DIN 21057-1:2023-08 (E)

Pipe classes for process plants - Part 1: General - General principles for creating pipe classes

Contents

Page

Foreword ... 5

1 Scope ... 6

2 Normative references ... 6

3 Terms and definitions, symbols and units ... 7
3.1 Terms and definitions ... 7
3.2 Symbols and units ... 8

4 General design principles ... 10
4.1 Design of piping components ... 10
4.2 Pressure/temperature ratings ... 10
4.2.1 General ... 10
4.2.2 Minimum temperature ... 11
4.2.3 Maximum temperature ... 11
4.3 Cyclic loading ... 12
4.4 Vacuum resistance ... 12

5 Materials ... 12

6 Parameters for the design of piping components under internal pressure ... 12
6.1 Allowable stresses for piping components ... 12
6.2 Allowable stress for fasteners ... 13
6.3 Corrosion allowances ... 13
6.4 Tolerances and allowable wall thickness minus tolerances ... 13
6.5 Weld factors ... 13
6.6 Test conditions ... 13

7 Requirements for piping components ... 14
7.1 General requirements for piping components ... 14
7.2 Pipes ... 14
7.3 Fittings ... 14
7.3.1 General ... 14
7.3.2 Pipe bending (cold forming of pipes) ... 14
7.3.3 Pipe elbows ... 15
7.3.4 Reducers ... 16
7.3.5 Flexible piping elements ... 16

8 Branches ... 16
8.1 Branch types ... 16
8.2 Calculation of branches ... 17
8.2.1 General ... 17
8.2.2 Wall thickness ratio ... 18
8.2.3 Calculation method and selection ... 18
8.2.4 Design and fabrication notes ... 19
8.2.5 Adaptation of pipe connections ... 19
8.2.6 Angular offset ... 19

9 Branch tables for pipe classes ... 20
9.1 General ... 20
9.2 Explanatory notes on the branch tables ... 20

10 Dished ends ... 23
11 Flanges ... 23
11.1 General principles ... 23
11.2 Flange facings ... 23
12 Flange joint ... 24
12.1 General principles ... 24
12.2 Additional pipe forces, external loads ... 24
12.3 Tightening torque — Basic provisions ... 24
12.3.1 General ... 24
12.3.2 Friction coefficient ... 24
12.4 Gaskets ... 25
12.4.1 Gasket types and materials ... 25
12.4.2 Gasket dimensions ... 25
12.4.3 Gasket parameters ... 25
13 Specification sheets for pipe classes ... 25
Annex A (informative) Pipe class designation ... 27
A.1 General ... 27
A.2 Designation ... 27
A.3 Selecting/establishing a pipe class ... 27
A.4 Pipe material group ... 27
A.5 Flange facing or connection type ... 28
A.6 Gaskets ... 29
A.7 Materials ... 29
Annex B (informative) Colour coding ... 31
Bibliography ... 33

Figures

Figure 1 — Qualitative comparison of pressure/temperature rating for flange and piping component ... 11
Figure 2 — Wall thickness ratio ... 18
Figure 3 — Adaptation of pipe connections ... 19
Figure 4 — Angular offset ... 20
Figure A.1 — Pipe class designation ... 27

Tables

Table 1 — Symbols and units ... 9
Table 2 — Determination of allowable stresses ... 12
Table 3 — Corrosion allowances ... 13
Table 4 — Minimum radius of bend for cold-formed bends ... 15
Table 5 — Branch types ... 16

Table 6 — Explanatory notes on the branch tables **21**

Table 7 — Comparison of flange facings **23**

Table A.1 — Classification into material groups **28**

Table A.2 — Connection types **28**

Table A.3 — Gasket groups **29**

Table A.4 — B — Unalloyed steels with specified properties at room temperature **29**

Table A.5 — C — Unalloyed and alloyed steels with specified properties at elevated temperatures **30**

Table A.6 — F —Alloyed fine-grained structural steels and alloyed steels with specified properties at low temperatures **30**

Table A.7 — H — Stainless steels **30**

Table B.1 — Colour coding of pipes **31**

Table B.2 — RAL colours **32**