DIN EN 12516-1:2018-11 (E)

Industrial valves - Shell design strength - Part 1: Tabulation method for steel valve shells (includes Amendment A1:2018)

Contents

Page

European foreword ... 5

Introduction ... 7

1 Scope ... 9

2 Normative references ... 9

3 Terms and definitions ... 10

4 Symbols and units ... 11

5 Material groups and material temperature limitations ... 12

6 Pressure/temperature (*p/t*) ratings ... 12
6.1 General ... 12
6.2 Standard rating ... 12
6.3 Special Class ... 12
6.4 Limited Class ... 12
6.5 Intermediate ratings ... 12
6.6 Flanged ratings ... 12

7 Temperature effects ... 13
7.1 Temperature limits ... 13
7.2 Fluid thermal expansion ... 13

8 Dimensions ... 13
8.1 Minimum wall thickness ... 13
8.2 Inside diameter ... 13
8.3 Valve body necks ... 14
8.4 Local areas ... 16
8.5 Contours at body ends ... 16
8.5.1 Butt welding ends ... 16
8.5.2 Socket welding and threaded ends ... 16
8.6 Additional metal thickness ... 17
8.7 Bonnets, cover and connections ... 17
8.8 Wafer or flangeless valves ... 17

9 Auxiliary connections ... 19
9.1 General ... 19
9.2 Pipe thread tapping ... 19
9.3 Socket welding ... 19
9.4 Butt welding ... 20
9.5 Bosses ... 20

10 End dimensions ... 21
10.1 Flanged ends ... 21
10.2 Butt welding ends ... 21
10.3 Socket welding ends ... 21
10.4 Threaded ends ... 21
10.5 Intermediate rated socket welding and threaded ends ... 21

11 Marking ... 21
11.1 Standard rating valves ... 21

11.2 Special Class valves 21
11.3 Limited Class valves 22
11.4 Intermediate rating valves 22

Annex A (normative) Methods used for establishing pressure/temperature ratings 72
A.1 Minimum wall thickness 72
A.2 Material properties 73
A.3 Pressure/temperature ratings 74
A.3.1 General 74
A.3.2 Selected stress values for steels from group 3E0 to 9E1 75
A.3.3 Selected stress values for steels from group 10E0 to 16E0 75
A.3.4 Maximum ratings 75

Annex B (informative) Material groups 76

Annex C (informative) Special Class 78
C.1 General 78
C.2 Required examination 78
C.2.1 Castings 78
C.2.2 Forgings, bars, plates and tubular products 80
C.2.3 Drop forgings 81
C.2.4 Welded fabrication 81
C.2.5 Defect removal and repair — Repair by welding 81
C.3 Method for establishing Special rating 87
C.3.1 Methods for all materials 87
C.3.2 Special ratings 88

Annex D (informative) Radiographic procedure and acceptance standards 108
D.1 Radiographic procedure 108
D.2 Acceptance standards 109

Annex E (informative) Magnetic particle examination procedure and acceptance standards 110
E.1 General 110
E.2 Acceptance standards 110
E.2.1 Castings 110
E.2.2 Forgings and rolled or wrought material and drop forgings 110

Annex F (informative) Liquid penetrant examination procedure and acceptance standards 112
F.1 Procedure 112
F.2 Acceptance criteria 112
F.2.1 Castings 112
F.2.2 Forgings, rolled or wrought material and drop forgings 112

Annex G (informative) Ultrasonic examination procedure and acceptance standards 113
G.1 Procedure for forgings and rolled or wrought material 113
G.1.1 General 113
G.1.2 Extent of examination 113
G.1.3 Acceptance standards 113
G.2 Procedure for castings 113
G.2.1 General 113
G.2.2 Extent of examination 113
G.2.3 Acceptance standards 113

Annex H (informative) Requirement for Limited Class valves in sizes DN 65 and smaller 114
H.1 General 114
H.2 Limited Class rating method 114
H.3 Dimensions 115

H.3.1 General **115**
H.3.2 Inside diameter **115**
H.3.3 Wall thickness **115**
H.3.4 Valve body necks **115**
H.3.5 Contours for body run transitions **115**
H.3.6 Additional metal thickness **115**
H.3.7 Welded fabrication **116**

Annex I (informative) ASTM/ASME material **117**
I.1 General **117**
I.2 Material groups **117**
I.3 Minimum wall thickness **118**
I.4 Material properties **118**
I.5 Pressure/temperature ratings **118**
I.5.1 Standard rating **118**
I.5.2 Special rating **118**

Annex J (informative) Relationship between DN, NPS, pipe inside diameter D_{ni}, pipe outside diameter OD **196**

Annex ZA (informative) Relationship between this European Standard and the essential requirements of Directive 2014/68/EU (PED) aimed to be covered **200**

Bibliography **201**