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