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