

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

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

---

<b>Contents</b>		<b>Page</b>
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 ( <i>p/t</i> ) 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
<b>Annex A</b>	<b>(normative) Methods used for establishing pressure/temperature ratings.....</b>	<b>72</b>
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
<b>Annex B</b>	<b>(informative) Material groups.....</b>	<b>76</b>
<b>Annex C</b>	<b>(informative) Special Class.....</b>	<b>78</b>
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
<b>Annex D</b>	<b>(informative) Radiographic procedure and acceptance standards.....</b>	<b>108</b>
D.1	Radiographic procedure .....	108
D.2	Acceptance standards .....	109
<b>Annex E</b>	<b>(informative) Magnetic particle examination procedure and acceptance standards..</b>	<b>110</b>
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
<b>Annex F</b>	<b>(informative) Liquid penetrant examination procedure and acceptance standards...</b>	<b>112</b>
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
<b>Annex G</b>	<b>(informative) Ultrasonic examination procedure and acceptance standards.....</b>	<b>113</b>
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
<b>Annex H</b>	<b>(informative) Requirement for Limited Class valves in sizes DN 65 and smaller .....</b>	<b>114</b>
H.1	General .....	114
H.2	Limited Class rating method.....	114
H.3	Dimensions .....	115

<b>H.3.1</b>	<b>General</b> .....	<b>115</b>
<b>H.3.2</b>	<b>Inside diameter</b> .....	<b>115</b>
<b>H.3.3</b>	<b>Wall thickness</b> .....	<b>115</b>
<b>H.3.4</b>	<b>Valve body necks</b> .....	<b>115</b>
<b>H.3.5</b>	<b>Contours for body run transitions</b> .....	<b>115</b>
<b>H.3.6</b>	<b>Additional metal thickness</b> .....	<b>115</b>
<b>H.3.7</b>	<b>Welded fabrication</b> .....	<b>116</b>
<b>Annex I (informative) ASTM/ASME material</b> .....		<b>117</b>
<b>I.1</b>	<b>General</b> .....	<b>117</b>
<b>I.2</b>	<b>Material groups</b> .....	<b>117</b>
<b>I.3</b>	<b>Minimum wall thickness</b> .....	<b>118</b>
<b>I.4</b>	<b>Material properties</b> .....	<b>118</b>
<b>I.5</b>	<b>Pressure/temperature ratings</b> .....	<b>118</b>
<b>I.5.1</b>	<b>Standard rating</b> .....	<b>118</b>
<b>I.5.2</b>	<b>Special rating</b> .....	<b>118</b>
<b>Annex J (informative) Relationship between DN, NPS, pipe inside diameter <math>D_{ni}</math>, pipe outside diameter OD</b> .....		<b>196</b>
<b>Annex ZA (informative) Relationship between this European Standard and the essential requirements of Directive 2014/68/EU (PED) aimed to be covered</b> .....		<b>200</b>
<b>Bibliography</b> .....		<b>201</b>