

ISO/TS 13725:2016-06 (E)

Hydraulic fluid power - Method for evaluating the buckling load of a hydraulic cylinder

Contents		Page
Foreword		iv
Introduction		v
1	Scope	1
2	Symbols and units	1
2.1	General	1
2.2	Additional notations	2
3	General principles	3
3.1	Purpose	3
3.2	Description	3
3.3	Dimensional layout of hydraulic cylinder	3
3.4	Common calculation of maximum stress in the rod (for all mounting types) max	5
3.4.1	Deflexion curve	6
3.4.2	Bending moment	6
3.4.3	Maximum value of the bending moment	6
3.4.4	Maximum stress of the piston rod	7
3.4.5	Mounting types of the cylinder tube and piston rod	7
4	Case of pin-mounted hydraulic cylinders	8
4.1	Model of the hydraulic cylinder and unknown values	8
4.2	Linear system	9
4.3	Critical buckling load	9
4.4	Greatest allowable compressive load	10
5	Case of hydraulic cylinders fixed at the beginning of the cylinder tube and pin mounted at the end of the piston rod	10
5.1	Critical buckling load	10
5.2	Linear system	10
6	Case of hydraulic cylinders pin mounted at the beginning of the cylinder tube and fixed at the end of the piston rod	11
6.1	Critical buckling load	11
6.2	Linear system	11
7	Case of hydraulic cylinders fixed at both ends	12
7.1	Critical buckling load	12
7.2	Linear system	12
8	Case of hydraulic cylinders fixed at the beginning of the cylinder tube and free at the end of the piston rod	13
8.1	Critical buckling load	13
8.2	Linear system	14
9	Case of hydraulic cylinders fixed at both ends with free movement allowed at the end of the piston rod	15
9.1	Critical buckling load	15
9.2	Linear system	15

Annex A (informative) Example of numerical results	17
Bibliography	19