	23
	Table 7 -- Maximum number of load cycles for seamless steel pipes with an outside diameter $\leq 114,3$ mm, quality characteristics as in DIN EN 10216-1 or comparable standards and codes of practice (determined with $SL = 10$ as in Figure 7)	23