msc
Madhuker Steel Centre

ISO 9001:2015 CERTIFIED APPROVED

Petrochemical

Power Generation

Oil & Gas

SPECIALITY STEEL SOLUTION

Marine Precision Engineering

Pharmaceutical Aerospace

About us:

'Madhukar Steel Centre' is a leading manufacturer and distributor who deals in various steel products such asstainless steel, alloy steel, carbon steel, nickel & special metals alloys. Our products are broadly valued for its outstanding fabrication and finishing, sturdiness and cost effectiveness. Equipped with an experience of over 4 decades in industrial steel & executing over 100 large projects satisfactorily, 'Madhukar Steel Centre' has emerged as a leading producer of pipes & pipes fittings that are quality certified by TUV Rheinland (INDIA),PED & ISO 9001 : 2015.

'Madhukar Steel Centre' has began its journey in the year 2017dr. We make sure that we offer the best quality products by latest industry standards along with modern technologies. Our product line represents the highest standard in productivity and reliability terms.

Our products are procured from certified vendors in the market who offer quality standard products with competitive prices.

'Madhukar Steel Centre' is a client focused company - we purely value our customer requirements and expectation, which is evident with the growing consumer base over the years as we consistently strive to enrich our customer experience.

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INTRODUCTION TO THE COMPANY

MADHUKAR has an in-depth experience of over 4 decades of steel industry and constantly taps it to its client's advantage.

MADHUKAR believes in 100% performance and consistency in its services, which is vital for creating lasting customer values. Client trust and satisfaction have been an integral part of MADHUKAR for the past 40 years. This is what drives us to find the very best solutions for our clientsin any given situation.

Our store is furnished and equipped with top-notch quality materials while ensuring secure planning and acost-effective purchasing process.

We are focused on making an ideal atmosphere to ensure great customer service with premium support. We currently have two central warehouses in Kalamboli plot No -1445/Vasai Palghar Plot No-342, which stores morethan 6000 tons of pipes, flanges, elbows, and butt-weld fittings, and pipe accessories.

This clearly shows our tremendous expertise in the aspects of the product knowledge, its standards & its applied science. This vast reservoir of expertise helps us assist our customers in planning, construction, and maintenance management.

With our reliable and efficient logistics services, we can vouch for the 'on-time delivery' of our products and services.

EN & DIN Standards

Pipes / Tubes As per DIN EN

Standards

Carbon Steels	DIN EN
Seamless pipes	10216-1 to 4
Welded pipes	10217-1 to 6
Precision steel pipes	10305-1 to 5
Stainless Steels	
Seamless pipes	10216-5
Welded pipes	10217-7
Precision steel pipes	10305-1 to 2
Line Pipes	
Seamless and welded pipes	10208 and ISO 3183

Material Grades

- P235TR1
- P235GH TC1 and TC2
- 16Mo3, 13CrMo4-5
- P215NL, P265NL, 12Ni14, X10Ni9
- L290NB, L360NB, L290NE, L360NE
- 1.4301, 1.4306, 1.4307, 1.4541
- 1.4401, 1.4404, 1.4571
- 1.4410 (Superduplex), 1.4462 (Duplex)
- 1.4529, 1.4539, 1.4547

Types

Seamless and welded

Dimensions and Weights

Carbon Steels / DIN EN 10220
Stainless Steels / DIN EN ISO 1127

DIN and EN Flanges

Madhukar provides, Coating, Marking (Trademark material designation) cutting & beveling, tapering, short blasting or as per requiredspecification.

Standards DIN EN 10 2-1and DIN

Neck Flanges	Typ	DIN
Weld Neck Flanges	11	2627–2638
Weld Neck Collars	34	2673–2676
Slip-on Flanges	12	86029/30
Threaded Flanges	13	2565–2569
Flat Flanges		
Flanges for welding	01	2573, 2576
Loose Flanges	04	2673–2676
Blind Flanges	05	2527
Collars		
Flat Collars	32	2641/2, 2655/6
Weld-on Collars	37	2641/2

Flanges for vessels, process apparatus and automated welding process
PAS 1057-6, Special Flanges acc. to drawing

Material Grades

- S235JR / RSt 37-2, S355J2 / St 52-3
- P250GH / C 22.8, P245GH, P265GH
- 16Mo3, 13CrMo4-5
- P355QH1 / W/TStE 355
- 1.4301, 1.4307, 1.4541
- 1.4401, 1.4404, 1.4571
- 1.4410 (Superduplex), 1.4462 (Duplex)
- 1.4529, 1.4539, 1.4547

Pressure Classes

PN 6 to 400

Facing

Acc. to DIN 2526, DIN EN 1092-1 and to customer specification

Dimensions

Standard dimensions

DIN EN and DIN Butt-weld Fittings

Madhukar provides, Coating, Marking (Trademark material designation) cutting & beveling, tapering, short blasting or as per requiredspecification.

DIN EN 10253 and DIN Standards

Butt-weld Fittings	Typ	DIN
Elbows	A/B	2605 Teil 1/2
Tees	A/B	2615 Teil 1/2
Reducers, concentric	B	2616 Teil 2
Reducers, eccentric	A/B	2616 Teil 1/2
Caps	B	2617

Special Fittings made of plates, round-bar steels acc. to drawing

Material Grades

- S235 / St 37.0
- P235GH / St 35.8
- P250GH, P265GH
- 16Mo3, 13CrMo4-5
- L290NB / L290NE
- L360NB / L360NE
- P355QH1 / W/TStE 355
- 1.4301, 1.4306, 1.4307, 1.4541
- 1.4401, 1.4404, 1.4571
- 1.4410 (Superduplex), 1.4462 (Duplex)
- 1.4529, 1.4539, 1.4547

Types

Seamless and welded

Elbow Types

2D, 3D and 5D or as per customer specification

Dimensions

All standard dimensions

ASTM, ASME & API Standards

ASTM / ASME / API - Pipes & Tubes

Standards

B 36.10, B 36.19 and API 5L

Material Grades

- SA 53 Gr. B, A/SA 106 Gr. B, API 5L Gr. B
- SA 335 Gr. P5, P9, P11, P12, P22, P91
- SA 333 Gr. 6
- API 5L Gr. X52, X60, X65
- SA 312 Gr. TP 304/L, TP 316/L
- Duplex, Special Alloys

Dimensions

1/2" to 48

Wall Thicknesses

All schedules

Types

Seamless and welded

Standards

B 16.5, B 16.47 Series A+B and B.S. 3293
API 6A

Material Grades

- SA 105/C21, P250GH
- SA 182 Gr. F5, F9, F11, F12, F22, F91
- SA 350 Gr. LF2, W/TStE 355, P355QH1, W/TStE 355
- SA 694 Gr. F52, F60, F65
- SA 182 Gr. F304/L, F316/L
- 1.4541, 1.4571
- F53 (Superduplex), F51 (Duplex)
- Special Alloys

Pressure Classes

Class 150 – 2500
2,000 – 20,000 psi

Types

- Blind Flanges
- Lap Joint Flanges
- Long Welding Neck Flanges
- Orifice Flanges B 16.36
- Socket Welding Flanges
- Slip-on Flanges
- Spectacle Blind B 16.48
- Weld Neck Flanges
- Threaded Flanges
- Flanges according to drawings

Facings

- RF and RTJ
- Above all requirements covered acc. to our customer required specification.

Dimensions

1/2" to 48"

ASTM / ASME Butt-weld Fittings

Madhukar provides, Coating, Marking (Trademark material designation) cutting & beveling, tapering, short blasting, requirement as per our customer specification.

Standards

B 16.9

Material grades

- SA 234 Gr WPB
- SA 234 Gr WP5, WP9, WP11, WP12, WP22, WP91
- SA 420 Gr WPL6
- SA 860 Gr WPHY42, WPHY52
  - L290NB / L290NE
  - L360NB / L360NE
  - SA 403 Gr WP304/L, WP316/L
  - Duplex, Special Alloys

Wall thicknesses

Schedule

Types

- Caps Elbows, seamless and welded
- Elbows, seamless and welded
- Reducers, concentric and eccentric, seamless and welded
- Stub Ends
- Tees, seamless and welded
- All Special Fittings are made of plates, Rods steels acc. to drawing

Elbow types

LR :- Long Radius
SR :- Short Radius

Dimensions

1/2" to 48"

ASME, EN & DIN Standards

ASME / ASTM Screws, Bolts and Nuts

Standards

- Screws
  DIN ISO 4014, 4016 and 4017
- Nuts
  DIN ISO 4032 and DIN ISO 4034
- Stud bolts DIN 2510
- B 16.5 and B 18.2.2

Grades

- 4.6, Grade 5
- 24 CrMo 5 and Ck 35
  DIN 17240 / DIN EN 10269
- V4A, V2A, A2-70, A4-70
- 1.4301, 1.4401, 1.4541, 1.4571
  DIN 17440 / DIN EN 10269
- ASTM/ ASME SA 193 Gr. B7 stud bolts
- ASTM/ ASME SA 194 Gr. 2H nuts
- Other materials to customer specifications

Dimensions

For all standard flange sizes

ASME / ASTM High-Pressure Fittings

Standards

High pressure forged steel fittings and branch outlet fittings

Material Grades

- A/SA 105/C21
- A/SA 182 Gr. F5, F11, F12, F22, F91
- A/SA 350 Gr. LF2, W/TStE 355
- A/SA 182 Gr. F304/L, F316/L
- 1.4541, 1.4571
  F53 (Superduplex), F51 (Duplex)

Pressure Classes

Class 2000, 3000, 6000, 9000

Wall Thicknesses

All schedules

Designs

Socket weld (SW) and threaded (NPT

Surfaces

Black, galvanized and hot-dip galvanized

Dimensions
1/4" to 4"

Pipes & Tubes Standard

Lucrative Expertise for Steel Piping & Tubing

When it comes to steel pipes & tubes, we have a vast diversity of inventory, storage capacity, packaging & logistics services, and that helps us fulfill our customer demands without any shortcomings.

Piping & Tubing Expertise

Because of our customer's trust and appreciation in our steel piping expertise for many long years, we were able to establish and expand our two fully automated pipe storage capacity design systems located centrally in Taloja, Plot No. 112.We can supply the steel piping as per DIN and ASME standards ranging from Carbon steel, Stainless steel, and API line pipes as per DIN EN ISO 3183.

We even stock pipes which can be utilized in the storage and refrigeration industry. We can also stock and supply custom pipes to meet customer's -custom made and specific requirements for special uses and applications.

We define each batch as per quality and priority and dispatch the products based on top priority customer demands, clearing our storage space and guarantee precision handling of our customer's orders.

EN Standards Comparison

DIN EN 10216 Seamless Steel Pipes for Pressure

DIN Replacement	EN	Description
1629 / 1630	10216-1	Non-alloy steel tubes with specified room temperature properties
17175	10216-2	Non-alloy and alloy steel tubes with specified elevated temperature properties
17179	10216-3	Alloy fine grain steel tubes
17173	10216-4	Non-alloy and alloy steel tubes with specified by temperature properties
17458 / 17459	10216-5	Stainless steel tubes

DIN EN 10217 Welded Steel Pipes for Pressure

DIN Replacement	EN	Description
1626 / 1628	10217-1	Non-alloy steel tubes with specified room temperature properties
17177	10217-2	Electric welded non-alloy & alloy steel tubes with specified elevated temperature properties
	10217-5	Submerged arc welded non-alloy & alloy steel tubes with specified elevated temperature properties
17178	10217-3	Alloy fine grain steel tubes
17174	10217-4	Electric welded non-alloy steel tubes with specified low temperature properties
17174	10217-6	Submerged arc welded non-alloy steel tubes with specified low temperature properties
17457	10217-7	Stainless steel tubes

(Petroleum and Natural Gas Industries) Steel Pipes for Pipeline Transportation Systems

DIN Replacement	EN	Description
10208-1 / -2	ISO 3183	Petroleum and natural gas industries / steel pipes for pipeline transportation systems

DIN EN 10208/ISO 3183 - Steel Pipes for Pipelines for Combustible Fluids

DIN Replacement	EN	Description
2470-1	10208-1	Requirement class A (to 16 bar operating pressure)
2470-2 / 17172	10208-2	Requirement class B (over 16 bar operating pressure)

Gas Infrastructure / Pipelines for Maximum Operating Pressure $\leq$ 16 Bar

DIN Replacement	EN	Description
2470-1	12007-1	General functional requirements
	12007-2	Specific functional requirements for polyethylene (MOP) up to and including 10 bar
	12007-3	Specific functional requirements for steel
	12007-4	Specific functional requirements for renovation
	12007-5	Service lines – Specific functional requirements

DIN EN 10305 – Steel Pipes for Precision Applications

DIN Replacement	EN	Description
2391-1 / -2	10305-1	Seamless cold drawn steel tubes
2393-1 / -2	10305-2	Welded cold drawn steel tubes
2394-1 / -2	10305-3	Welded cold sized steel tubes
2391-1 / -2 in connection with DIN 1630	10305-4	Cold drawn seamless tubes for hydraulic and pneumatic power systems
2395-1 / -2	10305-5	Welded and cold sized square and rectangular tubes
	10305-6	Cold drawn welded tubes for hydraulic and pneumatic power systems

DIN EN 10210 – Hot Finished Structural Sections

DIN Replacement	EN	Description
17120 – 17125	10210-1	Hot finished structural hollow sections
59410	10210-2	Hot finished structural hollow sections of non-alloy and fine grain steels (**Dimensions)**

DIN EN 10296 – Welded Steel Tubes for Mechanical and General Engineering Purposes

DIN Replacement	EN	Description
1626 / 17123	10296-1	Welded circular steel tubes for mechanical and general engineering purpose **(Non-alloy and alloy steels)**
17455	10296-2	Welded circular steel tubes for mechanical & general engineering purpose **(Stainless steels)**

Non-Alloy Steel Pipes – Welding and Threading

DIN Replacement	EN	Description
2440 / 2441	10255	Non-alloy steel pipes suitable for welding and threading

DIN EN 10219 – Cold Formed Structural Hollow Sections

DIN Replacement	EN	Description
17119/-20/-23	10219-1	Cold formed structural hollow sections of non-alloy and fine grain steels
59411	10219-2	Cold formed structural hollow sections of non-alloy and fine grain steels

DIN EN 10297 – Seamless Steel Tubes for Mechanical and General Engineering

DIN Replacement	EN	Description
1629 / 17124	10297-1	Seamless circular steel tubes for mechanical and general engineering purpose **(Non-alloy and alloy steels)**
17456	10297-2	Seamless circular steel tubes for mechanical & general engineering purpose **(Stainless steels)**

Seamless Steel Pipes for Pressure Applications

DIN EN 10216 in comparsion to earlier DIN Standards

DIN	EN	Area of Application
1629 / 1630	10216-1	Non-alloy steel tubes with specified room temperature properties
17175	10216-2	Non-alloy and alloy steel tubes
17179	10216-3	Alloy fine grain steel tubes with specified room temperature properties
17173	10216-4	Non-alloy and alloy steel tubes with specified low temperature properties
17458 / 17459	10216-5	Stainless steel tubes

Non-alloy steel tubes with specified properties of room temperature
Application: acc. to rules and standards of DVGW, TRB, TRD and AD 2000 Data Sheet W4
(only TR2 approved under PED)

Standards (DIN)	Operating Temperature / Working Pressure	Size Range	EN Materials	Notes
EN 10216-1 (DIN 1629)	to 300° C / to 160 bar	10,2–711,0 mm	P235TR1 (St 37.0) P265TR1 (St 44.0)	**TR1** without impact test
EN 10216-1 (DIN 1630)	to 300° C / to unlimited		P235TR2 (St 37.4) P265TR2 (St 44.4)	**TR2** impact test a 0° C (optional –10° C)

Non-alloy and alloy steel tubes with specified properties of elevated temperature
Application: pipeline & plant engineering, pressure vessels and apparatus engineering, Boiler construction

Standards (DIN)	Operating Temperature / Working Pressure	Size Range	EN Materials	Notes
EN 10216-2 (DIN 17175)	Non-alloy tubes: **TC1** / to 450° C / 160 bar **TC2** / to 450° C / unlimited Alloy tubes: **TC2** / to 600° C / unlimited	10,2–711,0 mm	P235GH (St 35.8) P265GH (St 45.8) 16Mo3 (15Mo3) 13CrMo4-5 (13CrMo44)	**TC1** without US testing **TC2** with US testing (generally with alloy steels)

Alloy fine grain steel tubes
Application: Apparatus, general mechanical engineering and tool-building, pressure vessel, pipelines,

Standards (DIN)	Test classes	Size range	EN materials	
EN 10216-3 (DIN 17179)	**TC1** without US testing **TC2** with US testing	10,2–711,0 mm	basic quality	P355N (StE 355) P460N (StE 460)
			special low temperature quality	P275NL2 (EStE 285) P355NL2 (EStE 355) P460NL2 (EStE 460)
			low temperature quality	P275NL1 (TStE 285) P355NL1 (TStE 355) P460NL1 (TStE 460)
			elevated temperature quality	P355NH (WStE 355) P460NH (WStE 460)

Non-alloy and alloy steel tubes with specified low temperature properties
Application: Apparatus, general pipeline engineering, pressure vessel and refrigeration system

Standards (DIN)	Test Classes	Size Range	EN Materials	Official Rule (DIN)
EN 10216-4 (DIN 17173)	Non-alloy tubes: **TC1** without US testing **TC2** with UA testing Alloy tubes: general **TC2**	10,2–711,0 mm	P215NL (TTSt 35N) P255QL (TTSt 35V) 12Ni14 (10Ni14) X12Ni5 (12Ni19)	AD 2000 Data Sheet W4/W10

Stainless steel tubes
Application: Pressure vessel, apparatuspipeline & plant engineering (transportation of corrosive materials)

Standards (DIN)	Test Classes / Operating Temperature	Size Range	EN Materials (comparable to ASTM A312)		AD 2000-W2 Rule
EN 10216-5 (DIN 17459) EN 10216-5 (DIN 17459)	**TC1** without US testing **TC2** with US testing Generally **TC2** / from 500° C operating temperature	6,0–610,0 mm	V2A-Series	TP 304 (1.4301) TP 304L (1.4306) TP 304L (1.4307) TP 321 (1.4541)	Enteral tubes: AD 2000-W2/**TC1** Line pipes: OD ≤ 42.4 mm and wall ≤ 3,6 mm: AD 2000-W2/**TC1** OD > 42.4 mm or wall > 3,6 mm: AD 2000-W2/**TC2** Casting tubes for pressure vessels: AD 2000-W2/**TC2**
			V4A-Series	TP 316 (1.4401) TP 316L (1.4404) TP 316Ti (1.4471)	
			Super-Duplex	1.4410	
			Duplex	1.4462 TP 904L (1.4539)	

Welded Steel Pipes for Pressure Applications

DIN EN 10217 in comparison to earlier DIN standards

DIN	EN	Conditions of Use
1629 / 1628	10217-1	Non-alloy steel tubes with specified room temperature properties
17177	10217-2	Electric welded non-alloy & alloy steel tubes with specified elevated temperature properties
	10217-5	Submerged arc welded non-alloy & alloy steel tubes with specified elevated temperature properties
17178	10217-3	Alloy fine grain steel tubes
17174	10217-4	Electric welded non-alloy steel tubes with specified low temperature properties
17174	10217-6	Submerged arc welded non-alloy steel tubes with specified low temperature properties
17457	10217-7	Stainless steel tubes

Non-alloy steel tubes with specified properties of room temperature
Application: As per rules and standards of DVGW, TRB, TRD and AD 2000 Data Sheet W4 (only TR2 approved under PED)

Standards (DIN)	Operating Temperature / Working Pressure	Size Range	EN Materials (DIN)	Scope of Testing
EN 10217-1 (DIN 1626)	to 300° C / to 160 bar	10,2–2.540 mm	P235TR1 (St 37.0) P265TR1 (St 44.0)	**TR1** without impact test
EN 10217-1 (DIN 1628)	to 300° C / to unlimited		P235TR2 (St 37.4) P265TR2 (St 44.4)	**TR2** impact test a 0° C (optional –10° C)

Electric welded non-alloy and alloy steel tubes with specified properties of elevate temperature
Submerged arc welded non-alloy and alloy steelpipes with specified properties of high temperature
Application: Pipeline construction, pressure vessel, plaint engineering and shipbuilding

Standards (DIN)	Welding Techniques	Size Range	EN Materials (DIN)	Scope of Testing
EN 10217-2 (DIN 17177)	Electric welded (HFW = high frequency welding)	10,2–508,0 mm	P235GH (St 37.8) P265GH (St 42.8)	**TC1** without impact test
EN 10217-5	Submerged arc welded (SAW = submerged arc welded) SAWL longitudial welded/ SAWH spiral welded	406,4–2,540 mm	16Mo3 (15 Mo 3) 13CrMo4-5 (13 CrMo 4 4)	**TC2** with US testing (generally with alloy steels)

Alloy fine grain steel tubes

Application: Pressure vessels, apparatus and general mechanical engineering

Standards (DIN)	Welding Techniques	Size Range	EN Materials (DIN)		Scope of Testing
EN 10217-3 (DIN 17178)	Electric welded (HFW = high frequency welding)	10,2–508,0 mm	basic quality	P355N (StE 355) P460N (StE 460)	**TC1** without US testing **TC2** with US testing (generally with alloy steels)
	Submerged arc welded (SAW = submerged arc welded) SAWL with longitudinal seam/ SAWL with spiral seam	406,4–2,540 mm	special low temperature quality	P275NL2 (EStE 285) P355NL2 (EStE 355) P460NL2 (EStE 460)	
			low temperature quality	P275NL1 (TStE 285) P355NL1 (TStE 355) P460NL1 (TStE 460)	
			elevated temperature quality	P355NH (WStE 355) P460NH (WStE 460)	

Electric welded non-alloy steel tubes with specified low temperature properties

Submerged arc welded non- alloy steel tubes with specified low temperature properties

Application: General pipeline engineering, pressure vessel, apparatus and refrigeration system

Standards (DIN)	Welding Techniques	Size Range	EN Materials (DIN)	Scope of Testing
EN 10217-4 (DIN 17174)	Electric welded (HFW = high frequency welding)	10,2–508,0 mm	P215NL1 (TTSt 35 N) P265NL1	AD 2000 Data Sheet W4/W10
EN 10217-6 (DIN 17174)	Submerged arc welded (SAW = submerged arc welded) SAWL with longitudial seam/ SAWH spiral welded seam	406,4–2,540 mm		

Stainless steel tubes

Application: Chemical system, pressure vessel and apparatus engineering, pipelines (transport of corrosive media), water and wastewater technology

Standards (DIN)	Test Classes / Test Scope per 100 Pipes	Size range	EN Materials (comparable to ASTM A312)		Delivery Conditions
EN 10217-7 (DIN 17457)	**TC1** 1 Tensile test / 1 Ring tension test **TC2** 2 Tensile tests / 1 Ring tension test	6,0–1.016 mm	V2A-Series	TP 304 (1.4301) TP 304L (1.4306) TP 304L (1.4307) TP 321 (1.4541)	W1 = hot rolled strip, unannealed W2 = cold rolled, unannealed W1A / W2A = hear-treated, descaled W1R/ W2R = bright annealed
			V4A-Series	TP 316 (1.4401) TP 316L (1.4404) TP 316Ti (1.4471)	
			Super-Duplex	1.4410	
			Duplex	1.4462	
				TP 904L (1.4539)	

DIN EN 10305 Precision Steel Pipes

Cold Drawn Seamless Tubes
Application: Automotive, mechanical engineering

Standards (DIN)	State As Delivered	Size Range	EN Materials (DIN)	Notes
EN 10305-3 (DIN 2391-1/-2)	**+C** Cold finished, hard **+LC** Cold finished, soft **+SR** Cold finished and stress-relieved **+A** Annealed **+N** Normalised	4,0–260 mm	E215 (St 30 Al) E235 (St 35) E355 (St 52)	·Precisely defined tolerances ·Specified surface roughness

Cold drawn welded tubes
Application: Automotive, mechanical engineering

Standards (DIN)	State As Delivered	Size Range	EN Materials (DIN)	Notes
EN 10305-2 (DIN 2393-1/-2)	**+C** Cold finished, hard **+LC** Cold finished, soft **+SR** Cold finished and stress-relieved **+A** Annealed **+N** Normalized	4,0–150 mm	E195 (St 34-2) E235 (St 37-2) E275 (St 44-2) E355 (St 52-3)	·Precisely defined tolerances ·Specified surface roughness

Cold sized welded tubes
Application: Automotive, mechanical and plant engineering

Standards (DIN)	State As Delivered	Size Range	EN Materials (DIN)	Insert Strip
EN 10305-3 (DIN 2394-1/-2)	**+CR1** Usually not heat-treated, but suitable for final annealing **+CR2** After welding heat treatment and sizing is not provided **+A** After welding and sizing the pipes are annealed **+N** After welding and sizing the pipes are normalized	6,0–193.7	E155 E195 (St 34-2) E235 (St 37-2) E275 (St 44-2) E355 (St 52-3) Additional for + CR2: E190, E220, E260, E320, E370, E420	**S1** (black) **S2** (black) **S3** (Cold rolled) **S4** (Coated)

Cold drawn seamless tubes for hydraulic and pneumatic power systems
Application: Hydraulic and pneumatic power systems

Standards (DIN)	Surface Finish	Size Range	EN Materials (DIN)	Notes
EN 10305-4 (DIN 2391-1/-2 in connection with DIN 1630)	·Phosphate-treated (bonderized) ·Galvanized – chromate: with Cr6: olive-green/yellow Cr6-free: blue/white	4,0–80.0	E215 E235 (St 37.4) E355 (St 52.4)	·Precisely defined tolerances ·Specified surface roughness ·Suitable for conveying pressurized fluids

Precisions Steel Tubes With Threaded Ends

Welded and cold sized square tubes & rectangular tubes

Application : Mechanical Engineering & Automotive Industries.

Standards / (DIN)	State As Delivered (Designation)	Size Range	EN Materials / (DIN)	Strip
EN 10305-5 DIN 2395-1 DIN 2395-2	**+CR1** Usually not heat-treated, but suitable for final annealing **+CR2** Heat treatment after welding, and sizing is not provided **+A** After welding and sizing the pipes are annealed **+N** After welding and sizing the pipes are normalized	120/60 mm	E155 E195 (St 33/S185) E235 (RSt 37-2/S235JRG2) E275 E355 (St 52-3/S355J2G3 Additional for + CR2: E190, E220, E260, E320, E370, E420	**S1** (black) **S2** (pickled) **S3** (Cold rolled) **S4** (Coated)

DIN EN 10255 – Non alloy steel Tubes are suitable for welding & threading

Application : Transferring of Fluids (up to 25 bar) and gaseous media (up to 10 bar)

Standards / (DIN)	Types	Size Range	EN Materials / (DIN)	Notes
EN 10255 DIN 2440 EN 10255 DIN 2441	M: Medium H: Heavy L, L1, L2 (ISO-Light series)	1/8"– Dia to 6" Dia.	S195T (St 33)	· Galvanized acc. to DIN EN 10240 (DIN 2444) · Pipe ends threaded/ non-threaded · Pipe ends with/without couplings

DIN EN 10220 Seamless Steel Pipes

Dimensions and masses for seamless pipes

Outer Dia (OD) in mm			Weight per unit lengths in kg/m for wall thicknesses in mm															
Series 1	series 2	series 3	1,6	1,8	2,0	2,3	2,6	2,9	3,2	3,6	4,0	4,5	5,0	5,6	6,3	7,1	8,0	8,8	10
10,2	–	–	0,339	0,373	0,404	0,448	0,487	–	–	–	–	–	–	–	–	–	–	–	–
	12,0	–	–	0,453	0,493	0,550	0,603	0,651	0,694	–	–	–	–	–	–	–	–	–	–
	12,7	–	–	0,484	0,528	0,590	0,648	0,701	0,750	–	–	–	–	–	–	–	–	–	–
13,5	–	–	–	0,519	0,567	0,636	0,699	0,758	0,813	0,879	–	–	–	–	–	–	–	–	–
		14.0	–	0,542	0,592	0,664	0,731	0,794	0,852	0,923	–	–	–	–	–	–	–	–	–
	16,0	–	–	0,630	0,691	0,777	0,859	0,937	1,01	1,10	1,18	–	–	–	–	–	–	–	–
17,2	–	–	–	0,684	0,750	0,845	0,936	1,02	1,10	1,21	1,30	1,41	–	–	–	–	–	–	–
		18,0	–	–	0,789	0,891	0,987	1,08	1,17	1,28	1,38	1,50	–	–	–	–	–	–	–
	19,0	–	–	–	0,838	0,947	1,05	1,15	1,25	1,37	1,48	1,61	1,73	–	–	–	–	–	–
	20,0	–	–	–	0,888	1,00	1,12	1,22	1,33	1,46	1,58	1,72	1,85	–	–	–	–	–	–
21,3	–	–	–	–	0,952	1,08	1,20	1,32	1,43	1,57	1,71	1,86	2,01	–	–	–	–	–	–
		22,0	–	–	0,996	1,12	1,24	1,37	1,48	1,63	1,78	1,94	2,10	–	–	–	–	–	–
	25,0	–	–	–	1,13	1,29	1,44	1,58	1,72	1,90	2,07	2,28	2,47	2,68	2,91	–	–	–	–
		25,4	–	–	1,15	1,31	1,46	1,61	1,75	1,94	2,11	2,32	2,52	2,73	2,97	–	–	–	–
26,9	–	–	–	–	1,23	1,40	1,56	1,72	1,87	2,07	2,26	2,49	2,70	2,94	3,20	3,47	3,73	–	–
		30,0	–	–	–	1,57	1,76	1,94	2,11	2,34	2,56	2,83	3,08	3,27	3,68	4,01	4,34	–	–
	31,8	–	–	–	–	1,67	1,87	2,07	2,26	2,50	2,74	3,03	3,30	3,62	3,96	4,32	4,70	–	–
	32,0	–	–	–	–	1,68	1,89	2,08	2,27	2,52	2,76	3,05	3,33	3,65	3,99	4,36	4,74	–	–
33,7	–	–	–	–	–	1,78	1,99	2,20	2,41	2,67	2,93	3,24	3,54	3,88	4,26	4,66	5,07	5,40	–
		35,0	–	–	–	–	2,08	2,30	2,51	2,79	3,06	3,38	3,70	4,06	4,46	4,89	5,33	5,69	–
	38,0	–	–	–	–	–	2,27	2,51	2,75	3,05	3,35	3,72	4,07	4,47	4,93	5,41	5,92	6,34	6,91
	40,0	–	–	–	–	–	2,40	2,65	2,90	3,23	3,55	3,94	4,32	4,75	5,24	5,76	6,31	6,77	7,40
42,4	–	–	–	–	–	–	2,55	2,82	3,09	3,44	3,79	4,21	4,61	5,08	5,61	6,18	6,79	7,29	7,99
		44,5	–	–	–	–	2,69	2,98	3,26	3,63	4,00	4,44	4,87	5,37	5,94	6,55	7,20	7,75	8,51
48,3	–	–	–	–	–	–	2,93	3,25	3,56	3,97	4,37	4,86	5,34	5,90	6,53	7,21	7,95	8,57	9,45
	51,0	–	–	–	–	–	3,10	3,44	3,77	4,21	4,64	5,16	5,67	6,27	6,94	7,69	8,48	9,16	10,1
		54,0	–	–	–	–	3,30	3,65	4,01	4,47	4,93	5,49	6,04	6,68	7,41	8,21	9,08	9,81	10,9
	57,0	–	–	–	–	–	–	3,87	4,25	4,74	5,23	5,83	6,41	7,10	7,88	8,74	9,67	10,5	11,6
60,3	–	–	–	–	–	–	–	4,11	4,51	5,03	5,55	6,19	6,82	7,55	8,39	9,32	10,3	11,2	12,4
	63,5	–	–	–	–	–	–	4,33	4,76	5,32	5,87	6,55	7,21	8,00	8,89	9,88	10,9	11,9	13,2
	70,0	–	–	–	–	–	–	4,80	5,27	5,90	6,51	7,27	8,01	8,89	9,90	11,0	12,2	13,3	14,8
		73,0	–	–	–	–	–	5,01	5,51	6,16	6,81	7,60	8,38	9,31	10,4	11,5	12,8	13,9	15,5
76,1	–	–	–	–	–	–	–	5,24	5,75	6,44	7,11	7,95	8,77	9,74	10,8	12,1	13,4	14,6	16,3
		82,5	–	–	–	–	–	–	6,26	7,00	7,74	8,66	9,56	10,6	11,8	13,2	14,7	16,0	17,9
88,9	–	–	–	–	–	–	–	–	6,76	7,57	8,38	9,37	10,3	11,5	12,8	14,3	16,0	17,4	19,5
	101,6	–	–	–	–	–	–	–	–	8,70	9,63	10,8	11,9	13,3	14,8	16,5	18,5	20,1	22,6
		108,0	–	–	–	–	–	–	–	9,27	10,3	11,5	12,7	14,1	15,8	17,7	19,7	21,5	24,2
114,3	–	–	–	–	–	–	–	–	–	9,83	10,9	12,2	13,5	15,0	16,8	18,8	21,0	22,9	25,7
	127,0	–	–	–	–	–	–	–	–	–	12,1	13,6	15,0	16,8	18,8	21,0	23,5	25,7	28,9
	133,0	–	–	–	–	–	–	–	–	–	12,7	14,3	15,8	17,6	19,7	22,0	24,7	27,0	30,3
139,7	–	–	–	–	–	–	–	–	–	–	13,4	15,0	16,6	18,5	20,7	23,2	26,0	28,4	32,0
		141,3	–	–	–	–	–	–	–	–	–	15,2	16,8	18,7	21,0	23,5	26,3	28,8	32,4
		152,4	–	–	–	–	–	–	–	–	–	16,4	18,2	20,3	22,7	25,4	28,5	31,2	35,1
		159,0	–	–	–	–	–	–	–	–	–	17,1	19,0	21,2	23,7	26,6	29,8	32,6	36,7
168,3	–	–	–	–	–	–	–	–	–	–	–	18,2	20,1	22,5	25,2	28,2	31,6	34,6	39,0
		177,8	–	–	–	–	–	–	–	–	–	–	21,3	23,8	26,6	29,9	33,5	36,7	41,4
		193,7	–	–	–	–	–	–	–	–	–	–	–	26,0	29,1	32,7	36,6	40,1	45,3
219,1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	33,1	37,1	41,6	45,6	51,6
		244,5	–	–	–	–	–	–	–	–	–	–	–	–	37,0	41,6	46,7	51,2	57,8

Tolerance of the outer dia and wall thickness					
Outer dia D mm	Tolerances for T in a T/D ratio of				Tolerances for D
	≤ 0,025	> 0,025 to 0,050	> 0,050 to 0,10	> 0,10	
± 12,5% or ± 0,4 mm, the larger value applies in each case					± 1% or ± 0,5 mm, the larger value applies in each case
D > 219,1	± 20%	± 15%	± 12,5%	± 10%[1)]	
[1)] For OD D ≥ 355,6 mm the upper limit of the local wall thickness may be exceeded by a further 5% of the wall thickness T.					

A1 Outer Dia (OD) of Pipe for all equipmentrequired in pipe system construction are standard.
A2 Outer Dia (OD) of Pipefor not all equipment are standard.
A3 Outer Dia (OD) of Pipe there are few conventional equipment

High-performance Welded Steel Pipe

Dimensions and masses for DIN EN 10220, DIN 1630 pipes.

Outer Dia (OD) in mm			Weight per unit lengths in kg/m for wall thicknesses in mm																
Series 1	series 2	series 3	1,6	1,8	2,0	2,3	2,6	2,9	3,2	3,6	4,0	4,5	5,0	5,6	6,3	7,1	8,0	8,8	10
10,2	–	–	0,304	0,339	0,373	0,404	0,448	0,487	–	–	–	–	–	–	–	–	–	–	–
13,2	–	–	0,418	0,470	0,519	0,567	0,635	0,699	0,758	0,813	0,879	–	–	–	–	–	–	–	–
	16,0	–	0,504	0,568	0,630	0,691	0,777	0,859	0,937	1,01	1,10	–	–	–	–	–	–	–	–
17,2	–	–	0,546	0,616	0,684	0,750	0,845	0,936	1,02	1,10	1,21	1,30	–	–	–	–	–	–	–
	19,0	–	0,608	0,687	0,764	0,838	0,947	1,05	1,15	1,25	1,37	1,48	–	–	–	–	–	–	–
	20,0	–	0,642	0,726	0,808	0,888	1,00	1,12	1,22	1,33	1,46	1,58	–	–	–	–	–	–	–
21,3	–	–	0,687	0,777	0,866	0,952	1,08	1,20	1,32	1,43	1,57	1,71	1,86	–	–	–	–	–	–
	25,0	–	0,815	0,923	1,03	1,13	1,29	1,44	1,58	1,72	1,90	2,07	2,28	2,47	–	–	–	–	–
		25,4	0,829	0,939	1,05	1,15	1,31	1,46	1,61	1,75	1,94	2,11	2,32	2,52	–	–	–	–	–
26,9	–	–	0,880	0,998	1,11	1,23	1,40	1,56	1,72	1,87	2,07	2,26	2,49	2,70	–	–	–	–	–
		30,0	0,987	1,12	1,25	1,38	1,57	1,76	1,94	2,11	2,34	2,56	2,83	3,08	3,37	3,68	–	–	–
	31,8	–	1,05	1,19	1,33	1,47	1,67	1,87	2,07	2,26	2,50	2,74	3,03	3,30	3,62	3,96	4,32	–	–
33,7	–	–	1,12	1,27	1,42	1,56	1,78	1,99	2,20	2,41	2,67	2,93	3,24	3,54	3,88	4,26	4,66	5,07	–
	38,0	–	1,26	1,44	1,61	1,78	2,02	2,27	2,51	2,75	3,05	3,35	3,72	4,07	4,47	4,93	5,41	5,92	6,34
42,4	–	–	1,42	1,61	1,80	1,99	2,27	2,55	2,82	3,09	3,44	3,79	4,21	4,61	5,08	5,61	6,18	6,79	7,29
		44,5	1,49	1,69	1,90	2,10	2,39	2,69	2,98	3,26	3,63	4,00	4,44	4,87	5,37	5,94	6,55	7,20	7,75
48,3	–	–	1,62	1,84	2,06	2,28	2,61	2,93	3,25	3,56	3,97	4,37	4,86	5,34	5,90	6,53	7,21	7,95	8,57
	51,0	–	1,71	1,95	2,18	2,42	2,76	3,10	3,44	3,77	4,21	4,64	5,16	5,67	6,27	6,94	7,69	8,48	9,16
		54,0	1,82	2,07	2,32	2,56	2,93	3,30	3,65	4,01	4,47	4,93	5,49	6,04	6,68	7,41	8,21	9,08	9,81
	57,0	–	1,92	2,19	2,45	2,71	3,10	3,49	3,87	4,25	4,74	5,23	5,83	6,41	7,10	7,88	8,74	9,67	10,5
60,3	–	–	2,03	2,32	2,60	2,88	3,29	3,70	4,11	4,51	5,03	5,55	6,19	6,82	7,55	8,39	9,32	10,3	11,2
	63,5	–	–	2,44	2,74	3,03	3,47	3,90	4,33	4,76	5,32	5,87	6,55	7,21	8,00	8,89	9,88	10,9	11,9
	70,0	–	–	2,70	3,03	3,35	3,84	4,32	4,80	5,27	5,90	6,51	7,27	8,01	8,89	9,90	11,0	12,2	13,3
		73,0	–	2,82	3,16	3,50	4,01	4,51	5,01	5,51	6,16	6,81	7,60	8,38	9,31	10,4	11,5	12,8	13,9
76,1	–	–	–	2,94	3,30	3,65	4,19	4,71	5,24	5,75	6,44	7,11	7,95	8,77	9,74	10,8	12,1	13,4	14,6
		82,5	–	3,19	3,58	3,97	4,55	5,12	5,69	6,26	7,00	7,74	8,66	9,56	10,6	11,8	13,2	14,7	16,0
88,9	–	–	–	3,44	3,87	4,29	4,91	5,53	6,15	6,76	7,57	8,38	9,37	10,3	11,5	12,8	14,3	16,0	17,4
	101,6	–	–	–	–	4,91	5,63	6,35	7,06	7,77	8,70	9,63	10,8	11,9	13,3	14,8	16,5	18,5	20,1
		108,0	–	–	–	5,23	6,00	6,76	7,52	8,27	9,27	10,3	11,5	12,7	14,1	15,8	17,7	19,7	21,5
114,3	–	–	–	–	–	5,54	6,35	7,16	7,97	8,77	9,83	10,9	12,2	13,5	15,0	16,8	18,8	21,0	22,9
	127,0	–	–	–	–	6,17	7,07	7,98	8,88	9,77	11,0	12,1	13,6	15,0	16,8	18,8	21,0	23,5	25,7
	133,0	–	–	–	–	6,46	7,41	8,36	9,30	10,2	11,5	12,7	14,3	15,8	17,6	19,7	22,0	24,7	27,0
139,7	–	–	–	–	–	6,79	7,79	8,79	9,78	10,8	12,1	13,4	15,0	16,6	18,5	20,7	23,2	26,0	28,4
		152,4	–	–	–	7,42	8,51	9,61	10,7	11,8	13,2	14,6	16,4	18,2	20,3	22,7	25,4	28,5	31,2
		159,0	–	–	–	7,74	8,89	10,0	11,2	12,3	13,8	15,3	17,1	19,0	21,2	23,7	26,6	29,8	32,6
168,3	–	–	–	–	–	–	–	–	11,8	13,0	14,6	16,2	18,2	20,1	22,5	25,2	28,2	31,6	34,6
		177,8	–	–	–	–	–	–	12,5	13,8	15,5	17,1	19,2	21,3	23,8	26,6	29,9	33,5	36,7
		159,0	–	–	–	–	–	–	13,6	15,0	16,9	18,7	21,0	23,3	26,0	29,1	32,7	36,6	40,1
219,1	–		–	–	–	–	–	–	–	17,0	19,1	21,2	23,8	26,4	29,5	33,1	37,1	41,6	45,6
		244,5	–	–	–	–	–	–	–	19,0	21,4	23,7	26,6	29,5	33,0	37,0	41,6	46,7	51,2
273,0	–	–	–	–	–	–	–	–	–	21,3	23,9	26,5	29,8	33,0	36,9	41,4	46,6	52,3	57,3
323,9	–	–	–	–	–	–	–	–	–	25,3	28,4	31,6	35,4	39,3	44,0	49,3	55,5	62,3	68,4
355,6	–	–	–	–	–	–	–	–	–	27,8	31,3	34,7	39,0	43,2	48,3	54,3	61,0	68,6	75,3
406,4	–	–	–	–	–	–	–	–	–	–	35,8	39,7	44,6	49,5	55,4	62,2	69,9	78,6	86,3
457,0	–	–	–	–	–	–	–	–	–	–	40,3	44,7	50,2	55,7	62,3	70,0	78,8	88,6	97,3
508,0	–	–	–	–	–	–	–	–	–	–	44,8	49,5	55,9	62,0	69,4	77,9	87,7	98,6	108
		559,0	–	–	–	–	–	–	–	–	–	–	61,5	68,3	76,4	85,9	96,6	109	119
610,0	–	–	–	–	–	–	–	–	–	–	–	–	67,2	74,6	83,5	93,8	106	119	130
		660,0	–	–	–	–	–	–	–	–	–	–	72,7	80,8	90,4	102	114	129	141
711,0	–	–	–	–	–	–	–	–	–	–	–	–	78,4	87,1	97,4	109	123	139	152
	762,0	–	–	–	–	–	–	–	–	–	–	–	84,1	93,3	104	117	132	149	163
813,0	–	–	–	–	–	–	–	–	–	–	–	–	89,7	99,6	112	125	141	159	175
		864,0	–	–	–	–	–	–	–	–	–	–	95,4	106	119	133	150	169	186
914,0	–	–	–	–	–	–	–	–	–	–	–	–	101	112	125	141	159	179	196
1016	–	–	–	–	–	–	–	–	–	–	–	–	112	125	140	157	177	199	219
1220	–	–	–	–	–	–	–	–	–	–	–	–	–	–	168	182	212	239	263
1420	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	220	247	279	306
1620	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	282	318	350
1820	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	393
2020	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2220	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

DIN EN 10217-2 – Tolerances of the outer dia and wall thickness for electric welded pipes			
Outer Dia (OD)	Tolerances dimensions in mm		
	Tolerances of Outer Dia (OD) D	Tolerances of wall thickness T[1)] for	
		T ≤ 5	5 < T ≤ 16
D ≤ 219,1	± 1% or ± 0,5 mm, the larger value applies in each case	± 10% or ± 0,3 mm, the larger value applies in each case	± 8%
D > 219,1	± 0,75%		
[1)] The upper limit tolerance does not apply to the weld seam area (see DIN EN 10217-2/section 8.7.4.2)			

DIN EN 10217-5 – Tolerances of the outer dia and wall thickness for submerged arc welded pipes			
Outer Dia (OD)	Tolerances dimensions in mm		
	Tolerances of outside diameter D	Tolerances of wall thickness T[1)] for	
		T ≤ 5	5 < T ≤ 40
D ≤ 219,1	± 1% or ± 0,5 mm, the larger value applies in each case	± 10% or ± 0,3 mm, the larger value applies in each case	± 8% or ± 2 mm, the smaller value applies in each case
[1)]The upper limit tolerance does not apply to the weld seam area (see DIN EN 10217-5/section 8.7.4.2)			

A1 Outer Dia (OD) for which all equipment required for pipe system construction are standard.
A2 Outer Dia (OD) for which not all equipment are standard.
A3 Outer Dia (OD) for which there are few standard equipment

Austenitic Stainless Steel Pipes

Outer Dia (OD) in mm			Weight per unit lengths in kg/m for wall thicknesses in mm																
Series 1	series 2	series 3	1,0	1,2	1,6	2,0	2,3	2,6	2,9	3,2	3,6	4,0	4,5	5,0	5,6	6,3	7,1	8,0	8,8
	6,0	–	0,125	0,144	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	8,0	–	0,176	0,204	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	10,0	–	0,225	0,264	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
10,2	–	–	0,230	0,270	0,344	0,410	–	–	–	–	–	–	–	–	–	–	–	–	–
	12,0	–	0,275	–	0,416	0,500	–	–	–	–	–	–	–	–	–	–	–	–	–
	12,7	–	0,293	0,345	0,445	0,536	0,599	0,658	0,711	0,761	–	–	–	–	–	–	–	–	–
13,5	–	–	0,313	0,369	0,477	0,576	0,645	–	0,789	–	–	–	–	–	–	–	–	–	–
		14,0	0,326	–	0,496	0,604	–	–	–	–	–	–	–	–	–	–	–	–	–
	16,0	–	0,376	0,445	0,577	0,577	0,701	–	–	–	–	–	–	–	–	–	–	–	–
17,2	–	–	0,406	–	0,625	0,761	0,858	–	–	1,12	–	–	–	–	–	–	–	–	–
		18,0	0,425	–	0,657	0,801	–	–	–	–	–	–	–	–	–	–	–	–	–
	19,0	–	0,451	0,535	0,697	0,851	–	–	–	–	–	–	–	–	–	–	–	–	–
	20,0	–	0,476	0,564	0,737	0,901	–	–	–	–	–	–	–	–	–	–	–	–	–
21,3	–	–	0,509	–	0,789	0,966	–	1,22	–	1,45	–	1,74	–	–	–	–	–	–	–
		22,0	0,526	–	–	1,00	–	–	–	–	–	–	–	–	–	–	–	–	–
	25,0	–	0,601	0,715	0,937	1,15	–	1,46	–	–	–	–	–	–	–	–	–	–	–
		25,4	–	0,727	0,953	1,17	–	1,48	–	–	–	–	–	–	–	–	–	–	–
26,9	–	–	0,649	–	1,01	1,25	–	1,58	1,75	1,90	–	2,29	–	–	–	–	–	–	–
		30,0	–	–	1,14	1,40	–	–	–	–	–	–	–	–	–	–	–	–	–
	31,8	–	–	0,920	1,21	1,49	–	1,90	–	2,29	–	2,78	–	–	–	–	–	–	–
	32,0	–	–	0,925	–	1,50	–	–	–	–	–	–	–	–	–	–	–	–	–
33,7	–	–	0,818	0,976	1,29	1,58	1,81	2,02	–	2,45	–	–	3,29	–	–	–	–	–	–
		35,0	–	1,02	–	1,65	–	–	–	–	–	–	–	–	–	–	–	–	–
	38,0	–	–	1,11	1,46	1,81	–	2,30	–	2,79	–	–	–	–	–	–	–	–	–
	40,0	–	–	1,17	1,54	–	–	2,44	–	–	–	–	–	–	–	–	–	–	–
42,4	–	–	–	–	1,63	2,02	–	2,59	–	3,14	3,49	–	–	4,68	–	–	–	–	–
		44,5	–	–	–	2,13	–	2,73	3,02	–	–	–	–	–	–	–	–	–	–
48,3	–	–	–	–	1,87	2,31	–	2,97	–	3,61	4,03	–	–	5,42	–	–	–	–	–
	51,0	–	1,25	1,49	1,98	2,46	–	3,15	–	3,83	–	–	–	–	–	–	–	–	–
		54,0	–	–	2,10	2,60	–	3,35	–	–	–	–	–	–	–	–	–	–	–
	57,0	–	–	–	2,22	2,75	–	–	3,39	–	–	–	–	–	–	–	–	–	–
60,3	–	–	–	–	2,35	2,92	3,34	3,76	4,17	4,58	5,11	5,83	–	–	7,66	–	–	–	–
	63,5	–	–	–	2,48	3,08	–	3,96	–	4,83	–	–	–	–	–	–	–	–	–
	70,0	–	–	–	2,74	3,40	–	–	4,87	–	–	–	–	–	–	–	–	–	–
76,1	–	–	–	–	2,98	3,70	4,25	4,78	5,32	–	6,54	7,22	–	8,90	–	–	12,3	–	–
		82,0	–	–	–	4,03	–	–	–	6,35	–	–	–	–	–	–	–	–	–
88,9	–	–	–	–	3,49	4,35	4,98	5,61	6,24	6,86	7,68	8,51	–	–	11,7	–	–	16,2	–
	101,6	–	–	–	–	4,98	–	–	7,17	–	–	9,77	–	–	13,5	–	–	18,8	–
114,3	–	–	–	–	4,52	5,62	–	7,27	8,09	–	9,98	–	12,4	–	–	17,1	–	–	23,2
139,7	–	–	–	–	5,53	6,89	–	8,92	–	11,0	–	13,6	–	16,8	–	21,0	23,5	–	–
168,3	–	–	–	–	6,68	8,32	–	10,8	–	13,2	–	16,4	18,5	20,4	–	–	28,6	–	–
219,1	–	–	–	–	–	10,9	–	41,1	–	17,3	19,4	21,5	–	–	–	33,6	–	42,2	–
273,0	–	–	–	–	–	13,6	–	17,6	–	21,6	24,3	26,9	–	–	–	42,0	–	–	–
323,9	–	–	–	–	–	–	–	20,9	–	25,7	–	32,1	35,9	39,9	–	–	56,3	–	–
355,6	–	–	–	–	–	–	–	22,9	–	28,2	–	35,2	–	43,8	–	–	–	–	–
406,4	–	–	–	–	–	–	–	26,3	–	32,3	–	40,3	–	50,2	–	–	–	–	–

Dimensions and masses weight per unit lengths of pipes according to DIN EN ISO 1127

Outer dia (OD) tolerances	
Tolerance	Outside diameter tolerances
D1	± 1,50 % / min. ± 0,75 mm
D2	± 1,00 % / min. ± 0,50 mm
D3	± 0,75 % / min. ± 0,30 mm
D4	± 0,50 % / min. ± 0,10 mm

Wall thickness tolerances	
Tolerance	Wall thickness tolerances
T1	± 15,0 % / min. ± 0,60 mm
T2	± 12,5 % / min. ± 0,40 mm
T3	± 10,0 % / min. ± 0,20 mm
T4	± 7,50 % / min. ± 0,15 mm
T5	± 5,00 % / min. ± 0,10 mm

Factor is based on an average density of these pipes of 7.97 kg/dm³.

EN 10305-1 to 10305-4 – Precisions Steel Pipes & Tubes

Weight and Dimensions of circular pipes

Outer Dia (OD) in mm	Part				Masses weight in kg/m for wall thickness T in mm[1)]															
	1	2	3	4	0,5	0,6	0,75	0,8	1,0	1,2	1,5	1,8	2,0	2,2	2,5	2,8	3,0	3,5	4,0	4,5
4,0	•	•	–	•	0,04	–	–	0,06	0,07	0,08	–	–	–	–	–	–	–	–	–	–
5,0	•	•	–	•	0,06	–	0,08	0,08	0,10	0,11	–	–	–	–	–	–	–	–	–	–
6,0	•	•	•	•	0,07	0,08	–	0,10	0,12	0,14	0,17	0,19	0,20	–	–	–	–	–	–	–
7,0	•	•	–	•	0,08	–	–	0,12	0,15	0,17	0,20	0,23	0,25	–	–	–	–	–	–	–
8,0	•	•	•	•	0,09	0,11	–	0,14	0,17	0,20	0,24	0,28	0,30	0,31	0,34	–	–	–	–	–
9,0	•	•	–	–	0,10	–	–	0,16	0,20	0,23	0,28	0,32	0,35	0,37	0,40	0,43	–	–	–	–
10,0	•	•	•	•	0,12	0,14	–	0,18	0,22	0,26	0,31	0,36	0,39	0,42	0,46	0,50	0,52	–	–	–
12,0	•	•	•	•	0,14	0,17	–	0,22	0,27	0,32	0,39	0,45	0,49	0,53	0,59	0,64	0,67	0,73	0,79	–
14,0	•	•	–	•	0,17	–	–	0,26	0,32	0,38	0,46	0,54	0,59	0,64	0,71	0,77	0,81	0,91	0,99	1,05
15,0	•	•	•	•	0,18	0,21	–	0,28	0,35	0,41	0,50	0,59	0,64	0,69	0,77	0,84	0,89	0,99	1,09	1,17
16,0	•	•	•	•	0,19	0,23	–	0,30	0,37	0,44	0,54	0,63	0,69	0,75	0,83	0,91	0,96	1,08	1,18	1,28
18,0	•	•	•	•	0,22	0,26	–	0,34	0,42	0,50	0,61	0,72	0,79	0,86	0,96	1,05	1,11	1,25	1,38	1,50
19,0	–	–	•	–	–	0,27	–	0,36	0,44	0,53	0,65	0,76	0,84	0,91	1,02	–	1,18	–	–	–
20,0	•	•	•	•	0,24	–	–	0,38	0,47	0,56	0,68	0,81	0,89	0,97	1,08	1,19	1,26	1,42	1,58	1,72
22,0	•	•	•	•	0,27	–	–	0,42	0,52	0,62	0,76	0,90	0,99	1,07	1,20	1,33	1,41	1,60	1,78	1,94
25,0	•	•	•	•	0,30	–	–	0,48	0,59	0,70	0,87	1,03	1,13	1,24	1,39	1,53	1,63	1,86	2,07	2,27
26,0	•	•	–	–	0,31	–	–	0,50	0,62	0,73	0,91	1,07	1,18	1,29	1,45	1,60	1,70	1,94	2,17	2,39
28,0	•	•	•	•	0,34	–	–	0,54	0,67	0,79	0,98	1,16	1,28	1,40	1,57	1,74	1,85	2,11	2,37	2,61
30,0	•	•	•	•	0,36	–	–	0,58	0,72	0,85	1,05	1,25	1,38	1,51	1,70	1,88	2,00	2,29	2,56	2,83
32,0	•	•	•	–	0,39	–	–	0,62	0,76	0,91	1,13	1,34	1,48	1,62	1,82	2,02	2,15	2,46	2,70	3,05
35,0	•	•	•	•	0,43	–	–	0,67	0,84	1,00	1,24	1,47	1,63	1,78	2,00	2,22	2,37	2,72	3,06	3,38
38,0	•	•	•	•	0,46	–	–	0,73	0,91	1,09	1,35	1,61	1,78	1,94	2,19	2,43	2,59	2,98	3,35	3,72
40,0	•	•	•	–	0,49	–	–	0,77	1,01	1,15	1,42	1,70	1,87	2,05	2,31	2,57	2,74	3,15	3,55	3,94
42,0	•	•	•	•	–	–	–	–	1,02	1,21	1,50	1,78	1,97	2,16	2,44	2,71	2,89	3,32	3,75	4,16
42,4	–	–		–	–	–	–	–	1,06	1,22	1,51	1,80	1,99	2,18	2,46	–	2,91	3,36	3,79	–
44,0	–	–	•	–	–	–	–	–	1,06	1,27	1,57	1,87	2,07	2,27	2,56	–	3,03	3,50	3,95	–
45,0				–	–	–	–	–	1,09	1,30	1,61	1,92	2,12	2,32	2,62	2,91	3,11	3,58	4,04	4,49
48,0	•	•	•	–	–	–	–	–	1,16	1,38	1,72	2,05	2,27	2,48	2,81	3,12	3,33	3,84	4,34	4,83
48,3	–	–		–	–	–	–	–	1,17	1,39	1,73	2,06	2,28	2,50	2,82	–	3,35	3,87	4,37	4,86
50,0	•	•	•	•	–	–	–	–	1,21	1,44	1,79	2,14	2,37	2,59	2,93	3,26	3,48	4,01	4,54	5,05
51,0	–	–		–	–	–	–	–	–	1,47	1,83	2,18	2,42	2,65	2,99	–	3,55	4,10	4,64	5,16
55,0					–	–	–	–	1,33	1,59	1,98	2,36	2,61	2,86	3,24	3,60	3,85	4,44	5,03	5,60
57,0	–	–		–	–	–	–	–		1,65	2,05	2,45	2,71	2,97	3,36	–	3,99	4,62	5,23	5,83
60,0					–	–	–	–	1,45	1,74	2,16	2,58	2,86	3,14	3,54	3,95	4,22	4,88	5,52	6,16
63,5	–	–		–	–	–	–	–	–	1,84	2,29	2,74	3,03	3,33	3,76	–	4,48	5,18	5,87	6,55
65,0			–	–	–	–	–	–	1,58	1,89	2,35	2,81	3,11	3,41	3,85	4,29	4,59	5,31	6,02	6,71
70,0					–	–	–	–	1,70	2,04	2,53	3,03	3,35	3,68	4,16	4,64	4,96	5,74	6,51	7,27
75,0	•	•	–	–	–	–	–	–	1,82	2,18	2,72	3,25	3,60	3,95	4,47	4,99	5,33	6,17	7,00	7,82
76,0	–	–		–	–	–	–	–	–	2,21	2,76	3,29	3,65	4,00	4,53	–	5,40	6,26	7,10	7,93
80,0	•	•	•	•	–	–	–	–	1,95	2,33	2,90	3,47	3,85	4,22	4,78	5,33	5,70	6,60	7,50	8,38
85,0			–	–	–	–	–	–	–	–	3,09	3,69	4,09	4,49	5,09	5,68	6,07	7,03	7,99	8,93
89,0	–	–		–	–	–	–	–	–	2,60	3,24	3,87	4,29	4,71	5,33	–	6,36	7,38	8,38	9,38
90,0				–	–	–	–	–	–	–	3,27	3,92	4,34	4,76	5,39	6,02	6,44	7,47	8,48	9,49
95,0			–	–	–	–	–	–	–	–	–	–	4,59	5,03	5,70	6,37	6,81	7,90	8,98	10,0
100,0				–	–	–	–	–	–	–	–	–	4,83	5,31	6,01	6,71	7,18	8,33	9,47	10,6
101,6	–	–		–	–	–	–	–	–	2,97	3,70	4,43	4,91	5,39	6,11	–	7,29	8,47	9,63	10,8
108,0	–	–		–	–	–	–	–	–	3,16	3,94	4,71	5,23	5,74	6,50	–	7,77	9,02	10,3	11,5
110,0			–	–	–	–	–	–	–	–	–	–	5,33	5,85	6,63	7,40	7,92	9,19	10,5	11,7
114,0	–	–		–	–	–	–	–	–	3,34	4,16	4,98	5,52	6,07	6,87	–	8,21	9,54	10,9	12,2
120,0				–	–	–	–	–	–	–	–	–	5,82	6,39	7,24	8,09	8,66	10,1	11,4	12,8
127,0	–	–		–	–	–	–	–	–	3,72	4,64	5,56	6,17	6,77	7,68	–	9,17	10,7	12,1	13,6
130,0			–	–	–	–	–	–	–	–	–	–	–	–	7,86	8,78	9,40	10,9	12,4	13,9
133,0	–	–		–	–	–	–	–	–	3,90	4,86	5,82	6,46	7,10	8,05	–	9,62	11,2	12,7	14,3
139,7	–	–		–	–	–	–	–	–	4,10	5,11	6,12	6,79	7,46	8,46	–	10,1	11,8	13,4	15,0
140,0			–	–	–	–	–	–	–	–	–	–	–	–	8,48	9,47	10,1	11,8	13,4	15,0
150,0			–	–	–	–	–	–	–	–	–	–	–	–	–	–	10,9	12,6	14,4	16,1
159,0	–	–		–	–	–	–	–	–	4,67	5,83	6,98	7,74	8,51	9,65	–	11,5	13,4	15,3	17,1
160,0		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	11,6	13,5	15,4	17,3
168,0	–	–		–	–	–	–	–	–	4,94	6,16	7,38	8,19	8,99	10,2	–	12,2	14,2	16,2	18,1
170,0		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	12,4	14,4	16,4	18,4
180,0		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	15,2	17,4	19,5
190,0		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	16,1	18,3	20,6
193,7	–	–		–	–	–	–	–	–	5,70	7,11	8,52	9,45	10,4	11,8	–	14,1	16,4	18,7	21,0
200,0		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	17,0	19,3	21,7
220,0		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	23,9
240,0		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	26,1
260,0		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Masses weight in kg/m for wall thickness T in mm[1)]														
1234	1234	1234	1234	1234	1234	1234	1234	1234	1234	1234	1234	1234	1234	1234
5,0	5,5	6,0	7,0	8,0	9,0	10,0	12,0	12,5	14,0	16,0	18,0	20,0	22,0	25,0
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1,23	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1,36	1,42	1,48	–	–	–	–	–	–	–	–	–	–	–	–
1,60	1,70	1,78	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1,85	1,97	2,07	2,24	–	–	–	–	–	–	–	–	–	–	–
2,10	2,24	2,37	2,59	–	–	–	–	–	–	–	–	–	–	–
2,47	2,64	2,81	3,11	3,35	–	–	–	–	–	–	–	–	–	–
2,59	2,78	2,96	3,28	3,55	–	–	–	–	–	–	–	–	–	–
2,84	3,05	3,26	3,63	3,95	–	–	–	–	–	–	–	–	–	–
3,08	3,22	3,55	3,97	4,34	4,66	4,93	–	–	–	–	–	–	–	–
3,33	3,59	3,85	4,32	4,73	5,10	5,43	–	–	–	–	–	–	–	–
3,70	4,00	4,29	4,83	5,33	5,77	6,17	–	–	–	–	–	–	–	–
4,07	4,41	4,73	5,35	5,92	6,44	6,90	–	–	–	–	–	–	–	–
4,32	4,68	5,03	5,70	6,31	6,88	7,40	–	–	–	–	–	–	–	–
4,56	4,95	5,33	6,04	6,71	7,32	7,89	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
4,93	5,36	5,77	6,56	7,30	7,99	8,63	–	–	–	–	–	–	–	–
5,30	5,76	6,21	7,08	7,89	8,66	9,37	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
5,55	6,04	6,51	7,42	8,29	9,20	9,86	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
6,17	6,71	7,25	8,29	9,27	10,2	11,1	12,7	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
6,78	7,39	7,99	9,15	10,3	11,3	12,3	14,2	14,7	–	–	–	–	–	–
7,21	7,87	–	–	–	–	–	–	–	–	–	–	–	–	–
7,40	8,07	8,73	10,0	11,2	12,4	13,6	15,7	–	17,6	–	–	–	–	–
8,01	8,75	9,47	10,9	12,2	13,5	14,8	17,2	17,7	19,3	–	–	–	–	–
8,63	9,43	10,2	11,7	13,2	14,7	16,0	18,6	–	21,1	23,3	–	–	–	–
8,75	9,56	–	–	–	–	–	–	–	–	–	–	–	–	–
9,25	10,1	11,0	12,6	14,2	15,8	17,3	20,1	20,8	22,8	25,3	–	–	–	–
9,86	10,8	11,7	13,5	15,2	16,9	18,5	21,6	–	24,5	27,2	–	–	–	–
10,4	11,3	12,3	–	–	–	–	–	–	–	–	–	–	–	–
10,5	11,5	12,4	14,3	16,2	18,0	19,7	23,1	–	26,2	29,2	–	–	–	–
11,1	12,1	13,2	15,2	17,2	–	–	–	–	–	–	–	–	–	–
11,7	12,8	13,9	16,1	18,2	20,2	22,2	26,0	–	29,7	33,1	36,4	–	–	–
11,9	13,0	14,1	–	–	–	–	–	–	–	–	–	–	–	–
12,7	13,9	15,1	–	–	–	–	–	–	–	–	–	–	–	–
13,0	14,2	15,4	17,8	20,1	22,4	24,7	29,0	–	33,1	37,1	40,8	–	–	–
13,4	14,7	16,0	–	–	–	–	–	–	–	–	–	–	–	–
14,2	15,5	17,9	19,5	22,1	24,6	27,1	32,0	–	33,6	41,0	45,3	–	–	–
15,0	16,5	18,4	–	–	–	–	–	–	–	–	–	–	–	–
15,4	16,9	18,8	21,2	24,1	26,9	29,6	34,9	–	40,1	45,0	49,7	–	–	–
15,8	17,3	19,8	–	–	–	–	–	–	–	–	–	–	–	–
16,6	18,2	19,8	–	–	–	–	–	–	–	–	–	–	–	–
16,7	18,2	18,2	23,0	26,0	29,1	32,1	37,9	–	43,5	48,9	54,2	–	–	–
17,9	19,6	21,3	24,7	28,0	31,3	34,5	40,8	–	47,9	52,9	58,6	64,1	–	–
19,0	20,8	22,6	–	–	–	–	–	–	–	–	–	–	–	–
19,1	21,0	22,8	26,4	30,0	33,5	37,0	43,8	–	50,4	56,8	63,0	69,0	–	–
20,1	22,0	24,0	–	–	–	–	–	–	–	–	–	–	–	–
20,3	22,3	24,3	28,1	32,0	35,7	39,5	46,8	–	53,9	60,8	67,5	74,0	–	–
21,6	23,7	25,7	29,9	33,9	38,0	41,9	49,7	–	57,3	64,7	71,9	78,9	–	–
22,8	25,0	27,2	31,6	33,9	40,2	44,4	52,7	–	60,8	68,7	79,3	83,8	–	–
23,3	25,5	27,8	–	–	–	–	–	–	–	–	–	–	–	–
24,0	26,4	28,7	33,3	33,3	42,4	46,9	55,6	–	64,2	72,6	80,8	88,8	96,6	–
26,5	29,1	31,7	36,8	41,8	46,8	51,8	61,6	–	71,1	80,5	89,7	98,6	107	120
29,0	31,8	34,6	40,2	45,8	51,3	56,7	67,5	–	78,0	88,4	98,5	109	118	133
31,4	34,5	37,6	43,7	49,7	55,7	61,7	73,4	–	84,9	96,3	107	118	129	145

DIN EN 10305-5 – Precisions Steel Tubes

Weight and Dimensions for square and rectangular steel Tubes.

Welded pipes, square Tubes & rectangular tubes

Side Length / mm			Weight in kg/m[1)] for wall Thickness T/mm						
H	B (or H)	Tolerance	1,00	1,25	1,50	2,00	2,50	3,00	4,00
15	15	± 0,20	0,438	0,537	0,632	0,810	–	–	–
20	10	± 0,20	0,438	0,537	0,632	0,810	–	–	–
	15		0,516	0,635	0,750	0,967	–	–	–
	20		0,595	0,733	0,868	1,12	–	–	–
25	15	± 0,25	0,595	0,733	0,868	1,12	–	–	–
	25		0,752	0,930	1,10	1,44	–	–	–
30	10	± 0,25	0,595	0,733	0,868	1,12	–	–	–
	15		0,673	0,831	0,985	1,28	–	–	–
	20		0,752	0,930	1,10	1,44	–	–	–
	30		0,909	1,13	1,34	1,75	2,15	2,39	–
34	20	± 0,25	0,815	1,01	1,20	1,56	–	–	–
35	20	± 0,25	0,830	1,03	1,22	1,59	1,95	–	–
	25		0,909	1,13	1,34	1,75	2,15	2,39	–
	35		1,07	1,32	1,57	2,07	2,54	2,86	–
40	20	± 0,30	–	–	1,34	1,75	2,15	2,39	–
	25		–	–	1,46	1,91	2,34	2,63	–
	30		–	–	1,57	2,07	2,54	2,86	–
	40		–	–	1,81	2,38	2,93	3,33	4,25
45	45	± 0,30	–	–	2,05	2,69	3,33	3,80	4,88
50	20	± 0,30	–	–	1,57	2,07	2,54	2,86	–
	25		–	–	1,69	2,22	2,74	3,10	–
	30		–	–	1,81	2,38	2,93	3,33	4,25
	40		–	–	2,05	2,69	3,33	3,80	4,88
	50		–	–	2,28	3,01	3,72	4,28	5,51
60	20	± 0,35	–	–	–	2,38	2,93	3,33	–
	30		–	–	–	2,69	3,33	3,80	4,88
	40		–	–	–	3,01	3,72	4,28	5,51
	50		–	–	–	3,32	4,44	4,75	6,14
	60		–	–	–	3,64	4,50	5,22	6,76
70	40	± 0,40	–	–	–	3,32	4,11	4,75	6,14
	70		–	–	–	4,26	5,29	6,16	8,02
80	20	± 0,50	–	–	–	3,01	3,72	4,28	–
	30		–	–	–	3,32	4,11	4,75	–
	40		–	–	–	3,64	4,50	5,22	6,76
	50		–	–	–	3,95	4,90	5,69	7,39
	60		–	–	–	4,26	5,29	6,16	8,02
	80		–	–	–	4,89	6,07	7,10	9,28
90	90	± 0,60	–	–	–	5,52	6,86	8,04	10,50
100	40	± 0,65	–	–	–	4,26	5,29	6,16	8,02
	50		–	–	–	4,58	5,68	6,63	8,65
	60		–	–	–	4,89	6,07	7,10	9,28
	80		–	–	–	5,52	6,86	8,04	10,50
	100		–	–	–	6,15	7,64	8,99	11,80
120	40	± 0,70	–	–	–	4,89	6,07	7,10	9,28
	60		–	–	–	5,52	6,86	8,04	10,50

ASME B 36.10 / 36.19 Pipes

Weights and Dimensions

Nominal Pipe Size			Wall thickness / Schedule in mm Weights in kg/m																
			ASME B 36.10[1)]													ASME B 36.19			
NPS	Ø	DN	S5	S10	S20	S30	STD	S40	S60	XS	S80	S100	S120	S140	S160	XXS	5S	10S	40S	80S
⅛"	10,3	–	–	1,24	–	1,45	173		–	2,41		–	–	–	–	–	–	1,24	1,73	2,41
			–	0,28	–	0,32	0,37		–	0,47		–	–	–	–	–	–	0,29	0,38	0,48
¼"	13,7	–	–	1,65	–	1,85	2,24		–	3,02		–	–	–	–	–	–	1,65	2,24	3,02
			–	0,49	–	0,54	0,63		–	0,80		–	–	–	–	–	–	0,50	0,64	0,82
⅜"	17,2	10	–	1,65	–	1,85	2,31		–	3,20		–	–	–	–	–	–	1,65	2,31	3,20
			–	0,63	–	0,70	0,84		–	1,10		–	–	–	–	–	–	0,67	0,86	1,12
½"	21,3	15	1,65	2,11	–	2,41	2,77		–	3,73		–	–	–	4,78	7,47	1,65	2,11	2,77	3,73
			0,80	1,00	–	1,12	1,27		–	1,62		–	–	–	1,95	2,55	0,82	1,02	1,30	1,65
¾"	26,7	20	1,65	2,11	–	2,41	2,87		–	3,91		–	–	–	5,56	7,82	1,65	2,11	2,87	3,91
			1,03	1,28	–	1,44	1,69		–	2,20		–	–	–	2,90	3,64	1,05	1,31	1,72	2,24
1"	33,4	25	1,65	2,77	–	2,90	3,38		–	4,55		–	–	–	6,35	9,09	1,65	2,77	3,38	4,55
			1,30	2,09	–	2,18	2,50		–	3,24		–	–	–	4,24	5,45	1,33	2,13	2,55	3,30
1¼"	42,2	32	1,65	2,77	–	2,97	3,56		–	4,48		–	–	–	6,35	9,70	1,65	2,77	3,56	4,85
			1,65	2,70	–	2,87	3,39		–	4,47		–	–	–	5,61	7,77	1,68	2,75	3,46	4,56
1½"	48,3	40	1,65	2,77	–	3,18	3,68		–	5,08		–	–	–	7,14	10,15	1,65	2,77	3,68	5,08
			1,91	3,11	–	3,53	4,05		–	5,41		–	–	–	7,25	9,56	1,95	3,17	4,13	5,52
2"	60,3	50	1,65	2,77	–	3,18	3,91		–	5,54		–	–	–	8,74	11,07	1,65	2,77	3,91	5,54
			2,40	3,93	–	4,48	5,44		–	7,48		–	–	–	11,1	13,4	2,45	4,01	5,55	7,63
2½"	73,0	–	2,11	3,05	–	4,78	5,16		–	7,01		–	–	–	9,53	14,02	2,11	3,05	5,16	7,01
			3,69	5,26	–	8,04	8,63		–	11,4		–	–	–	14,9	20,4	3,76	5,37	8,80	11,6
3"	88,9	80	2,11	3,05	–	4,78	5,49		–	7,62		–	–	–	11,13	15,24	2,11	3,05	5,49	7,62
			4,51	6,45	–	9,92	11,3		–	15,3		–	–	–	21,4	27,7	4,60	6,58	11,5	15,6
3½"	101,6	–	2,11	3,05	–	4,78	5,74		–	8,08		–	–	–	–	–	2,11	3,05	5,74	8,08
			5,18	7,40	–	11,4	13,6		–	18,6		–	–	–	–	–	5,28	7,55	13,9	19,0
4"	114,3	100	2,11	3,05	–	4,78	6,02		–	8,56		–	11,13	–	13,49	17,12	2,11	3,05	6,02	8,56
			5,84	8,36	–	12,9	16,1		–	22,3		–	28,3	–	33,5	41,0	5,96	8,53	16,4	22,7
5"	141,3	–	2,77	3,40	–	–	6,55		–	9,53		–	12,70	–	15,88	19,05	2,77	3,40	6,55	9,53
			9,47	11,6	–	–	21,8		–	31,0		–	40,3	–	49,1	57,4	9,66	11,8	22,2	31,6
6"	168,3	150	2,77	3,40	–	–	7,11		–	10,97		–	14,27	–	18,26	21,95	2,77	3,40	7,11	10,97
			11,3	13,8	–	–	28,3		–	42,6		–	54,2	–	67,6	79,2	11,5	14,1	28,9	43,5
8"	219,1	200	2,77	3,76	6,35	7,04	8,18		10,31	12,70		15,09	18,26	20,62	22,23	23,01	2,77	3,76	8,18	12,70
			14,8	20,0	33,3	36,8	42,6		53,0	64,6		75,9	90,4	101	108	111	15,1	20,4	43,5	65,9
10"	273,0	250	3,40	4,19	6,35	7,80	9,27		12,70		15,09	18,26	21,44	25,44	28,58	25,40	3,40	4,19	9,27	12,70
			22,6	27,8	41,8	51,0	60,3		81,6		96,0	115	133	155	172	155	23,1	28,4	61,5	83,2
12"	323,8	300	3,96	4,57	6,35	8,38	9,53	10,31	14,27	12,70	17,48	21,44	25,40	28,58	33,32	25,40	3,96	4,57	9,53	12,70
			31,3	36,0	49,7	65,2	73,9	79,7	109	97,5	132	160	187	208	239	187	31,9	44,6	75,4	99,5

NPS = Nominal Pipe Size
Ø = Outer Dia (OD) in mm
DN = Diameter Nominal

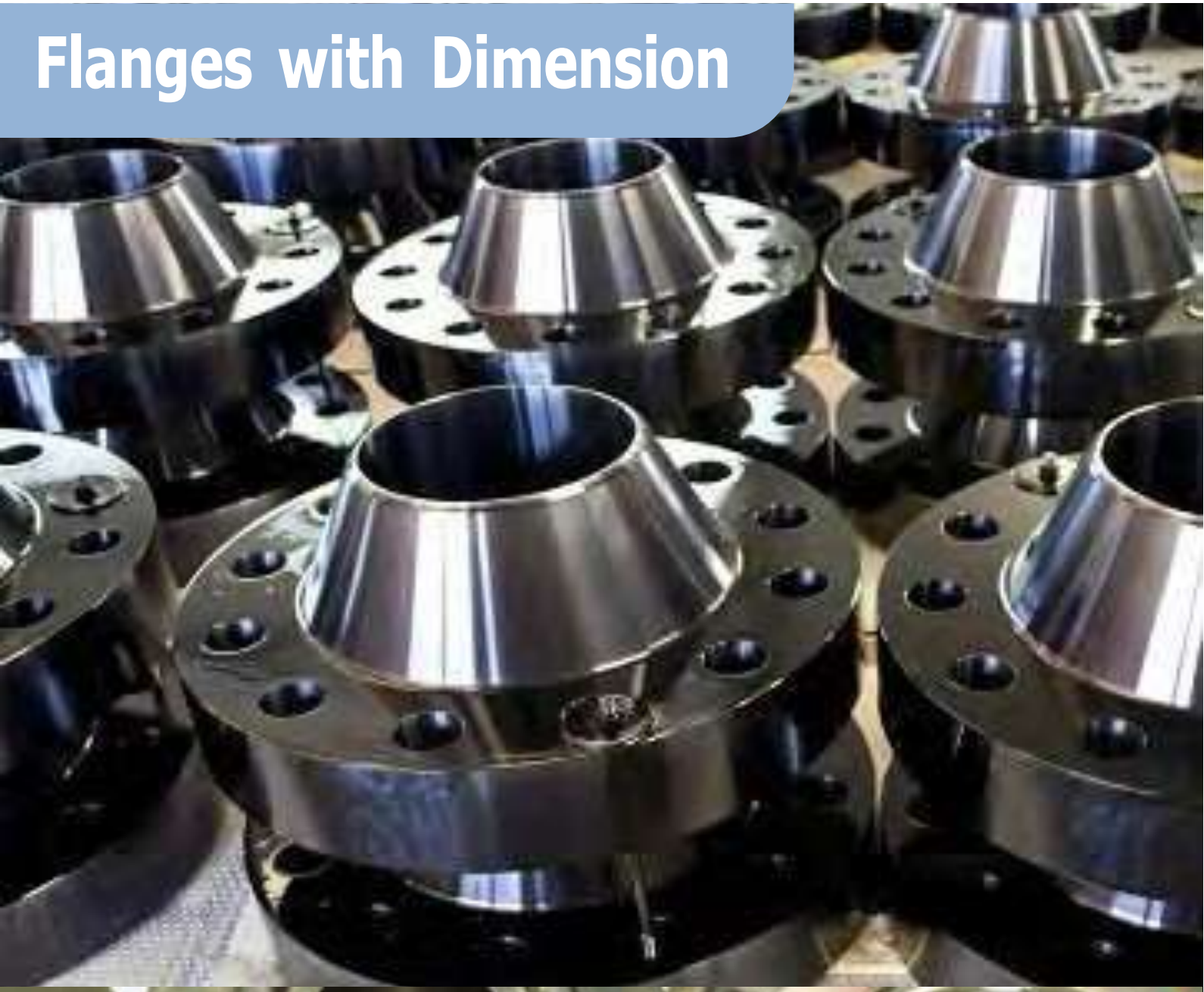
[1)] All details does apply to carbon steel pipes.
All weights from the stainless steel pipes arising from multiplications from values with the factor 1,015.

Nominal Pipe Size			Wall thickness / Schedule in mm Weights in kg/m																
			ASME B 36.10[1)]													ASME B 36.19			
NPS	Ø	DN	S5	S10	S20	S30	STD	S40	S60	XS	S80	S100	S120	S140	S160	XXS	5S	10S	40S	80S
14"	355,6	350	3,96	6,35	7,92	953		11,13	15,09	12,70	19,05	23,83	27,79	31,75	35,71	–	3,96	4,78	9,53	12,70
			34,4	54,7	67,9	81,3		94,6	127	107	158	195	225	254	282	–	35,1	42,2	82,9	109
16"	406,4	400	4,19	6,35	7,92	9,53		12,70	16,66	12,70	21,44	26,19	30,96	36,53	40,49	–	4,19	4,78	9,53	12,70
			41,6	62,6	77,8	93,3		123	160	123	203	246	287	333	365	–	42,4	48,2	95,2	126
18"	457,2	450	4,19	6,35	7,92	11,3	9,53	14,27	19,05	12,70	23,83	29,36	34,93	39,67	45,24	–	4,19	4,78	9,53	12,70
			46,8	70,6	87,7	122	105	156	206	139	255	310	364	408	459	–	47,3	54,5	107	142
20"	508,0	500	4,78	6,35	9,53	12,70	9,53	15,09	20,62	12,70	26,19	32,54	38,10	44,45	50,01	–	4,78	5,54	9,53	12,70
			59,3	78,6	117	155	117	183	248	155	311	381	441	508	565	–	60,5	70,3	119	158
22"	558,8	550	4,78	6,35	9,53	12,70	9,53	15,88	22,23	12,70	28,58	34,93	41,28	47,63	53,98	–	4,78	5,54	9,53	12,70
			65,2	86,5	129	171	129	213	294	171	374	451	527	601	672	–	66,5	77,4	132	174
24"	609,6	600	5,54	6,35	9,53	14,27	9,53	17,48	24,61	12,70	30,96	38,89	46,02	52,37	59,54	–	5,54	6,35	9,53	12,70
			82,5	94,5	141	210	141	255	355	187	442	548	640	720	808	–	84,2	96,4	144	191
26"	660,4	650	–	7,92	12,70	–	9,53	–	–	12,70	–	–	–	–	–	–	–	–	–	–
			–	127	203	–	153	–	–	203	–	–	–	–	–	–	–	–	–	–
28"	711,2	700	–	7,92	12,70	15,88	9,53	–	–	12,70	–	–	–	–	–	–	–	–	–	–
			–	137	219	271	165	–	–	219	–	–	–	–	–	–	–	–	–	–
30"	762,0	750	6,35	7,92	12,70	15,88	9,53	–	–	12,70	–	–	–	–	–	–	6,35	7,92	–	–
			118	147	235	292	177	–	–	235	–	–	–	–	–	–	121	150	–	–
32"	812,8	800	–	7,92	12,70	15,88	9,53	17,48	–	12,70	–	–	–	–	–	–	–	–	–	–
			–	157	257	312	189	343	–	215	–	–	–	–	–	–	–	–	–	–
34"	863,6	850	–	7,92	12,70	15,88	9,53	17,48	–	12,70	–	–	–	–	–	–	–	–	–	–
			–	167	267	332	200	365	–	267	–	–	–	–	–	–	–	–	–	–
36"	914,4	900	–	7,92	12,70	15,88	9,53	19,05	–	12,70	–	–	–	–	–	–	–	–	–	–
			–	177	177	352	213	420	–	282	–	–	–	–	–	–	–	–	–	–
38"	965,2	950	–	–	–	–	9,53	–	–	12,70	–	–	–	–	–	–	–	–	–	–
			–	–	–	–	224	–	–	298	–	–	–	–	–	–	–	–	–	–
40"	1016,0	1000	–	–	–	–	9,53	–	–	12,70	–	–	–	–	–	–	–	–	–	–
			–	–	–	–	236	–	–	314	–	–	–	–	–	–	–	–	–	–
42"	1066,8	1050	–	–	–	–	9,53	–	–	12,70	–	–	–	–	–	–	–	–	–	–
			–	–	–	–	248	–	–	330	–	–	–	–	–	–	–	–	–	–
44"	1117,6	1100	–	–	–	–	9,53	–	–	12,70	–	–	–	–	–	–	–	–	–	–
			–	–	–	–	260	–	–	346	–	–	–	–	–	–	–	–	–	–
46"	1168,4	1150	–	–	–	–	9,53	–	–	12,70	–	–	–	–	–	–	–	–	–	–
			–	–	–	–	272	–	–	352	–	–	–	–	–	–	–	–	–	–
48"	1219,2	1200	–	–	–	–	9,53	–	–	12,70	–	–	–	–	–	–	–	–	–	–
			–	–	–	–	284	–	–	378	–	–	–	–	–	–	–	–	–	–

NPS = Nominal Pipe Size
Ø = Oute Dia (OD) in mm
DN = Diameter Nominal

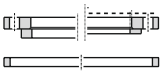
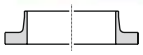
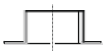
[1)] All details does apply to carbon steel pipes.
All weights from the stainless steel pipes arising from multiplications from values with the factor 1,015.

Flanges with Dimension



DIN EN 1092-1 – Types of Flanges

Flanges as per BS DIN EN 1092-1

Identification		PN / EN Type	2.5	6	10	16	25	40	63	100	160	250	320	400
					FLAT FLANGES									
Flat Flanges for welding		01	•	2573	2576	•	•	•	•	•	–	–	–	–
Loose Flanges Flat Collars [1] see also type 37		02	•	2641	2642	•	2655	2656	–	–	–	–	–	–
		32	•	2641	2642		2655	2656	–	–	–	–	–	–
Loose Flanges fit type 34		04	–	–	2673	2674	2674	2676	–	–	–	–	–	–
Blind Flanges		05	•	2527	2527	2527	2527	2527	2527	2527	–	–	–	–
					WELDING NECK FLANGES									
Weld-Neck Flanges		11	2630	2631	2632	2633	2634	2635	2636	2637	2638	2628	2629	2627
Weld-Neck Collars [2] fit type 04		34	–	–	2673	2674	2675	2676	–	–	–	–	–	–
Slip-on Flanges		12	–	–	86029	86030	•		•		–	–	–	–
Threaded Flanges		13	–	2565	•	2566	•	2567	2568	2569	–	–	–	–
					COLLARS AND FLANGING									
Flat Collars fit type 02		32	•	2641	2642		2655	2656	–	–	–	–	–	–
Pipe Ends, flanged fit type 02		33	•		•		–	–	–	–	–	–	–	–
Weld-Neck Collars fit type 04		34	–	–	2673	2674	2675	2676	–	–	–	–	–	–
Weld-Neck Rings fit type 02		35	•		•		•		–	–	–	–	–	–
Pressed Collars, long fit type 02		36	•		•		–	–	–	–	–	–	–	–
Pressed Collars fit type 02		37	•	2641	2642	•	–	–	–	–	–	–	–	–

[1] and [2] also see under Collars and Flanging

Notes

- The following DIN standards are not included in DIN EN 1092-1 and, if required, can be acc. to the relevant DIN standards ordered :
- DIN 2558 Oval threaded flanges.
- Flange joints for vessels and process apparatus DIN 28030, 28031, 28032, 28034, 28036, 28038, 86041, 86044 , 28117.
- DIN 2695 Flanges with chamfering for membrane seal welds.
- Slip-on flanges are available in type 12, PN 10 and 16 as per DIN EN 1092-1, or DIN 86029/86030.

DIN EN 1092-1 – Materials for Flanges

Group	Forgings			Flat Forgings		
	Material	Material No	DIN EN	Material	Material No	DIN EN
2 0				–	–	–
3 0				P235GH P265GH	1.0345 1.0425	10028-2 10028-2
3 1				P295GH	1.0481	10028-2
4 0				16Mo3	1.5415	10028-2
5 0				13CrMo4-5	1.7335	10028-2
6 0				12CrMo9-10 10CrMo9-10	1.7375 1.7380	10028-2 10028-2
6 1				–	–	–
7 0				P275NL1 P275NL2	1.0488 1.1104	10028-3 10028-3
7 1				P355NL1 P355NL2	1.0566 1.1106	10028-3 10028-3
7 2				15NiMn6 11MnNi5-3 13MnNi6-3	1.6228 1.6212 1.6217	10028-4 10028-4 10028-4
7 3				1 2 N i1 4 X 1 2 N 5 X8Ni9	1.5637 1.5680 1.5662	10028-4 10028-4 10028-4
8 0				–	–	–
8 2				P275NH	1.0487	10028-3
8 3				P355N P355NH	1.0562 1.0565	10028-3 10028-3
9 0				–	–	–
9 1				X10CrMoVNb9-1	1.4903	10028-2
1 E0				X2CrNi 18-9 X2CrNi 19-11 X1CrNi25-21	1.4307 1.4306 1.4335	10028-7 10028-7 10028-7
1 E1				X2CrNiN18-10	1.4311	10028-7
1 E0				X5CrNi18-10 X6CrNi18-10	1.4301 1.4948	10028-7 10028-7
1 E0				X6CrNiTi18-10 X6CrNiNb 18-10 X6CrNiTiB 18-10	1.4541 1.4550 1.4941	10028-7 10028-7 10028-7
1 E0				X2CrNiMo17- 12-2 X2CrNiMo17- 12-3 X2CrNiMo18- 14-3 X1NiCrMoCu2	1.4404 1.4432 1.4435 1.4539 1.4563	10028-7 10028-7 10028-7 10028-7 10028-7

		5-20-5 X1CrNiMoCu3 1-27-4		
1 E1		X2CrNiMoN17- 11-2 X2CrNiMoN17- 13-3 X2CrNiMoN17- 13-5 X1NiCrMoCuN2 5-20-7 X1CrNiMoCuN20- 18-7	1.4406 1.4429 1.4439 1.4529 1.4547	10028-7 10028-7 10028-7 10028-7 10028-7
1 E0		X5CrNiMo17-12-2 X3CrNiMo17-13-3	1.4401 1.4436	10028-7 10028-7
1 E0		X6CrNiMoTi17-12- 2 X6CrNiMoNb17- 12-2	1.4571 1.4580	10028-7 10028-7
E0 1		X2CrNiN23- 4 X2CrNiMoN 22-5-3 X2CrNiMoN25-7-4	1.4362 1.4462 1.4410	10028-7 10028-7 10028-7

BS EN 1092-1 Flanges For Pipes, Fittings and Accessories

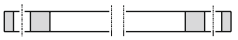
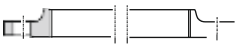
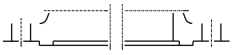
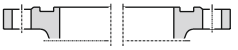
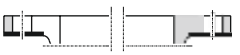
If they are according to the PED orthey are used in pressure equipment orthey shall have either

- Particular Material Appraisal
- European Approval of Material

Specification, Grade, Symbol and Material Number [1]						
Material Group [2]	Flat Steel Products [3] [5]		Forgings [3] [5]		Castings [3] Seamless Pipes [3] Welded Pipes [3] [4]	
	Standard	Material Number	Standard	Material Number	Standard	Material Number
1E0	VdTÜV 399/1 [6]	C21/1.0432	VdTÜV 399/3 [6]	C 21/1.0432	DIN 1681	GS-38
1E1	EN 10025-2	S235JR/1.0038	EN 10025-2 [8]	S235JR/1.0038	–	–
3E0	VdTÜV 350/1 [6]	C 22.8/1.0460	VdTÜV 350/3 [6]	C 22.8/1.0460	–	–
	–	–	EN 10222-2	P250GH/1.0460	–	–
7E0	DIN 17102 [7]	TSTE 285/1.0488	DIN 17103 [7]	TSTE 285/1.0488	–	–
7E1	DIN 17102 [7]	TSTE 355/1.0566	DIN 17103 [7]	TSTE 355/1.0566	DIN 17245	GS-10 Ni 19
	DIN 17102 [7]	TSTE 420/1.8912	DIN 17103 [7]	TSTE 420/1.8912	–	–
1E0	–	–	–	–	ASME SA 106	B
3E0	–	–	ASME SA 105	–	–	–
3E1	ASME SA 515	70	–	–	ASME SA 216	WCB
	ASME SA 516	70	–	–	ASME SA 216	WCC
	ASME SA 537	CL 1	–	–	ASME SA 333	6
4E0	ASME SA 204	A	ASME SA 182	F 1	ASME SA 217	WC 1
	ASME SA 204	B	ASME SA 182	F 1	ASME SA 217	WC 1
5E0	ASME SA 387	11	ASME SA 182	F 11, Cl 1, 2 & Cl 3	ASME SA 217	WC 6
	ASME SA 387	11	ASME SA 182	F 11, Cl 1, 2 & Cl 3	ASME SA 217	C 5
	ASME SA 387	12	ASME SA 182	F 12, Cl 1 & 2	ASME SA 355	P 12
6E0	ASME SA 387	5	ASME SA 182	F 5	ASME SA 217	C 12
	ASME SA 387	9	ASME SA 182	F 9	ASME SA 335	P 5, P 9
	ASME SA 387	22	ASME SA 182	F 22, Cl 1 and 3	ASME SA 335	P 22
7E3	ASME SA 203	A	ASME SA 182	LF 3	ASME SA 352	LC 2, LC 3, LC 8
	ASME SA 203	E	ASME SA 182	LF 3	ASME SA 352	LC 2, LC 3, LC 8
8E2	–	–	ASME SA 182	LF 2 Cl 1 / Cl 2	–	–
10E0	ASME SA 240	304	ASME SA 182	F304	ASME SA 351	CF 8
	ASME SA 240	304	ASME SA 182	F304	ASME SA 312	TP304L
	ASME SA 240	304L	ASME SA 182	F304L	ASME SA 312	TP304
	ASME SA 240	304H	ASME SA 182	F304H	ASME SA 312	TP304H
12E0	ASME SA 240	–	ASME SA 182	F321, F321H	ASME SA 312	TP321
	ASME SA 240	–	ASME SA 182	F321, F321H	ASME SA 312	TP321H
14E0	ASME SA 240	316	ASME SA 182	F316	ASME SA 351	CF 8 M
	ASME SA 240	316	ASME SA 182	F316	ASME SA 312	TP316
	ASME SA 240	316L	ASME SA 182	F316L	ASME SA 312	TP316L
	ASME SA 240	316H	ASME SA 182	F316H	ASME SA 312	TP316H
15E0	ASME SA 240	316Ti	–	–	–	–
16E0	–	–	ASME SA 182	F51	–	–

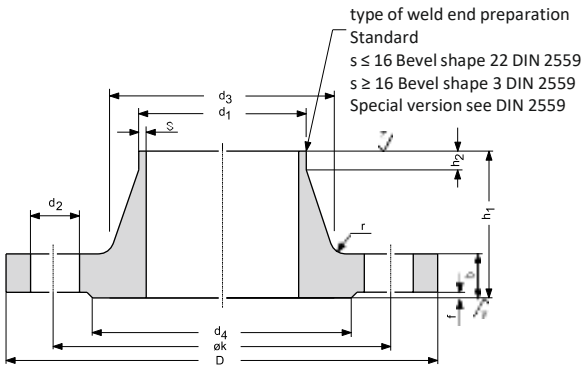
BS DIN EN 1092-1 Comparison with DIN 2526

Acc. to DIN EN 1092-1 The mechanical process “turning” contains all machining procedure that make either spiral or concentric grooves. The radius of the round steel chisel drill for types A, B1, E, and F must be at least 1 mm.

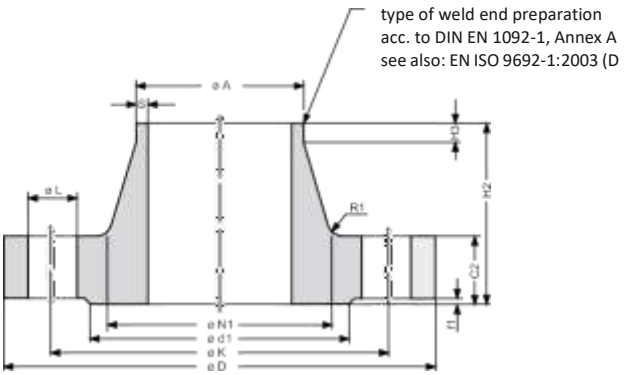
Flange	Identification acc. to DIN 2526			Identification acc. to DIN EN 1092-1			Drawing
	Standard	Note	Facing	Facing	Ra in µm [4]	Rz in µm [4]	
Flat Face	DIN 2641 / 2642 DIN 2655 / 2656 DIN 2673	No requirements	Type A	Type A	3,2–12,5	12,5–50	
	DIN 2527 ≤ PN 40 DIN 2573 / 2576	Rz = 160, turned [1]	Type B				
Raised Face	DIN 2630 to DIN 2635	Rz = 160, turned [1] Rz = 40, turned	Type C Type D	Type B1[2]	3,2–12,5	12,5–50	
	from DIN 2636 DIN 2527 ≥ PN 63	Rz = 16, turned	Type E	Type B2[3]	0,8–3,2	3,2–12,5	
Tongue	DIN 2512	PN 10 - PN 160	Type F	Type C	0,8–3,2	3,2–12,5	
Groove	DIN 2512	PN 10 - PN 160	Type N	Type D	0,8–3,2	3,2–12,5	
Male	DIN 2513	PN 10 - PN 100	Type V13	Type E	3,2–12,5	12,5–50	
Female	DIN 2513	PN 10 - PN 100	Type R13	Type F	3,2–12,5	12,5–50	
O-Ring	DIN 2514	PN 10 - PN 40	Type R14	Type G	0,8–3,2	3,2–12,5	
O-Ring Groove	DIN 2514	PN 10 - PN 40	Type V14	Type H	0,8–3,2	3,2–12,5	
Counter Bore For Ovale Seal	DIN 2696	PN 63 - PN 400	Type L	–	–	–	
Bevel For Diaphragm Welding Seal	DIN 2695	PN 63 - PN 400	Type M	–	–	–	

[1] No finer than 40 µm.
[2] B1 general applications PN 2,5 – PN 40.
[3] B2 general applications PN 63 – PN 400.
[4] Ra = arithmetical mean deviation.
[5] Rz = average surface roughness.

Measurement acc. to DIN



Measurement acc. to EN



Pressure Ratings, Facings and Dimensions

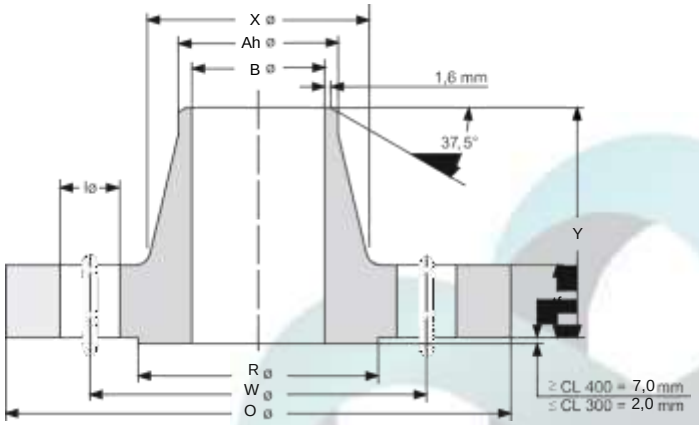
Nominal pressure comparison Class / bar / psi / API psi

ASME Class	150	300	400	600		900		1500		2500			
bar –	20	51	68	102	140	153	210	233	350	422	700	1050	1400
psi –	285	740	990	1480		2220		3380		6120			
API psi					2000		3000		5000		10000	15000	20000

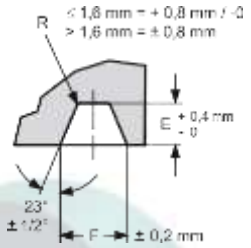
Bar Greek barys, hard
Psi Pounds per square inch

Conversion: 1 bar ~ 14,29 psi / 1 psi ~ 0,07 bar

ASME B 16.5 Dimensions



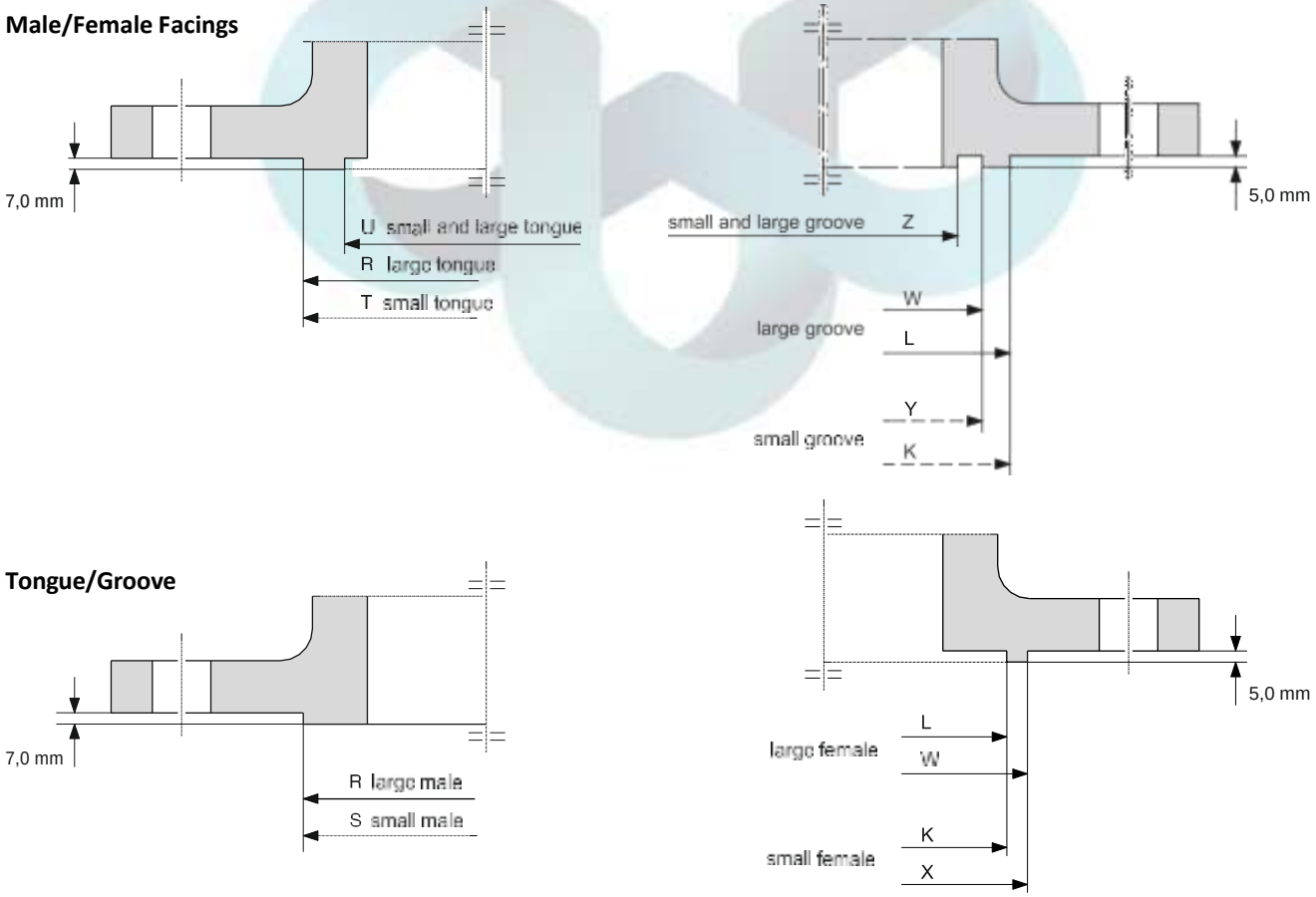
Ring Type Joint (RTJ)



Facing

The facing is made by mechanical turning, resulting in the following surface conditions:

Male/Female Facings



Tongue/Groove

Butt-weld Fittings Materials

DIN EN 10253 – Butt-weld Fittings

1. Brief Description and Comparison

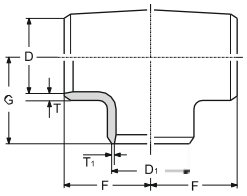
Butt-weld Fittings	
DIN EN 10253 - 1	Non-alloy steel for general applications and without special test requirements
DIN EN 10253 - 2	Non-alloy and alloy ferritic steels with special test requirements
DIN EN 10253 - 3	Wrought austenitic and austenitic-ferritic (duplex) stainless steels without special test requirements
DIN EN 10253 - 4	Wrought austenitic and austenitic-ferritic (duplex) stainless steels with special test requirements

Earlier Issues	
DIN 2609	Butt-welding fittings – Technical delivery conditions
DIN 2605-1/ -2	Elbows, reduced and full pressure factor
DIN 2615-1/ -2	Tees, reduced and full pressure factor
DIN 2616-1/-2	Reducers, reduced and full pressure factor
DIN 2617	Caps

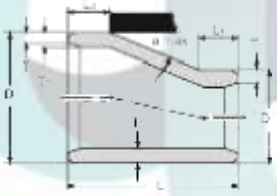
DIN EN 10253 establishes – in addition to the steel grades, mechanical properties, dimensions and tolerances, test requirements, test reports and identification – two types of fittings:

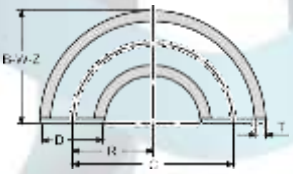
- **Type A Fittings :** Same wall thickness as the subsequent pipe (DIN 2605-1, DIN 2615-1, DIN 2616-1 und DIN 2617).
- **Type B Fittings :** With higher wall thickness of the fitting body are designed for the same internal pressure as for a straight pipe with the same dimensions (DIN 2605-2, DIN 2615-2 und DIN 2616-2).

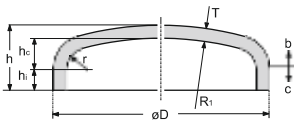
According to the calculation rules of DIN EN 13480-3, is also, opposed to DIN, caps of type A and B, in which, at a reduced utilization factor (Type A), the values lier in 94 to 100%, as far as it can be calculated as per standard.



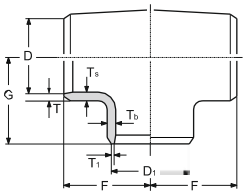
DIN EN 10253 Type A Tees


DIN EN 10253 Type A/B Eccentric Reducers

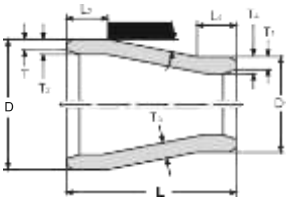

DIN EN 10253 Type A Elbows

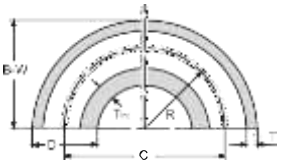


DIN EN 10253 Caps



DIN EN 10253 Type B Tees


DIN EN 10253 Type B Concentric Reducers


DIN EN 10253 Type B Elbows

2. Welding Ends Types

Ends Implementation as per to DIN EN 120253			Ends Implementation as per DIN 2559		
≤ 3 mm wall thk	Plain or slightly beveled ends		DIN 2559-1	≤ 3 mm wall thk	
> 3 mm to ≤ 22 mm	30° bevel +5 /-0° with a root face of 1,6 mm ± 0,8 mm		DIN 2559-22	> 3 mm to ≤ 16 mm	
> 22 mm wall thk	to be agreed		DIN 2559-3	> 16 mm wall thk	

3. Dimension Standards and Tolerances Comparison

Weld end tolerances			
DIN EN 1053-2	DIN EN 1053-4		DIN 2609
	Tolerances	Admitted Difference [1]	
± 1% of the theoretical inside diameter or ± 0,5 mm, whichever is greater, but not more than ± 5 mm. If the tolerance for the **OD** applies, **Option 9** must be ordered.	D2	± 1% oder 5 mm	± 1% of the theoretical OD (≤ 100 mm da as max. ± 5 mm is allowed.)
	D3	± 0,75% oder 0,3 mm [2]	
	D4	± 0,50% oder 0,1 mm [2]	

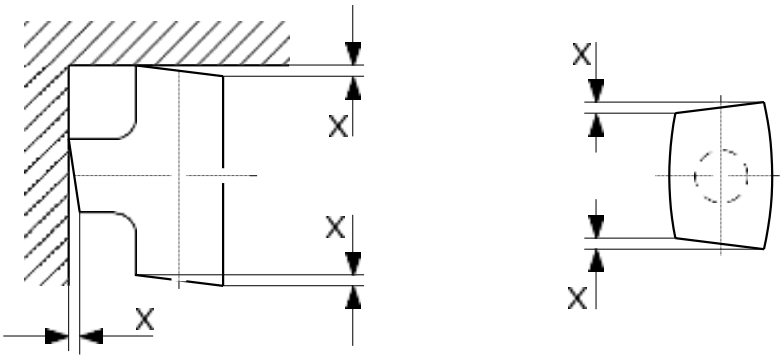
[1] Acc. to outer Dia (OD): the major value is applicable.
[2] Option 13: Fittings can be ordered in tolerances D3 or D4.

Welding Ends Wall Thickness Tolerances							
Diameter	Wall Thickness	DIN EN 1053-2		DIN EN 1053-2		DIN EN 1053-2	
		-	+	-	+	-	+
All	All					2605-1 12,5%	2609 15%
D ≤ 610	All	12,5%	20%	12,5%	15%	2605-2/2615/2616/2617 12,5%	
D > 610		**Seamless** 12,5%	20%				
D > 610	≤ 10 ≤ 10	**Welded** 0,35 mm 0,50 mm	20%	0,35 mm 0,50 mm	15%	2605-2/ 2615/ 2616/ 2617 0,35 mm 0,50 mm	

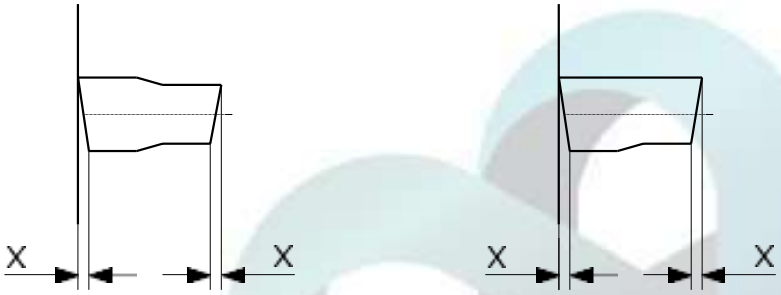
Fitting Geometry Tolerances		
DIN EN 10253-2	DIN EN 10253-4	DIN EN 2609
± 1% diameter at measuring point, min. 1 mm		
For 180° elbows, a tolerance P was created.		

Tolerances of the FiEng Geometry

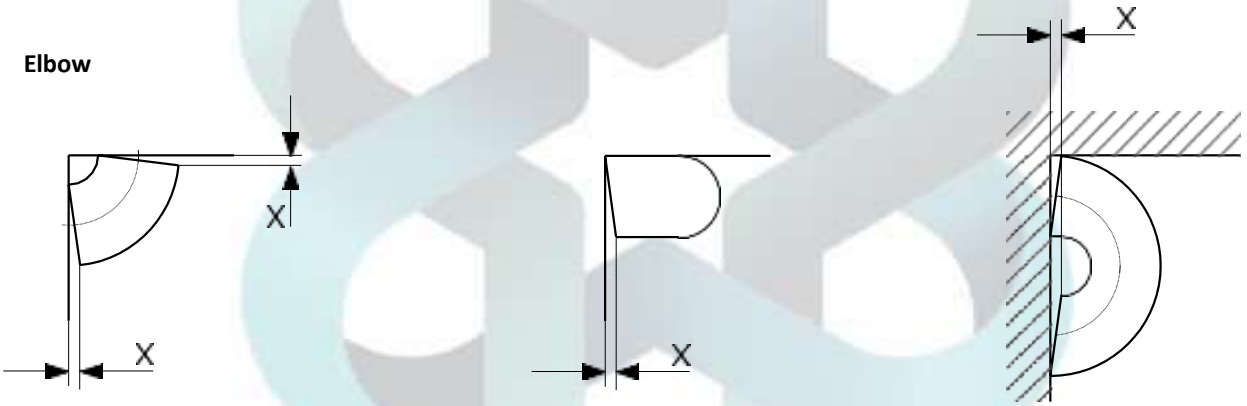
Tee



Reducer



Elbow



4. Elbows Radius

Size in mm	Type 2D / 2			Type 3D / 3			Type 5D / 5		
	DIN EN 10253		DIN 2605	DIN EN 10253		DIN 2605	DIN EN 10253		DIN 2605
	Part 2	Part 4		Part 2	Part 4		Part 2	Part 4	
21,3	25,0	17,5	17,5	38,0	28,0	28,0	–	–	–
26,9	–	–	–	38,0	29,0	29,0	–	–	–
48,3	–	–	–	–	–	–	109,5	108,0	107,5
51,0	–	–	–	63,0	63,0	63,5	122,5	115,0	115,0
57,0	–	–	–	–	–	–	130,0	127,5	127,5
60,3	–	–	–	–	–	–	137,5	135,0	135,0
88,9	–	–	–	–	–	–	207,5	205,0	205,0
101,6	–	–	–	133,0	133,5	133,5	235,0	237,5	237,5
108,0	–	–	–	–	–	–	253,0	252,5	252,5
133,0	–	–	–	–	–	–	311,5	312,5	312,5
219,1	–	–	–	–	–	–	515,0	510,0	510,0
323,9	–	–	–	–	–	–	770,0	775,0	775,0

5. Material Grade & Standard Comparison

Designation	Material Grade	DIN Material	Material Grade	ASME
P235TR2	1.0255	St 37.4	1.0255	–
P265TR2	1.0259	St 44.4	1.0257	–
P235GH	1.0345	St 35.8 / St 37.8	1.0305 / 1.0315	–
P265GH	1.0425	St 45.8 / St 42.8	1.5405 / 1.0498	WPB
16Mo3	1.5415	15 Mo 3	1.5415	–
10CrMo5-5	1.7338	–	–	WP11
13CrMo4-5	1.7335	13 CrMo 4 4	1.7335	WP12
10CrMo9-10	1.7380	10 CrMo 9 10	1.7380	WP22
X11CrMo5	1.7362	12 CrMo 19 5	1.7362	WP5
X11CrMo5	1.7386	X 12 CrMo 9 1	1.7386	WP9
X10CrMoVNb9-1	1.4903	–	–	WP91
P355N	1.0562	StE 355	1.0562	–
P355NH	1.0565	WStE 355	1.0565	–
P355NL1	1.0566	TStE 355	1.0566	–
P215NL	1.0451	TT St 35 N	1.0356	–
P265NL	1.0453	–	–	–
12Ni14	1.5637	10 Ni 14	1.5637	WPL3
X10Ni9	1.5682	X 8 Ni 9	1.5662	–
L290NB	1.0484	StE 290.7	1.0484	WPHY42
L360NB	1.0582	StE 360.7	1.0582	WPHY52
L360QB	1.8948	–	–	–
L415NB	1.8972	StE 415.7	1.8972	WPHY60
L415QB	1.8947	–	–	–
L450QB	1.8952	–	–	–

DIN 2609 – Materials for Butt-weld Fittings

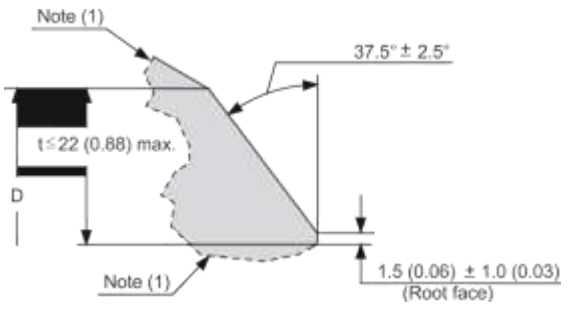
Materials Group		Base Material	Material	Product Form of Base Materials [1]						Application
Index	Short Name		Number	1	2	3	4	5	DIN	Temperature in °C
A	St 37.0	St 37.0	1.0254	•	–	–	–	–	1629	–10 to 300
		St 37.0	1.0254	–	•	–	–	–	1626	–10 to 300
		St 37-2	1.0028	–	–	•	•	•	17 100	–10 to 300
B	St 44.0	St 44.0	1.0256	•	–	–	–	–	1629	–10 to 300
		St 44.0	1.0256	–	•	–	–	–	1626	–10 to 300
		St 44-2	1.0044	–	–	•	•	•	17 100	–10 to 300
C	St 52.0	St 52.0	1.0421	•	–	–	–	–	1629	–10 to 300
		St 52.0	1.0421	–	•	–	–	–	1626	–10 to 300
		St 52-3	1.0570	–	–	•	•	•	17 100	–10 to 300
D	St 290.7	St 290.7	1.0484	•	•	–	–	–	17 172	–10 to 50
E	StE 360.7	StE 360.7	1.0582	•	•	–	–	–	17 172	–10 to 50
F	St 35.8 I	St 35.8 I	1.0305	•	–	–	–	–	17 175	–10 to 420
		St 35.8 I	1.0315	–	•	–	–	–	17 177	–10 to 420
		HI	1.0345	–	–	•	–	–	17 155	–10 to 420
		HII	1.0425	–	–	•	–	–	17 155	–10 to 420
		C 22.8	1.0460	–	–	–	•	•	17 243	–10 to 420
G	St 35.8 III	St 35.8 III	1.0305	•	–	–	–	–	17 175	–10 to 420
		St 35.8 III	1.0315	–	•	–	–	–	17 177	–10 to 420
		HII	1.0425	–	–	•	–	–	17 155	–10 to 420
		C 22.8	1.0460	–	–	–	•	•	17 243	–10 to 420
H	15 Mo 3	15 Mo 3	1.5415	•	–	–	–	–	17 175	–10 to 530
		15 Mo 3	1.5415	–	•	–	–	–	17 177	–10 to 530
		15 Mo 3	1.5415	–	–	•	–	–	17 155	–10 to 530
		15 Mo 3	1.5415	–	–	–	•	•	17 243	–10 to 530
J	13 CrMo 4 4	13 CrMo 4 4	1.7335	•	–	–	–	–	17 175	–10 to 570
		13 CrMo 4 4	1.7335	–	–	•	–	–	17 155	–10 to 570
		13 CrMo 4 4	1.7335	–	–	–	•	•	17 243	–10 to 570
K	10 CrMo 9 10	10 CrMo 9 10	1.7380	•	–	–	–	–	17 175	–10 to 600
		10 CrMo 9 10	1.7380	–	–	•	–	–	17 155	–10 to 600
		10 CrMo 9 10	1.7380	–	–	–	•	•	17 243	–10 to 600
L	X 5 CrNi 18 10	X 5 CrNi 18 10	1.4301	•	–	–	–	–	17 458	–200 to 550
		X 5 CrNi 18 10	1.4301	–	•	–	–	–	17 457	–200 to 550
		X 5 CrNi 18 10	1.4301	–	–	•	•	•	17 440	–200 to 550
M	X 2 CrNi 19 11	X 2 CrNi 19 11	1.4306	•	–	–	–	–	17 458	–200 to 550
		X 2 CrNi 19 11	1.4306	–	•	–	–	–	17 457	–200 to 550
		X 2 CrNi 19 11	1.4306	–	–	•	•	•	17 440	–200 to 550
N	X 6 CrNiTi 18 10	X 6 CrNiTi 18 10	1.4541	•	–	–	–	–	17 458	–200 to 550
		X 6 CrNiTi 18 10	1.4541	–	•	–	–	–	17 457	–200 to 550
		X 6 CrNiTi 18 10	1.4541	–	–	•	•	•	17 440	–200 to 550
O	X 5 CrNiMo 17 12 2	X 5 CrNiMo 17 12 2	1.4401	•	–	–	–	–	17 458	–200 to 550
		X 5 CrNiMo 17 12 2	1.4401	–	•	–	–	–	17 457	–200 to 550
		X 5 CrNiMo 17 12 2	1.4401	–	–	•	•	•	17 440	–200 to 550
P	X 2 CrNiMo 17 13 2	X 2 CrNiMo 17 13 2	1.4404	•	–	–	–	–	17 458	–200 to 550
		X 2 CrNiMo 17 13 2	1.4404	–	•	–	–	–	17 457	–200 to 550
		X 2 CrNiMo 17 13 2	1.4404	–	–	•	•	•	17 440	–200 to 550
Q	X 6 CrNiMoTi 17 12 2	X 6 CrNiMoTi 17 12 2	1.4571	–	–	–	–	–	17 458	–200 to 550
		X 6 CrNiMoTi 17 12 2	1.4571	–	–	–	–	–	17 457	–200 to 550
		X 6 CrNiMoTi 17 12 2	1.4571	–	–	–	–	–	17 440	–200 to 550
R	WStE 355	WStE 355	1.0565	•	–	–	–	–	17 179	–20 to 400
		WStE 355	1.0565	–	•	–	–	–	17 178	–20 to 400
		WStE 355	1.0565	–	–	•	–	•	17 102	–20 to 400
		WStE 355	1.0565	–	–	–	•	–	17 103	–20 to 400
S	TStE 355	TStE 355	1.0566	•	–	–	–	–	17 179	–60 to 50
		TStE 355	1.0566	–	•	–	–	–	17 178	–60 to 50
		TStE 355	1.0566	–	–	•	–	•	17 102	–60 to 50
		TStE 355	1.0566	–	–	–	•	–	17 103	–60 to 50
T	TStE 285	TStE 285	1.0488	•	–	–	–	–	17 179	–50 to 50
		TStE 285	1.0488	–	•	–	–	–	17 178	–50 to 50
		TStE 285	1.0488	–	–	•	–	•	17 102	–50 to 50
		TStE 285	1.0488	–	–	–	•	–	17 103	–50 to 50
U	10 Ni 14	10 Ni 14	1.5637	•	–	–	–	–	17 173	–105 to 50
		10 Ni 14	1.5637	–	•	–	–	–	17 174	–105 to 50
		10 Ni 14	1.5637	–	–	•	•	•	17 280	–105 to 50

ASME B 16.9 – Butt-weld Fittings General Standard

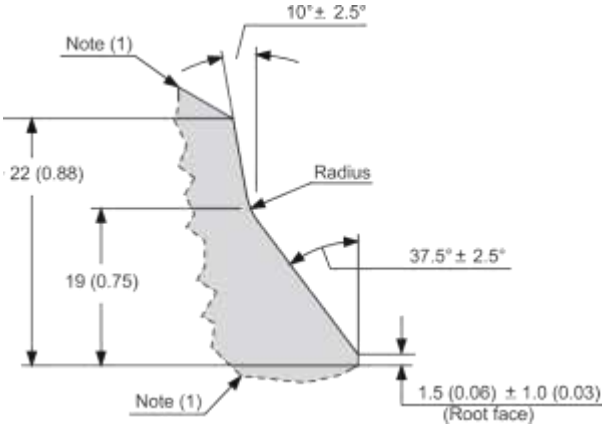
Types																										
	Elbows			Tees															Reducers Concentric/ Eccentric						Caps	Stub Ends
OD 1	LR	SR	3D	Outside Diameter 2															OD 1	Outside Diameter 2							
½"	•	–	–	½"	⅜"	¼"	–	–	–	–	–	–	–	–	–	–	–	–	½"	–	–	–	–	–	–	•	•
¾"	•	–	•	¾"	½"	⅜"	–	–	–	–	–	–	–	–	–	–	–	–	¾"	½"	⅜"	–	–	–	–	•	•
1"	•	•	•	1"	¾"	½"	–	–	–	–	–	–	–	–	–	–	–	–	1"	¾"	½"	–	–	–	–	•	•
1¼"	•	•	•	1¼"	1"	¾"	½"	–	–	–	–	–	–	–	–	–	–	–	1¼"	1"	¾"	½"	–	–	–	•	•
1½"	•	•	•	1½"	1¼"	1"	¾"	½"	–	–	–	–	–	–	–	–	–	–	1½"	1¼"	1"	¾"	½"	–	–	•	•
2"	•	•	•	2"	1½"	1¼"	1"	¾"	–	–	–	–	–	–	–	–	–	–	2"	1½"	1¼"	1"	¾"	–	–	•	•
2½"	•	•	•	2½"	2"	1½"	1¼"	1"	–	–	–	–	–	–	–	–	–	–	2½"	2"	1½"	1¼"	1"	–	–	•	•
3"	•	•	•	3"	2½"	2"	1½"	1¼"	–	–	–	–	–	–	–	–	–	–	3"	2½"	2"	1½"	1¼"	–	–	•	•
3½"	•	•	–	3½"	3"	2½"	2"	1½"	–	–	–	–	–	–	–	–	–	–	3½"	3"	2½"	2"	1½"	1¼"	–	•	•
4"	•	•	•	4"	3½"	3"	2½"	2"	1½"	–	–	–	–	–	–	–	–	–	4"	3½"	3"	2½"	2"	1½"	–	•	•
5"	•	•	•	5"	4"	3½"	3"	2½"	2"	–	–	–	–	–	–	–	–	–	5"	4"	3½"	3"	2½"	2"	–	•	•
6"	•	•	•	6"	5"	4"	3½"	3"	2½"	–	–	–	–	–	–	–	–	–	6"	5"	4"	3½"	3"	2½"	–	•	•
8"	•	•	•	8"	6"	5"	4"	3½"	–	–	–	–	–	–	–	–	–	–	8"	6"	5"	4"	3½"	–	–	•	•
10"	•	•	•	10"	8"	6"	5"	4"	–	–	–	–	–	–	–	–	–	–	10"	8"	6"	5"	4"	–	–	•	•
12"	•	•	•	12"	10"	8"	6"	5"	–	–	–	–	–	–	–	–	–	–	12"	10"	8"	6"	5"	–	–	•	•
14"	•	•	•	14"	12"	10"	8"	6"	–	–	–	–	–	–	–	–	–	–	14"	12"	10"	8"	6"	–	–	•	•
16"	•	•	•	16"	14"	12"	10"	8"	6"	–	–	–	–	–	–	–	–	–	16"	14"	12"	10"	8"	–	–	•	•
18"	•	•	•	18"	16"	14"	12"	10"	8"	–	–	–	–	–	–	–	–	–	18"	16"	14"	12"	10"	–	–	•	•
20"	•	•	•	20"	18"	16"	14"	12"	10"	8"	–	–	–	–	–	–	–	–	20"	18"	16"	14"	12"	–	–	•	•
22"	•	•	•	22"	20"	18"	16"	14"	12"	10"	–	–	–	–	–	–	–	–	22"	20"	18"	16"	14"	–	–	•	•
24"	•	•	•	24"	22"	20"	18"	16"	14"	12"	10"	–	–	–	–	–	–	–	24"	22"	20"	18"	16"	–	–	•	•
26"	•	–	•	26"	24"	22"	20"	18"	16"	14"	12"	–	–	–	–	–	–	–	26"	24"	22"	20"	18"	–	–	•	–
28"	•	–	•	28"	26"	24"	22"	20"	18"	16"	14"	12"	–	–	–	–	–	–	28"	26"	24"	22"	20"	–	–	•	–
30"	•	–	•	30"	28"	26"	24"	22"	20"	18"	16"	14"	12"	10"	–	–	–	–	30"	28"	26"	24"	22"	–	–	•	–
32"	•	–	•	32"	30"	28"	26"	24"	22"	20"	18"	16"	14"	–	–	–	–	–	32"	30"	28"	26"	24"	–	–	•	–
34"	•	–	•	34"	32"	30"	28"	26"	24"	22"	20"	18"	16"	–	–	–	–	–	34"	32"	30"	28"	26"	24"	–	•	–
36"	•	–	•	36"	34"	32"	30"	28"	26"	24"	22"	20"	18"	16"	–	–	–	–	36"	34"	32"	30"	28"	26"	–	•	–
38"	•	–	•	38"	36"	34"	32"	30"	28"	26"	24"	22"	20"	18"	–	–	–	–	38"	36"	34"	32"	30"	28"	26"	•	–
40"	•	–	•	40"	38"	36"	34"	32"	30"	28"	26"	24"	22"	20"	18"	–	–	–	40"	38"	36"	34"	32"	30"	–	•	–
42"	•	–	•	42"	40"	38"	36"	34"	32"	30"	28"	26"	24"	22"	20"	18"	16"	–	42"	40"	38"	36"	34"	32"	30"	•	–
44"	•	–	•	44"	42"	40"	38"	36"	34"	32"	30"	28"	26"	24"	22"	20"	–	–	44"	42"	40"	38"	36"	–	–	•	–
46"	•	–	•	46"	44"	42"	40"	38"	36"	34"	32"	30"	28"	26"	24"	22"	–	–	46"	44"	42"	40"	38"	–	–	•	–
48"	•	–	•	48"	46"	44"	42"	40"	38"	36"	34"	32"	30"	28"	26"	24"	22"	–	48"	46"	44"	42"	40"	–	–	•	–

Weld seam preparations	
Nominal wall thickness T	**Type of preparation**
T < 5 mm (for austenitic steels ≤ 3 mm)	Cut square or slightly chamfered, at manufacturer's dicretion
5 < T < 22 mm (for austenitic steels > 3 mm)	Plain bevel as in sketch 1 (s.b.)
T > 22 mm	Compound bevel as in sketch 2 (s.b.)

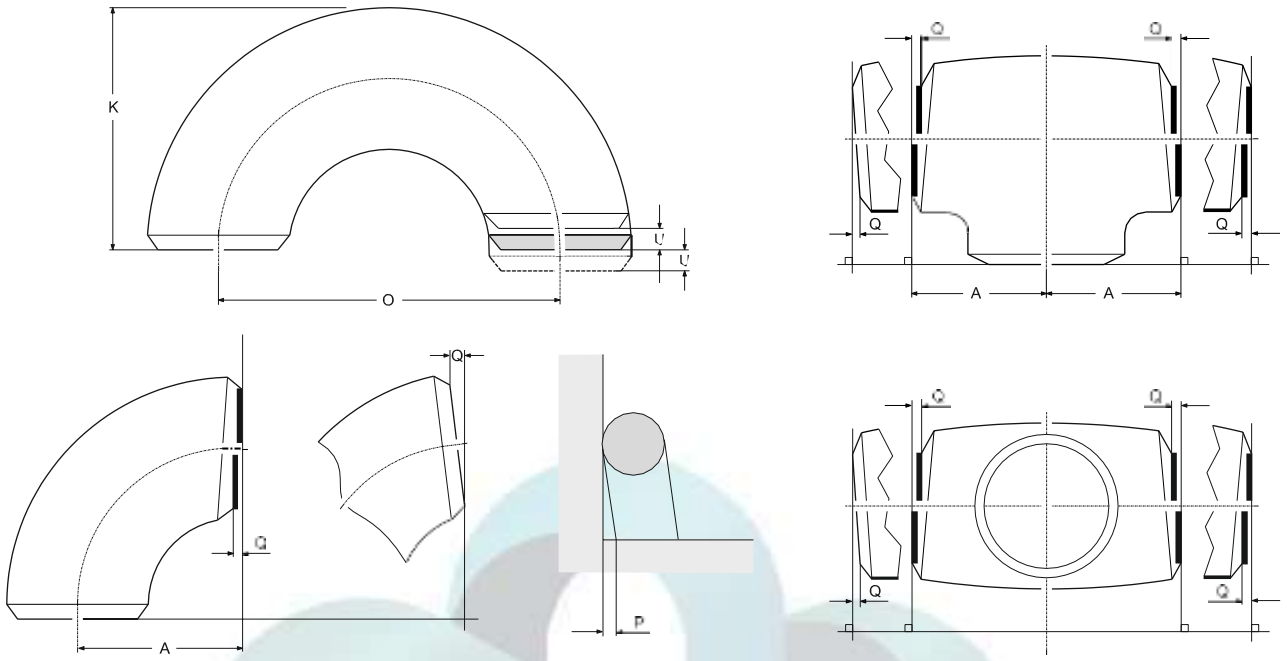
Sketch 1: Plain bevel



Sketch 2: Compound be



ASME B 16.9 Tolerances



	All Fittings			Elbows 90°/45° and Tees	Reducers / Lap Joint Stub Ends	Elbows 180°			Elbows 3D	Caps
Nominal Pipe Size	Outside Diameter At Bevel	Inside Diameter At End	Wall Thickness	Center to End	length	Center to Center	Back to Face	Ends Alignment	Center to End	Length
	D		T	A, B, C, M	F, H	O	K	U	A, B	E
½–2½"	+1,6/–0.8	± 0,8	No Smaller than 87.5% of the nominal wall thickness	± 2	± 2	± 6	± 6	± 1	± 3	± 3
3"–3½"	± 1,6	± 1,6		± 2	± 2	± 6	± 6	± 1	± 3	± 3
4"	± 1,6	± 1,6		± 2	± 2	± 6	± 6	± 1	± 3	± 3
5"–8"	+2,4/–1,6	± 1,6		± 2	± 2	± 6	± 6	± 1	± 3	± 6
10"–18"	+4,0/–3,2	± 3,2		± 2	± 2	± 10	± 6	± 2	± 3	± 6
20"–24"	+6,4/–4,8	± 4,8		± 2	± 2	± 10	± 6	± 2	± 3	± 6
26"–30"	+6,4/–4,8	± 4,8		± 3	± 5	–	–	–	± 6	± 10
32"–48"	+6,4/–4,8	± 4,8		± 5	± 5	–	–	–	± 6	± 10

All data in mm

Round Angularity Tolerances		
NPS	Off Angle	Off Plane
	D	P
½–2½"	+1,6/–0.8	± 0,8
3"–3½"	± 1,6	± 1,6
4"	± 1,6	± 1,6
5"–8"	+2,4/–1,6	± 1,6
10"–18"	+4,0/–3,2	± 3,2
20"–24"	+6,4/–4,8	± 4,8
26"–30"	+6,4/–4,8	± 4,8
32"–48"	+6,4/–4,8	± 4,8

Lap Joint Stub Ends			
NPS	OD of Lap	Fillet	Thickness
	D	R	T
½–2½"	+0/–1	+0/–1	± 1,6/–0
3"–3½"	+0/–1	+0/–1	± 1,6/–0
4"	+0/–1	+0/–1	± 1,6/–0
5"–8"	+0/–1	+0/–1	± 1,6/–0
10"–18"	+0/–2	+0/–2	± 3,2/–0
20"–24"	+0/–2	+0/–2	± 3,2/–0
26"–30"	–	–	–
32"–48"	–	–	–

Flange Surface

General

While using the surface marks acc. to the following table, each underlying Series – 1, 2, 3 or 4 – and a reference to DIN 3141 must be stated on thedrawing.

Symbols	R_t max. µm Series 1	R_t max. µm Series 2	R_t max. µm Series 3	R_t max. µm Series 4	Requirements
	Optional	Optional	Optional	Optional	None
	Optional	Optional	Optional	Optional	Clean and evenly
	160	100	63	25	Values may not be exceeded
	40	25	16	10	Values may not be exceeded
	16	6	4	2,5	Values may not be exceeded
		1	1	0,4	Values may not be exceeded

Rugosity Comparison

Exact comparison is not possible since the following table has been drawn, up to allow the acceptable roughness to be observed.

Roughness	Comparison												
R_t in µm	160	100	63	50	40	32	25	16	10	8	6,3	4	2,5
R_a in µm	40	25	16	12,5	10	6,3	4,8	3,2	2,5	1,6	1,2	0,8	0,4
R_a in µinch	1500	1000	630	500	350	250	190	125	80	63	48	32	16
R_p in µm	80	50	32	25	20	12,5	10	6,3	4,8	3,2	2,5	1,6	0,8

Values for the rotation

Radius	Roughness R_t in mm												
	160	100	63	50	40	32	25	16	10	8	6,3	4	2,5
1 mm	1,13	0,89	0,69	0,63	0,57	0,50	0,48	0,36	0,28	0,25	0,22	0,18	0,13
1,6 mm	1,40	1,12	0,90	0,80	0,72	0,65	0,57	0,46	0,36	0,32	0,28	0,23	0,18

Technical Segment

Quality System of MSC INDIA

Roughness Conversion Table

N values	R_a µm	R_t µm approx.	R_z µm approx.	AARH/CLA	RMS	Ration R_z to R_a
N1	0,025	0,24 to 0,40	0,22 to 0,30	1	1,1	9:1 to 12:1
N2	0,050	0,49 to 0,80	0,45 to 0,60	2	2,2	8:1 to 12:1
N3	0,100	0,85 to 1,15	0,80 to 1,10	4	4,4	8:1 to 11:1
N4	0,200	1,10 to 2,40	1,00 to 1,80	8	8,8	5:1 to 8:1
N5	0,400	1,75 to 3,60	1,60 to 2,80	16	17,6	4:1 to 7:1
N6	0,800	3,20 to 6,00	3,00 to 4,80	32	35,2	3,8:1 to 6:1
N7	1,600	6,30 to 10,00	5,90 to 16,00	63	64,3	3,7:1 to 5:1
N8	3,200	13,00 to 19,50	12,00 to 16,00	125	137,5	3,7:1 to 5:1
N9	6,300	25,00 to 38,00	23,00 to 38,00	250	275,0	3,7:1 to 5:1
N10	12,500	48,00 to 68,00	46,00 to 57,00	500	550,0	3,7:1 to 4,6:1
N11	25,000	95,00 to 130,00	90,00 to 110,00	1000	1100	3,6:1 to 4,4:1
N12	50,000	190,00 to 250,00	180,00 to 220,00	2000	2200	3,6:1 to 4,4:1
N13	100,000	380,00 to 500,00	360,00 to 430,00	4000	4400	3,6:1 to 4,3:1

N5
R_a 0,4 µm – AARH / CL 16
R_z 1,92 µm

N6
R_a 0,8 µm – AARH / CL 32
R_z 3,20 µm

N7
R_a 1,6 µm – AARH / CL 63
R_z 6,15 µm

N8
R_a 3,2 µm – AARH / CL 125
R_z 12,5 µm

N9
R_a 6,3 µm – AARH / CL 250
R_z 25,7 µm

N10
R_a 12,5 µm – AARH / CL 500
R_z 48,7 µm

N11
R_a 25 µm – AARH / CL 100
R_z 102 µm

N12
R_a 50 µm – AARH / CL 2000
R_z 185 µm

DIN / EN / ASTM – Materials Comparison

Pipes / Tubes

ASTM	EN	DIN	Material Number
STAINLESS STEEL			
A 312 Grade TP304L	X2CrNi18-9	–	1.4307
A 312 Grade TP304L	X2CrNi19-11	X 2 CrNi 19 11	1.4306
A 312 Grade TP304	X5CrNi18-10	X 5 CrNi 18 10	1.4301
A 312 Grade TP321	X6CrNiTi18-10	X 6 CrNiTi 18 10	1.4541
A 312 Grade TP347	X6CrNiNb18-10	X 6 CrNiNb 18-10	1.4550
A 312 Grade TP316L	X2CrNiMo17-12-2	X 2 CrNiMo 17 13 2	1.4404
A 312 Grade TP316	X5CrNiMo17-12-2	X 5 CrNiMo 17 12 2	1.4401
A 312 Grade TP316Ti	X6CrNiMoTi17-12-2	X 6 CrNiMoTi 17 12 2	1.4571
A 312 Grade TP316LN	X2CrNiMoN17-13-3	X 2 CrNiMoN 17 13 3	1.4429
A 312 Grade TP316	X3CrNiMo17-13-3	X 5 CrNiMo 17 13 3	1.4436
A 312 Grade TP316L	X2CrNiMoN18-14-3	X 2 CrNiMoN 18 14 3	1.4435
UNS S 31726	X2NiCrMoN17-13-5	X 2 CrNiMoN 17 13 5	1.4439
UNS N 08904 (904L)	X1NiCrMoCuN25-20-5	X 1 NiCrMoCuN 25 20 5	1.4539
UNS S 31254	X1CrNiMoCuN20-18-7	–	1.4547
UNS N 08926	X1NiCrMoCuN25-20-7	X 1 NiCrMoCuN 25 20 6	1.4529
UNS S 31803 (Duplex)	X2CrNiMoN22-5-3	X 2 CrMoN 22 5 3	1.4462
UNS S 32750 (Superduplex)	X2CrNiMoN25-7-4	–	1.4410
ALLOYED HEAT-RESISTANT			
	16Mo3	15 Mo 3	1.5415
A 335 Grade P11, P12	13CrMo4-4	13 CrMo 4 4	1.7335
A 335 Grade P22	10CrMo9-10	10 CrMo 9 10	1.7380
A 335 Grade P5	X11CrMo5	12 CrMo 19 5	1.7362
A 335 Grade P9	–	–	–
A 335 Grade P91	X10CrMoVNb9-1	–	1.4903
NON-ALLOY			
A 53 Grade A	P234TR1	St 37.0	1.0254
	S355J2H (1.0576)	St 52.3	1.0570
A 106 Grade A	P235GH TC1 (1.0345)	St 35.8/I	1.0305
	P235GH TC2 (1.0345)	St 35.8/III	1.0305
A 106 Grade B	P265GH TC1 (1.0425)	St 45.8/I	1.0405
	P265GH TC2 (1.0425)	St 45.8/III	1.0405
LOW TEMPERATURE			
A 333 Grade 3	X12Ni14	10 Ni 14	1.5637
A 333 Grade 1	P215NL (1.0451)	TTSt 35 N	1.0356
	P255QL (1.0452)	TTSt 35 V	1.0356
A 333 Grade 6	P265NL (1.0453)	–	–
HIGH YIELD STEELS			
API 5L Grade B	L245NB/L245NE	StE 240.7	1.0457
API 5L Grade X42	L290NB/L290NE	StE 290.7	1.0484
API 5L Grade X54	L360NB/L360NE	StE 360.7	1.0582
API 5L Grade X60	L415NB/L415NE	StE 415.7	1.8972
FINE GRAIN STEELS			
API 5L Grade X42	–	StE 285	1.0486
API 5L Grade X52	P355N	StE 355	1.0562
API 5L Grade X60	P420N	StE 420	1.8902
API 5L Grade X70	P460N	StE 460	1.8905

DIN / EN / ASTM – Materials Comparison

Flanges			
ASTM	**EN**	**DIN**	**Material Number**
STAINLESS STEEL			
A 182 Grade F304L	X2CrNi18-9	–	1.4307
–	–	–	1.4306
A 182 Grade F304	X5CrNi18-10	X 5 CrNi 18 10	1.4301
A 182 Grade F321	X6CrNiTi18-10	X 6 CrNiTi 18 10	1.4541
A 182 Grade F347	X6CrNiNb18-10	X 6 CrNiNb 18-10	1.4550
A 182 Grade F316L	X2CrNiMo17-12-2	X 2 CrNiMo 17 13 2	1.4404
A 182 Grade F316	X5CrNiMo17-12-2	X 5 CrNiMo 17 12 2	1.4401
A 182 Grade F316Ti	X6CrNiMoTi17-12-2	X 6 CrNiMoTi 17 12 2	1.4571
A 182 Grade F316LN	X2CrNiMoN17-13-3	X 2 CrNiMoN 17 13 3	1.4429
A 182 Grade F316	X3CrNiMo17-13-3	X 5 CrNiMo 17 13 3	1.4436
A 182 Grade F316L	X2CrNiMo18-14-3	X 2 CrNiMoN 18 14 3	1.4435
A 182 Grade F48	X2CrNiMoN17-13-5	X 2 CrNiMoN 17 13 5	1.4439
A 182 Grade F904L	X1NiCrMoCu25-20-7	X 1 NiCrMoCuN 25 20 5	1.4539
UNS S 31254	X1CrNiMoCuN20-18-7	–	1.4547
UNS N 08926	X1NiCrMoCuN25-20-7	X 1 NiCrMoCuN 25 20 6	1.4529
A 182 Grade F51 (Duplex)	X2CrNiM0N22-5-3	X 2 CrMoN 22 5 3	1.4462
A 182 Grade F53 (Superduplex)	X2CrNiMoN25-7-4	–	1.4410
ALLOYED HEAT-RESISTANT			
	16Mo3	15 Mo 3	1.5415
A 182 Grade F11, F12	13CrMo4-5	13 CrMo 4 4	1.7335
A 182 Grade F22	11CrMo9-10(1.7383)	10 CrMo 9 10	1.7380
A 182 Grade F5	–	12 CrMo19 5	1.7362
A 182 Grade F9	–	–	–
A 182 Grade F91	X10CrMoVNb9-1	–	1.4903
NON-ALLOY			
–	S235JR	RSt 37-2	1.0038
–	S235J2 (1.0577)	St 52-3	1.0570
–	P250GH	C 22.8	1.0460
A 105	–	C 21	1.0432
–	P245GH	–	1.0352
LOW TEMPERATURE			
A 350 Grade LF3	12Ni14	10 Ni 14	1.5637
A 350 Grade LF2	P355QH1	TStE 355	1.0566
FINE GRAIN STEELS			
A 694 Grade F42	–	StE 285	1.0486
A 694 Grade F52	P355N	StE 355	1.0562
A 694 Grade F60	P420N	StE 420	1.8902
A 694 Grade F70	P460N	StE 460	1.8905

DIN / EN / ASTM – Materials Comparison

Butt-weld Fittings			
ASTM	**EN**	**DIN**	**Material Number**
STAINLESS STEEL			
A 182 Grade WP304L	X2CrNi18-8	–	1.4307
A 403 Grade WP304L	X2CrNi19-11	X 2 CrNi 19 11	1.4306
A 403 Grade WP304	X5CrNi18-10	X 5 CrNi 18 10	1.4301
A 403 Grade WP321	X6CrNiTi18-10	X 6 CrNiTi 18 10	1.4541
A 403 Grade WP347	X6CrNiNb18-10	X 6 CrNiNb 18-10	1.4550
A 403 Grade WP316L	X2CrNiMo17-12-2	X 2 CrNiMo 17 13 2	1.4404
A 403 Grade WP316	X5CrNiMo17-12-2	X 5 CrNiMo 17 12 2	1.4401
UNS S 31635	X6CrNiTi18-10	X 6 CrNiMoTi 17 12 2	1.4571
A 403 Grade WP316LN	X2CrNiMoN17-13-3	X 2 CrNiMoN 17 13 3	1.4429
A 403 Grade WP316	X3CrNiMo17-13-3	X 5 CrNiMo 17 13 3	1.4436
A 403 Grade WP316LN	X2CrNiMo18-14-3	X 2 CrNiMo 18 14 3	1.4435
UNS S 31726	X2CrNiMoN17-13-5	X 2 CrNiMoN 17 13 5	1.4439
UNS N 08904 (904L)	X1NiCrMoCu25-20-5	X 1 NiCrMoCuN 25 20 5	1.4539
UNS S 31254	X1CrNiMoCu20-18-7	–	1.4547
UNS N 08926	X1CrNiMoCuN25-20-7	X 1 NiCrMoCuN 25 20 6	1.4529
UNS S 31803 (Duplex)	X2CrNiMoN22-5-3	X2 CrNiMoN 22 5 3	1.4462
UNS S 32750 (Superduplex)	X2CrNiMoN25-7-4	–	1.4410
ALLOYED HEAT-RESISTANT			
–	16Mo3	15 Mo 3	1.5415
A 234 Grade WP11, WP12	13CrMo4-5	13 CrMo 4 4	1.7335
A 234 Grade WP22	10CrMo9-10	10 CrMo 9 10	1.7380
A 234 Grade WP5	X11CrMo5	12 CrMo 19 5	1.7362
A 234 Grade WP9	–	–	–
A 234 Grade WP91	X10CrMoVNb9-1	–	1.4903
NON-ALLOY			
–	S235	St 37.0	1.0254
–	–	–	–
A 234 Grade WPA	P235GH (1.0345)	St 35.8/I	1.0305
	P235GH (1.0345)	St 35.8/III	1.0305
A 234 Grade WPB	P265GH (1.0425)	St 45.8/I	1.0405
	P265GH (1.0425)	St 45.8/III	1.0405
LOW TEMPERATURE			
A 420 Grade WPL3	21Ni14	10 Ni 14	1.5637
	P215NL (1.0451)	TTSt 35 N	1.0356
		TTSt 35 V	1.0356
A 420 Grade WPL6	P265NL (1.0453)	–	–
HIGH YIELD STEELS			
–	–	StE 240.7	1.0457
A 860 Grade WPHY42	L290NB/L290NE	StE 290.7	1.0484
A 860 Grade WPHY52	L360NB/L360NE	StE 360.7	1.0582
A 860 Grade WPHY60	L415NB/L415NE	StE 415.7	1.8972
FINE GRAIN STEELS			
A 860 Grade WPHY42	–	StE 285	1.0486
A 860 Grade WPHY52	P355N	StE 355	1.0562
A 860 Grade WPHY60	–	StE 420	1.8902
A 860 Grade WPHY70	–	StE 460	1.8905

DIN / EN / ASTM – Materials Comparison

Forged Materials

	ASTM		DIN			EN		
	A	Grade	Material Number	Material	Technical Delivery Conditions	Number	Material	Technical Delivery Conditions
Stainless Steel	182	F304	1.4301	X 5 CrNi 18 10	17440	1.4301	X5CrNi18-10	10222-5
	182	F304L	1.4306	X 2 CrNi 19 11	17440	1.4307	X2CrNi18-9	10222-5
	182	F321	1.4541	X 6 CrNiTi 18 10	17440	1.4541	X6CrNiTi18-10	10222-5
	182	F316	1.4401	X 5 CrNi 17 12 2	17440	1.4401	X5CrNiMo17-12-2	10222-5
	182	F316L	1.4404	X 2 CrNiMo 17 13 2	17440	1.4404	X2CrNiMo17-12-2	10222-5
	182	F316Ti	1.4571	X 6 CrNiMoTi 17 12 2	17440	1.4571	X6CrNiMoTi17-12-2	10222-5
	–	–	1.4529	X 1 NiCrMoCuN 25 20 6	VdTÜV WB 502	1.4529	X1NiCrMoCuN25-20-7	10222-5
	182	F904L	1.4539	X 1 NiCrMoCuN 25 20 5	VdTÜV WB 421	1.4539	X1NiCrMoCu25-20-5	10222-5
	182	F51	1.4462	X 2 CrNiMoN 22 5 3	VdTÜV WB 418	1.4462	X2CrNiMoN22-5-3	10222-5
Alloyed heat-resistant	182	F1	1.5415	15 Mo 3	17243	1.5415	16Mo3	10222-2
	182	F12	1.7335	13 CrMo 44	17243	1.7335	13CrMo4-5	10222-2
	182	F22	1.7380	10 CrMo 9 10	17243	–	–	–
Non-alloy	–	–	1.0038	RSt 37-2	17100	1.0038	S235JR	10025-2
	–	–	1.0570	St 52-0	17100	1.0577	S355J2	10025-2
Low temperature	350	LF3	1.5637	10 Ni 14	17280	1.5637	12Ni14	10222-3
	350	LF2	1.0566	TStE 355	17103	–	–	–
Non-alloy heat-resistant	–	–	–	–	–	1.0352	P245GH	10222-2
	–	–	1.0460	C 22.8	17243	1.0460	P250GH	10222-2 NB[1)]
	105	–	1.0432	C 21	VdTÜV WB399/3		–	–
Fine grained steel	694	F42	1.0477	WStE 285	17103	1.0477	P285NH	10222-4
	694	F52	1.0565	WStE 355	17103	1.0565	P355NH	10222-4
	964	F60	1.8932	WStE 420	17103	1.8932	P420NH	10222-4

Seamless Pipes

	ASTM		DIN			EN		
	ASTM	Grade	Material Number	Material	Technical Delivery Conditions	Material Number	Material	Technical Delivery Conditions
Stainless Steel	A 312	TP304	1.4301	X 5 CrNi 18 10	17458	1.4301	X5CrNi18-10	10216-5
	A 312	TP304L	1.4306	X 2 CrNi 19 11	17458	1.4307	X2CrNi18-9	10216-5
	182	TP321	1.4541	X 6 CrNiTi 18 10	17440	1.4541	X6CrNiTi18-10	10222-5
	182	TP316	1.4401	X 5 CrNi 17 12 2	17440	1.4401	X5CrNiMo17-12-2	10222-5
	182	TP316L	1.4404	X 2 CrNiMo 17 13 2	17440	1.4404	X2CrNiMo17-12-2	10222-5
	A 312	TP316Ti	1.4571	X 6 CrNiMoTi 17 12 2	17458	1.4571	X6CrNiMoTi17-12-2	10216-5
	A 312	N 08926	1.4529	X 1 NiCrMoCuN 25 20 6	VdTÜV WB 502	1.4529	X1NiCrMoCuN25-20-7	10216-5
	A 312	N 08904	1.4539	X 1 NiCrMoCu 25 20 5	VdTÜV WB 421	1.4539	X1NiCrMoCu25-20-5	10216-5
	–	–	1.4462	X 2 CrNiMoN 22 5 3	VdTÜV WB 418	1.4462	X2CrNiMoN22-5-3	10216-5
Alloyed heat-resistant	A 335	P 1	1.5415	15 Mo 3	17175	1.5415	16Mo3	10216-2
	A 335	P 11	1.7335	13 CrMo 4 4	17175	1.7335	13CrMo4-5	10216-2
	A 335	P 22	1.7380	10 CrMo 9 10	17175	1.7380	10CrMo9-10	10216-2
Non-alloy	–	–	1.0254	St 37.0	1629	1.0254	P235TR1	10216-1
	–	–	1.0256	St 44.0	1629	1.0258	P265TR1	10216-1
	–	–	1.0421	St 52.0	1629	–	–	–
Low temperature	A 333	1	1.0356	TTSt 35 N	17173	1.0451	P215NL	10216-4
	–	–	1.0356	TTSt 35 V	17173	1.0452	P255QL	10216-4
	A 333	3	1.5637	10 Ni 14	17173	1.5637	12Ni14	10216-4
	–	–	1.5680	12 Ni 19	17173	1.5680	X12Ni5	10216-4
High yield steels	API 5L	B	1.0457	St 240.7	17172	1.0457	L245NB	10208-2
	API 5L	X42	1.0484	St 290.7	17172	1.0484	L290NB	10208-2
	API 5L	X52	1.0582	StE 360.7	17172	1.0582	L360NB	10208-2
	API 5L	X60	1.8972	StE 415.7	17172	1.8972	L415NB	10208-2
Fine grained steel	–	–	1.0562	StE 355	17179	1.0562	P355N	10216-3
	–	–	1.0565	WStE 355	17179	1.0565	P355NH	10216-3
	–	–	1.0566	TStE 355	17179	1.0566	P355NL1	10216-3
	–	–	1.1106	EStE 355	17179	1.1106	P355NL2	10216-3
Non-alloy heat-resistant	A 106	A	1.0305	St 35.8	17175	1.0345	P235GH	10216-2
	A 106	B	1.0405	St 45.8	17175	1.0425	P265GH	10216-2

DIN / EN / ASTM - Materials Comparison

Sheet Metals

	ASTM		DIN			EN		
	A	Grade	Material Number	Material	Technical Delivery Conditions	Material Number	Material	Technical Delivery Conditions
Stainless Steel	240	304	1.4301	X 5 CrNi 18 10	17440	1.4301	X5CrNi18-10	10028-7
	240	304L	1.4306	X 2 CrNi 19 11	17440	1.4307	X2CrNi18-9	10022-7
	182	321	1.4541	X 6 CrNiTi 18 10	17440	1.4541	X6CrNiTi18-10	10022-5
	182	316	1.4401	X 5 CrNi 17 12 2	17440	1.4401	X5CrNiMo17-12-2	10022-5
	182	316L	1.4404	X 2 CrNiMo 17 13 2	17440	1.4404	X2CrNiMo17-12-2	10028-5
	240	F316Ti	1.4571	X 6 CrNiMoTi 17 12 2	17440	1.4571	X6CrNiMoTi17-12-2	10028-7
	–	–	1.4529	X 1 NiCrMoCuN 25 20 6	VdTÜV WB 502	1.4529	X1NiCrMoCuN25-20-7	10028-7
	240	904L	1.4539	X 1 NiCrMoCu 25 20 5	VdTÜV WB 421	1.4539	X1NiCrMoCu25-20-5	10028-7
	240	S 31803	1.4462	X 2 CrNiMoN 22 5 3	VdTÜV WB 418	1.4462	X2CrNiMoN22-5-3	10028-7
Alloyed heat-resistant	204	A	1.5415	15 Mo 3	17155	1.5415	16Mo3	10028-2
	387	11	1.7335	13 CrMo 44	17155	1.7335	13CrMo4-5	10028-2
	387	22	1.7380	10 CrMo 9 10	17155	1.7380	10CrMo9-10	10028-2
Non-alloy	–	–	1.0038	St 37-2	17100	1.0038	S235JR	10025-2
	–	–	1.0570	St 52-3	17100	1.0577	S355J2	10025-2
Low temperature	203	D	1.5637	10 Ni 14	17280	1.5637	12Ni14	10028-4
	–	–	1.5680	12 Ni 19	17280	1.7380	X12Ni5	10028-4
Fine grained steel	515	60	1.0487	WStE 285	17102	1.0487	P275NH	10028-3
	516	60	1.0488	TStE 285	17102	1.0488	P275NL1	10028-3
	–	–	1.1104	EStE 285	17102	1.1104	P275NL2	10028-3
	–	–	1.0562	StE 355	17102	1.0562	P355N	10028-3
	515	70	1.0565	WStE 355	17102	1.0565	P355NH	10028-3
	516	70	1.0566	TStE 355	17102	1.0566	P355NL1	10028-3
	–	–	1.1106	EStE 355	17102	1.1106	P355NL2	10028-3
	–	–	1.8935	WStE 460	17102	1.8935	P460NH	10028-3
	–	–	1.8915	TStE 460	17102	1.8915	P460NH1	10028-3
	–	–	1.8918	EStE 460	17102	1.8918	P460NH2	10028-3
Non-alloy heat-resistant	–	–	1.0460	C 22.8	VdTÜV WB350/1	–	–	10028-2
	515	55	1.0425	H II	17155	1.0425	P265GH	10028-2

Welded Pipes

	ASTM		DIN			EN		
	A	Grade	Material Number	Material	Technical Delivery Conditions	Material Number	Material	Technical Delivery Conditions
Stainless Steel	A 312	TP304	1.4301	X 5 CrNi 18 10	17457	1.4301	X5CrNi18-10	10217-7
	A 312	TP304L	1.4306	X 2 CrNi 19 11	17457	1.4307	X2CrNi18-9	10217-7
	182	TP321	1.4541	X 6 CrNiTi 18 10	17440	1.4541	X6CrNiTi18-10	10222-5
	182	TP316	1.4401	X 5 CrNi 17 12 2	17440	1.4401	X5CrNiMo17-12-2	10222-5
	182	TP316L	1.4404	X 2 CrNiMo 17 13 2	17440	1.4404	X2CrNiMo17-12-2	10222-5
	A 312	TP316Ti	1.4571	X 6 CrNiMoTi 17 12 2	17457	1.4471	X6CrNiMoTi17-12-2	10217-7
	A 312	N 08926	1.4529	X 1 NiCrMoCuN 25 20 6	VdTÜV WB 502	1.4529	X1NiCrMoCuN25-20-7	10217-7
	A 312	N 08904	1.4539	X 1 NiCrMoCu 25 20 5	VdTÜV WB 421	1.4539	X1NiCrMoCu25-20-5	10217-7
	–	–	1.4462	X 2 CrNiMoN 22 5 3	VdTÜV WB 418	1.4462	X2CrNiMoN22-5-3	10217-7
Alloyed heat-resistant	–	–	1.5415	15 Mo 3	17177	1.5415	16Mo3	10217-2/5
Non-alloy	–	–	1.0254	St 37.0	1626	1.0254	P235TR1	10217-1
	–	–	1.0256	St 44.0	1626	1.0258	P265TR1	10217-1
	–	–	1.0421	St 52.0	1626	–	–	–
Non-alloy heat-resistant	–	–	1.0315	St 35.8	17177	1.0345	P235GH	10217-2/5
	–	–	1.0498	St 45.8	17177	1.0425	P265GH	10217-2/5
Low temperature	A 333	1	1.0356	TTSt 35 N	17174	1.0451	P215NL	10217-4/6
	–	–	1.0356	TTSt 35 V	17174	1.0452	P255QL	10217-4/6
	A 333	3	1.5637	10 Ni 14	17174	1.5637	12Ni14	10217-4/6
	–	–	1.5680	12 Ni 19	17174	1.5680	X12Ni5	10217-4/6
High yield steels	API 5L	B	1.0457	St 240.7	17172	1.0457	L245NB	10208-2
	API 5L	X42	1.0484	St 290.7	17172	1.0484	L290NB	10208-2
	API 5L	X52	1.0582	StE 360.7	17172	1.0582	L360NB	10208-2
	API 5L	X60	1.8972	StE 415.7	17172	1.8972	L415NB	10208-2
Fine grained steel	–	–	1.0562	StE 355	17178	1.0562	P355N	10217-3
	–	–	1.0565	WStE 355	17178	1.0565	P355NH	10217-3
	–	–	1.0566	TStE 355	17178	1.0566	P355NL1	10217-3
	–	–	1.1106	EStE 355	17178	1.1106	P355NL2	10217-3

Pipe Construction Standards

Standard	Directives, Rules, Regulations
PED 97/23/EC	Directives for pressure equipment
Pressure equipment	Pressure Equipment Regulation (14.Change of the GPSG)

Standard	Publicly Available Specifications
	Pipe classes for process plants
PAS 1057-1	Basic requirements for the development of pipe classes EN 13480
PAS 1057-5	Special Pipe Fittings
PAS 1057-6	Automated Welding Processes Flanges
PAS 1057-10	Technical delivery conditions for pipe components made from non-alloy & alloy steels with identified elevated temperature properties.
PAS 1057-11	Technical delivery conditions for austenitic stainless steels, pipe components.
PAS 1057-101	Standard pipe classes PN 10 to PN 100 - Pipe components made from non-alloy and alloy steels with identified elevated temperature properties.

Standard	Pressure Purpose Seamless Steel Tubes
DIN EN 10216-1	Non-alloy steel tubes with identified room temperature properties
DIN EN 10216-2	Non-alloy and alloy steel tubes with identified elevated temperature properties
DIN EN 10216-3	Alloy fine grain steel tubes
DIN EN 10216-4	Non-alloy and alloy steel tubes with identified temperature properties
DIN EN 10216-5	Stainless steel tubes

Standard	Pressure Purposes Welded Steel Tubes
DIN EN 10217-1	Non-alloy steel tubes with identified room temperature properties
DIN EN 10217-2	Electric welded alloy & non-alloy steel tubes with specified elevated temperature properties
DIN EN 10217-3	Alloy fine grain steel tubes
DIN EN 10217-4	Electric welded non-alloy tubes with specified low temperature properties
DIN EN 10217-5	Submerged arc welded non-alloy steel tubes with specified elevated temperature properties
DIN EN 10217-6	Submerged arc welded non-alloy tubes with specified low temperature properties
DIN EN 10217-7	Stainless steel tubes

Standard	Technical Basics
	Symbolic representation for use engineering drawings
DIN 2429-1	Basic requirements
DIN 2429-2	Functional representation
	Procurement guide of power station plant, equipment and systems
DIN EN 45510-7-1	High pressure piping systems
DIN EN 45510-7-2	Boiler and high pressure piping valves
DIN EN ISO 6708	Pipeline components-Definition and selection for nominal diameter.
ISO 2944	Components-Nominal pressures and Fluid power systems
DIN 2403	Pipelines identification according to the fluid conveyed

Standard	Technical Rules
DIN EN 764-1 to 7	Pressure tools
DIN EN 12952-1 to 16	Water tube boilers and auxiliary installations
DIN EN 12953-1 to 12	Shell boilers
DIN EN 13445-1 to 8	Unfired pressure vessels
DIN EN 13480-1 to 8	Metallic industrial piping
DIN EN 14276-1 to 2	Heat pumps and refrigerating system for pressure equipment.

Standard	Technical Basic Standards
DIN EN 10020	Definition and classification of steel grades
DIN EN 10027-1	**Steels Designation Systems** Steel names
DIN EN 10027-2	Numerical systems
CR 10260	Steels Designation Systems Additional symbols
DIN EN 10220	Seamless and welded steel tubes - Dimensions and messes per unit length
DIN EN 10204	Metallic products - Types of inspection documents
DIN EN ISO 1127	Stainless steel tubes - dimensions, tolerances and conventional masses per unit length

Standard	Steel Pipes for Pipelines for Combustible Fluids	
DIN EN 10208-1	Pipes for pipelines for combustible fluids	Requirement class A
DIN EN 10208-2		Requirement class B
DIN EN ISO 3183	Petroleum and natural gas industries - Steel pipe for pipeline transportation systems	

Standard	Flat Products and Forgings
DIN EN 10222-1 to 5	Steel forgings for pressure purposes
DIN EN 10228-1 to 6	Steels flat products for pressure purposes

Standard	Flanges and Joints	
DIN EN 1092-1	PN designated Circular flanges	Steel flanges
DIN EN 1092-2		Cast iron flanges
DIN EN 1092-3		Copper alloy flanges
DIN EN 1092-4		Aluminium alloy flanges
	Gaskets for PN-designated Flanges	
DIN EN 1514-1	Non-metallic flat gaskets with or without inserts	
DIN EN 1514-2	Spiral wound gaskets for use with steel flanges	
DIN EN 1514-3	Non-metallic PTFE envelope gaskets	
DIN EN 1514-4	Corrugated flat or grooved metallic and filled metallic gaskets for use with steel flanges	
DIN EN 1514-6	Covered serrated metal gaskets for use with steel flanges	
DIN EN 1514-7	Covered metal jacketed gaskets for se with steel flanges	
DIN EN 1514-8	Polymeric O-Ring gaskets for grooved flanges	
	Circular Flanges for Pipes, Valves, Fittings and Equipment, Class Designated	
DIN EN 1759-1	Steel flanges, NPS 1/2 to 24	
DIN EN 1759-3	Copper alloy flanges	
DIN EN 1759-4	Aluminium alloy flanges	
	Gaskets for Class-designated Flanges	
DIN EN 12560-1	Non-metallic flat gaskets with or without inserts	
DIN EN 12560-2	Spiral wound gaskets	
DIN EN 12560-3	Non-metallic PTFE envelope gaskets	
DIN EN 12560-4	Corrugated flat or grooved metallic and filled metallic gaskets	
DIN EN 12560-5	Metallic ring-joint gaskets (RTJ)	
DIN EN 12560-6	Covered serrated metal gaskets	
DIN EN 12560-7	Covered metal jacketed gaskets	
DIN EN 14772	Quality assurance testing and inspection of gaskets in accordance with the standards series EN 1514 and EN 12560	
	Bolts and Nuts	
DIN EN 1515-1	Bolts and nuts selection	
DIN EN 1515-2	Bolt materials classification for steel flanges, PN designated	
DIN EN 1515-3	Bolt materials Classification for steel flanges, Class designated	
DIN EN 1515-4	Bolting selection for equipment subject to the Pressure Equipment Directive 97/23/EC	

Standard	Design Rules for Gasketed Circular Flanges Connections
DIN EN 1591-1	Method of calculation
DIN EN 1591-1 Bbl1	Background information
DIN EN 1591-2	Parameters of gasket
DIN CEN/TS 1591-3	Metal to metal contact type flanged join calculation method
DIN CEN/TS 1591-4	Qualification of personnel competency in the assembly of bolted joints fitted to equipment subject to the PED
DIN CEN/TS 1591-5	Full face gasketed joints calculation method

Standard	AD 2000
	Group W - Pressure vessel made from steel material
W0	General materials principles
W1	Non-alloy and alloy steel plates
W2	Austenitic stainless steels
W4	Non-alloy and alloy steel tubes
W7	Ferritic steel-Bolts and nuts
W9	Steel flanges
W10	Materials for low temperature
W13	Non-alloy and steel forgings

Standard	Piping Equipment
DIN EN 10241	Threaded steel pipe fittings
DIN EN 10242	Malleable iron fittings
DIN EN 10253-2	Butt-weld pipe fittings – Non-alloy and ferritic alloy steels with specific inspection requirements
DIN EN 10253-4	Butt-weld pipe fittings – Austenitic and austenitic- ferritic (duplex) stainless steels with specific inspection requirements

Standard	Guideline for Manufacturing and Ordering of Pressure Equipment According to PED 97/23/EC
PAS 1010-1	General requirement
PAS 1010-2	Unfired pressure vessels
PAS 1010-3	Industrial piping
PAS 1010-4	Equipment of pressure
PAS 1010-5	Equipment with safety function
PAS 1010-6	Package units

DIN / EN Standards Comparing

Product and quality standards			
Flanges		**DIN Standard**	**DIN EN 1029-1**
Blind flanges	PN 6–100	2527	Type 05, PN 2.5 –100
Oval screwed flanges	PN 6	2558	
Screwed flanges	PN 10 / 16 PN 25 / 40 PN 64 PN 100	2566 2567 2568 2569	Type 13, PN 10 / 16 Type 13, PN 25 / 40 Type 13, PN 63 Type 13, PN 100
Flanges for welding	PN 6 PN 10	2573 2576	Type 01, PN 6 Type 01, PN 10
Welding neck flanges	PN 1–2.5 PN 6 PN 10 PN 16 PN 25 PN 40 PN 64 PN 100 PN 160 PN 250 PN 320 PN 400	2630 2631 2632 2633 2634 2635 2636 2637 2638 2628 2629 2627	Type 11, PN 2.5 Type 11, PN 6 Type 11, PN 10 Type 11, PN 16 Type 11, PN 25 Type 11, PN 40 Type 11, PN 63 Type 11, PN 100 Type 11, PN 160 Type 11, PN 250 Type 11, PN 320 Type 11, PN 400
Loose flanges for type 32 Weld-on collar Pressed collar	PN 6 PN 6 PN 6	2641 2641 2641	Type 01, PN 6 Type 32, PN 6 Type 37, PN 6
Loose flanges for type 32 Weld-on collar Pressed collar	PN 10 PN 10 PN 10	2642 2642 2642	Type 02, PN 10 Type 32, PN 10 Type 37, PN 10
Loose flanges for type 32 Weld-on collar	PN 25 PN 25	2655 2655	Type 02, PN 25 Type 32, PN 25
Loose flanges for type 32 Weld-on collar	PN 40 PN 40	2656 2676	Type 02, PN 40 Type 32, PN 40
Loose flanges for type 34 Welding neck collar	PN 10 PN 10	2673 2673	Type 04, PN 10 Type 34, PN 10
Loose flanges for type 34 Welding neck collar	PN 16 PN 16	2674 2674	Type 04, PN 16 Type 34, PN 16
Loose flanges for type 34 Welding neck collar	PN 25 PN 25	2675 2675	Type 04, PN 25 Type 34, PN 25
Slip-on welding flanges	PN 10 PN 16	86 029[1)] 86 030[1)]	Type 12, PN 10 Type 12, PN 16
Welding flanges for tanks and sea boxes		86 041	
Exhaust flanges		86 044	
Welding on flanges		86 057	
Flanged joint for vessels and process apparatus		28 030	
Non-alloy and stainless steel Weld flanges for non-pressure vessels and process apparatus		28 031	
Non-alloy steel weld flanges for pressure vessels and process apparatus		28 032	
Welding neck flanges for process apparatus and pressure vessles		28 034	
Stainless steel weld flanges for pressure vessels and process apparatus		28 036	
Stainless steels weld flanges with cylindrical hub for pressure vessels and process apparatus		28 038	

[1)] EN 1092-1 includes the slip-on flanges (type 12), but the DIN standards continue to be valid.

Product and quality standards		
Pipes / Machine Pipes, Seamless	**DIN Standard**	**DIN EN Standard**
Pressure purposes seamless circular steel tubes	1629	10 297-1
Seamless steel tubes dimensions and conventional masses per unit length of	2448	10 297-1
Seamless circular fine grain steel tubes for structural steelwork	17 124	10 297-1
Austenitic seamless circular tubes for general requirements	17 456	10 297-2
Gaskets	**DIN Standard**	**DIN EN Standard**
Flat gaskets for flanges with / without raised face	2690	1514-1
Flat gaskets for flanges with tongue / groove	2691	1514-1
Flat gaskets for flanges male / female facing	2692	1514-1
Spiral wound gaskets	–	1514-2
PTFE envelope gaskets	–	1514-3
Grooved seals	2697	1514-4
Screws	**DIN Standard**	**DIN EN Standard**
Hexagonal head bolts	601	ISO 4016
Hexagonal nuts	555	ISO 4034
Hexagon head bolts	931	ISO 4014
Hexagon head screws	933	ISO 4017
Hexagon nuts	934	ISO 4032
Pipe Clamps	**DIN Standard**	
Pipe clamps, galvanized an black	3567/A	
Tori spherical Heads, Semi-ellipsoidal Heads	**DIN Standard**	
Tori spherical heads	28 011	
Ellipsoidal heads	28 013	
U-bolts	**DIN Standard**	
U-bolts, galvanized	3570	

ASME / ASTM / API Standard Overview

ASME	Flange & Fitting Products
B 16.5	Flanged Fittings and Pipe Flanges ≤ NPS 24
B 16.47 Series A	Flanged Fittings and Pipe Flanges > NPS 24 (prior MSS-SP44)
B 16.47 Series A	Flanged Fittings and Pipe Flanges > NPS 24 (prior API 605)
B 16.36	Orifice Flanges
B 16.48	Line Blanks
B 16.9	Butt-welding Fittings
B 16.11	Forged Steel Fittings
B 36.10	Seamless and Welded wrought steel pipes / Dimensions and masses
B 36.19	Seamless and Welded stainless steel pipes / Dimensions and masses
B 16.20	Pipe Flanges Metallic Gaskets
B 16.21	Pipe Flanges Nonmetallic Flat Gaskets
B 16.25	Butt-welding Ends
B 1.20.1	General purpose pipe threads
ASTM/ASME	**Sheets, Strips, Flat Products**
SA 179	Stainless and Heat-Resisting Chromium steels plates
SA 203	Pressure vessel alloy steel, nickel plates
SA 204	Pressure vessel alloy steel, molybdenum plates
SA 240	Chromium and chromium-nickel stainless steel plates and stripes
SA 285	Pressure vessel carbon steel, low- and intermediate-tensile strength plates
SA 387	Pressure vessel alloy steel, chromium-molybdenum plates
SA 515	Pressure vessel carbon steel, for intermediate- and higher-temperature service plates
SA 516	Pressure vessel carbon steel, for moderate- and lower-temperature service plates
ASTM/ASME	**Seamless and Welded Steel Pipes**
SA 53	Black and hot-dipped, zinc-coated steel pipes
SA 312	Cold worked austenitic stainless steel pipes
SA 333	Low temperature service steel pipes
SA 334	Low-temperature service Alloy- and non-alloy steel tubes
SA 335	Steel pipes forgings for pressure and high-temperature service
ASTM/ASME	**Butt-weld Fittings**
SA 234	Alloy and Carbon steel piping fittings for high-temperature service
SA 403	Austenitic stainless steel piping fittings
SA 420	Wrought carbon steel and alloy steel Pipe fittings for low-temperature service
SA 815	Wrought ferritic, ferritic/austenitic, and martensitic stainless steels pipe fitting
SA 860	Wrought high-strength ferritic steel Butt-welding Fittings
ASTM/ASME	**Seamless Steel Pipes and Tubes**
SA 106	Carbon steel high-temperature service pipes
SA 179	Cold-drawn low-carbon steel heat-exchanger and condenser tubes
SA 209	Carbon-molybdenum alloy steel boiler and super-heater tubes
SA 210	Carbon steel boiler and super-heater tubes
SA 213	Austenitic and Ferritic alloy steel boiler, super-heater and exchanger tubes
SA 335	Ferritic alloy steel high-temperature service pipes
ASTM/ASME	**Welded Steel Tubes and Pipes**
SA 178	Carbon steel and carbon-manganese steel boiler and super-heater electric-resistance-welded tubes
SA 214	Carbon steel heat-exchanger condenser, ERW tubes
SA 249	Austenitic steel boiler, heat-exchanger, super heater and condenser tubes
SA 250	Ferritic alloy steel boiler and super-heater ERW tubes
SA 358	Chromium-nickel stainless steel high-temperature service pipes
SA 381	With high-pressure transmission systems, metal-arc-welded pipes

ASTM/ASME	Forged Material
SA 105	Carbon steel forgings for piping applications
SA 181	Carbon steel forgings, for general purpose piping
SA 182	Stainless steel forged and rolled alloy for high-temperature service
SA 266	Carbon steel forgings for pressure vessel components
SA 336	Alloy steel forgings for high-temperature service and pressure
SA 350	Low alloy and carbon steel forgings, requiring attain toughness testing
SA 369	Ferritic alloy and carbon steel forged and bored pipe for high-temperature service
SA 372	Alloy and steel carbon forgings for thick-walled pressure vessels
SA 694	Alloy and Carbon steel forging pipe flange for high-pressure transmission service
SA 193	Stainless steel and alloy steel and bolt materials for high-pressure service
SA 194	Alloy and carbon steel nuts, bolts for high pressure and temperature
SA 320	Stainless steel and alloy steel bolting materials for low-temperature service
ASTM/ASME	API Steels
API 5 CT	Casting and tubing specification
API 5 D	Drill pipe specification
API L	Line pipe specification

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