

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