AESTEIRON
STEELS LLP

Petrochemical

Power Generation

Oil & Gas

Marine Precision Engineering

Pharmaceutical Aerospace

SPECIALITY STEEL SOLUTION

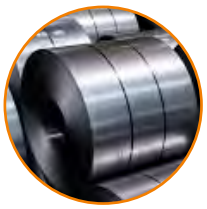
About us :

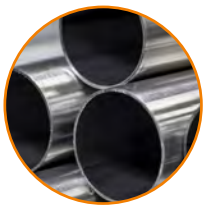
'AESTEIRON Steels LLP' is a leading manufacturing and distribution house dealing in various steel products such as stainless steel, carbon steel, alloy steel, nickel & special metals alloys. Our offered products are widely valued for their excellent design and finishing, sturdiness and cost effectiveness. Equipped with an experience of over 4 decades in industrial steel & executing over 100 large projects satisfactorily, 'AESTEIRON Steel LLP' has emerged as a leading producer of pipes & pipes fittings that are quality certified by TUV Rheinland (INDIA), PED & ISO 9001 : 2015.

AESTEIRON Steels LLP' commenced it's journey back in the year 2007. AESTEIRON ensures that it delivers the best quality products through continuous testing based on new & current industry standards along with harnessing modern up to date techniques. Our product line embodies the highest standard in terms of productivity and reliability.

Our prices are competitive and our products are procured from certified vendors who have a good reputation in the market and provides quality standard products.

'AESTEIRON Steels LLP' being a client focused company - we at Aesteiron deeply value our client's needs and expectations. This has been 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

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

AESTEIRON 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 AESTEIRON for the past 40 years. This is what drives us to find the very best solutions for our clients in any given situation.

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

We are focused on creating an ideal environment to ensure great customer service with optimal support. We currently have two central warehouses in Kalamboli plot No -1439/ Taloja Plot No -112, which stores more than 6000 tonnes 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 & it's 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

Aesteiron provides, Coating, Marking (Trademark material designation) cutting & bevelling, taperring, short blasting, requirment as per our customer specification.

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

Types

Seamless and welded

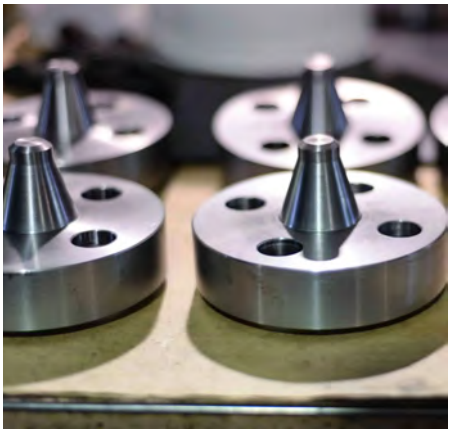
Dimensions and weights

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

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

Flanges As per DIN EN and DIN



Aesteiron provides, Coating, Marking (Trademark material designation) cutting & bevelling, taperring, short blasting, requirment as per our customer specification.

Standards DIN EN 1092-1 and 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	02	2641/2, 2655/6
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 und process apparatus, Flanges for automated welding process PAS 1057-6, Special Flanges acc. to drawing

Pressure Classes

PN 6 to 400

Dimensions

Standard dimensions

Facing

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

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

Buttweld Fittings As per DIN EN and DIN

Aesteiron provides, Coating, Marking (Trademark material designation) cutting & bevelling, taperring, short blasting, requirment as per our customer specification.

Standards DIN EN 10253 and DIN

Buttweld 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

Types of elbows

2D, 3D and 5D as well as customer specification

Dimensions

All standard dimensions

Types

Seamless and welded

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

ASTM, ASME & API Standards

Pipes / Tubes As per ASTM / ASME / API

Aesteiron provides, Coating, Marking (Trademark material designation) cutting & bevelling, taperring, short blasting, requirment as per our customer specification.

Standards

B 36.10, B 36.19 and API 5L

Types

Seamless and welded

Wall thicknesses

All schedules

Material grades

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

Dimensions

1/2" to 48"

Flanges As per ASTM/ASME/API

Aesteiron provides, Coating, Marking (Trademark material designation) cutting & bevelling, taperring, short blasting, requirment as per our customer specification.

Standards

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

Types

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

Pressure classes

Class 150–2500
2,000 – 20,000 psi

Material grades

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

Dimensions

1/2" to 48"

Facings

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

Buttwelding fittings As per ASTM / ASME

Aesteiron provides, Coating, Marking (Trademark material designation) cutting & bevelling, taperring, short blasting, requirment as per our customer specification.

Standards

B 16.9

Types

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

Elbow types

LR :- Long Radius
SR :- Short Radius

Wall thicknesses

Schedules

Material grades

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

Dimensions

1/2" to 48"

ASME, EN & DIN Standards

Screws, bolts and nuts As per ISO/ ASME / ASTM

Standards

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

Dimensions

For all standard flange sizes

Pressure Classes

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

High-pressure fittings As per ASME / ASTM

Standards

All types of high pressure forged steel fittings and branch outlet fittings

Pressure classes

Class 2000, 3000, 6000, 9000

Designs

Socket weld (SW) and threaded (NPT)

Wall thicknesses

All schedules

Surfaces

Black, galvanised and hot-dip galvanised

Dimensions

1/4" to 4"

Material grades

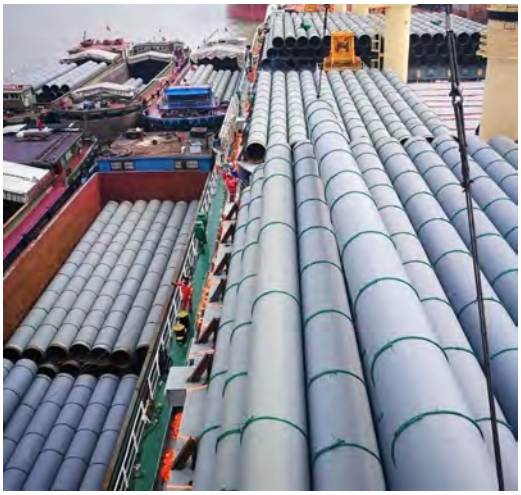
- A/SA 105/C21
- A/SA 182 Gr. F5, F11, F12, F22, F91
- A/SA 350 Gr. LF2, W/TStE 355
- A/SA 182 Gr. F304/L, F316/L
- 1.4541, 1.4571
- F53 (Superduplex), F51 (Duplex)

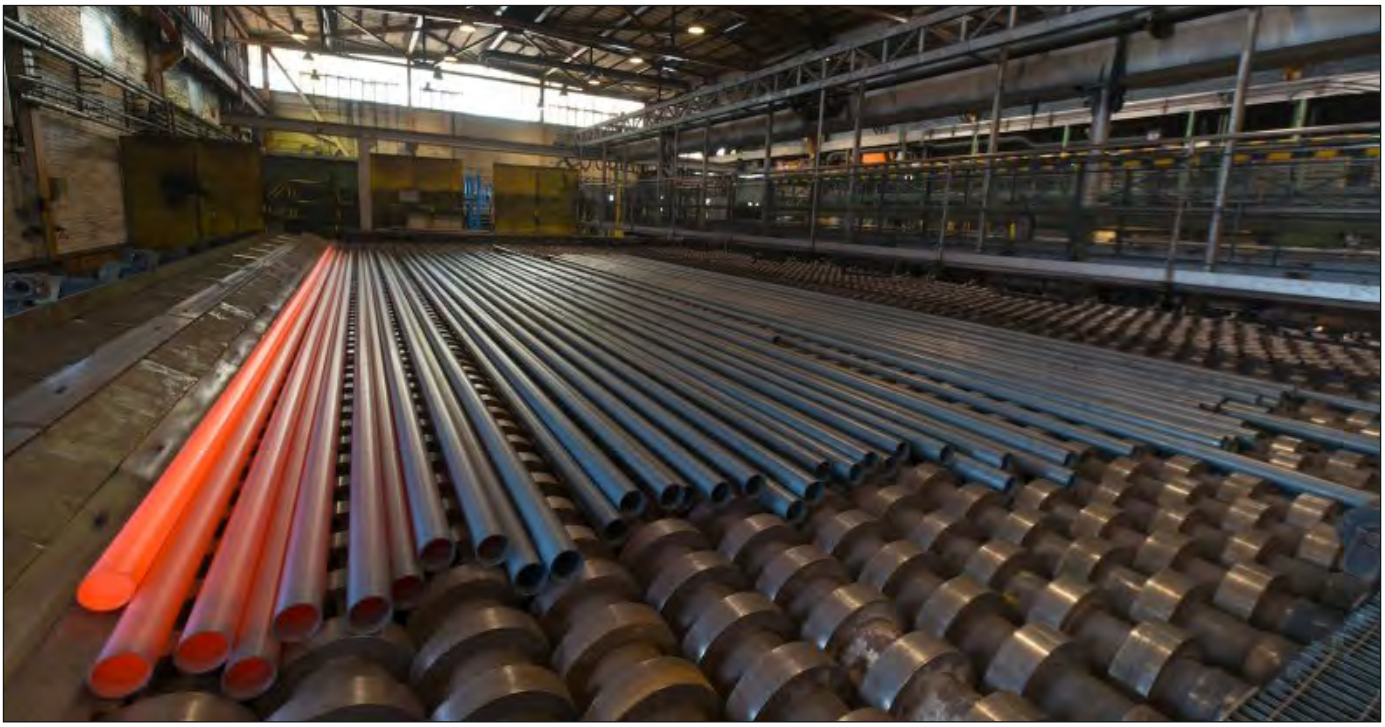
Pipes & Tubes Standard

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 also stock pipes that are used 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.

Standards comparison EN Standards

Welded steel pipes for pressure purposes DIN EN 10217

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

Seamless steel pipes for pressure purposes DIN EN 10216

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

Petroleum and natural gas industries / steel pipes for pipeline transportation systems

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

Steel pipes for pipelines for combustible fluids DIN EN 10208/ISO 3183

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

Gas infrastructure / Pipelines for maximum operating pressure ≤ 16 bar

EN Standard	Description / Area of application	Replacement for DIN
12007-1	General functional requirements	2470-1
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	

Steel pipes for precision applications DIN EN 10305

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

Hot finished structural sections DIN EN 10210

EN Standard	Description / Area of application	Replacement for DIN
10210-1	Hot finished structural hollow sections **(Technical delivery conditions)**	17120 – 17125
10210-2	Hot finished structural hollow sections of non-alloy and fine grain steels (**Dimensions)**	59410

Welded steel tubes for mechanical and general engineering purposes DIN EN 10296

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

Non-alloy steel pipes suitable for welding and threading

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

Colded formed structural hollow sections DIN EN 10219

EN Standard	Description / Area of application	Replacement for DIN
10219-1	Cold formed structural hollow sections of non-alloy and fine grain steels **(Technical delivery conditions)**	17119/-20/-23
10219-2	Cold formed structural hollow sections of non-alloy and fine grain steels **(Dimensions)**	59411

Seamless steel tubes for mechanical and general engineering purposes DIN EN 10297

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

Seamless steel pipes for pressure applications

DIN EN 10216 in comparsion to earlier DIN Standards

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

Part 1: Non-alloy steel tubes with specified room temperature properties
Area of application: acc. to rules and standards of DVGW, TRB, TRD and AD 2000 Data Sheet W4 (only TR2 approved under PED)

Standards (formerly DIN)	Operating temperature / working pressure	Size range	EN materials (formerly DIN)	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)

Part 2: Non-alloy and alloy steel tubes with specified elevated temperature properties
Area of application: Boiler construction, pipeline and plant engineering, pressure vessels and apparatus engineering

Standards (formerly DIN)	Operating temperature / working pressure	Size range	EN materials (formerly DIN)	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)

Part 3: Alloy fine grain steel tubes
Area of application: Pressure vessel, apparatus, pipelines, general mechanical engineering and tool-building

Standards (formerly DIN)	Test classes	Size range	EN materials (formerly DIN)	
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)
			elevated temperature quality	P355NH (WStE 355) P460NH (WStE 460)
			low temperature quality	P275NL1 (TStE 285) P355NL1 (TStE 355) P460NL1 (TStE 460)
			special low temperature quality	P275NL2 (EStE 285) P355NL2 (EStE 355) P460NL2 (EStE 460)

Part 4: Non-alloy and alloy steel tubes with specified low temperature properties
Area of application: Apparatus, pressure vessel, refrigeration system and general pipeline engineering

Standards (formerly DIN)	Test classes	Size range	EN materials (formerly DIN)	Official regulations
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

Part 5: Stainless steel tubes
Area of application: Pressure vessel, pipeline and plant engineering (transportation of corrosive materials)

Standards (formerly DIN)	Test classes / operating temperature	Size range	EN materials (comparable to ASTM A312)		AD 2000-W2 regulations
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	1.4301 (TP 304) 1.4306 (TP 304L) 1.4307 (TP 304L) 1.4541 (TP 321)	Interal 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	1.4401 (TP 316) 1.4404 (TP 316L) 1.4471 (TP 316Ti)	
			Super-Duplex	1.4410	
			Duplex	1.4462 1.4539 (TP 904L)	

Welded steel pipes for pressure applications

DIN EN 10217 in comparsion to earlier DIN standards

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

Part 1: Non-alloy steel tubes with specified room temperature properties
Area of application: As per rules and standards of DVGW, TRB, TRD and AD 2000 Data Sheet W4 (only TR2 approved under PED)

Standards (formerly DIN)	Operating temperature / working pressure	Size range	EN materials (formerly DIN)	Test scope
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)

Part 2: Electric welded non-alloy and alloy steel tubes with specified elevated temperature properties
Part 5: Submerged arc welded non-alloy and alloy steel pipes with specified high temperature properties
Area of application: Pressure vessel and plaint engineering, pipeline construction, shipbuilding

Standards (formerly DIN)	Welding process	Size range	EN materials (formerly DIN)	Test scope
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)

Part 3: Alloy fine grain steel tubes
Area of application: Pressure vessels, apparatus and general mechanical engineering

Standards (formerly DIN)	Welding process	Size range	EN materials (formerly DIN)		Test scope
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	elevated temperature quality	P355NH (WStE 355) P460NH (WStE 460)	
			low temperature quality	P275NL1 (TStE 285) P355NL1 (TStE 355) P460NL1 (TStE 460)	
			special low temperature quality	P275NL2 (EStE 285) P355NL2 (EStE 355) P460NL2 (EStE 460)	

Part 4: Electric welded non-alloy steel tubes with specified low temperature properties
Part 6: Submerged arc welded non- alloy steel tubes with specified low temperature properties
Area of application: Apparatus, pressure vessel, refrigeration system and general pipeline engineering

Standards (formerly DIN)	Welding process	Size range	EN materials (formerly DIN)	Test scope
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		

Part 7: Stainless steel tubes
Area of application: Chemical system, pressure vessel and apparatus engineering, pipelines (transport of corrosive media), water and wastewater technology

Standards (formerly 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	1.4301 (TP 304) 1.4306 (TP 304L) 1.4307 (TP 304L) 1.4541 (TP 321)	W1 = hot rolled strip, unannealed W2 = cold rolled, unannealed W1A / W2A = hear-treated, descaled W1R/ W2R = bright annealed
			V4A-Series	1.4401 (TP 316) 1.4404 (TP 316L) 1.4471 (TP 316Ti)	
			Super-Duplex Duplex	1.4410 1.4462 1.4539 (TP 904L)	

DIN EN ISO 3183 Line Pipes

Seamless and welded

Operation area

PSL 1 Pipes with special requirements
PSL 2 Pipes to the European Onshore- gas pipeline / attachment M

Example for an order text

Seamless pipes Pipe, seamless, DIN EN ISO 3183, L290NE/1.0484, APZ DIN EN 10204/3.2, TÜV 114,3 × 3,6 mm

Welded pipes Pipe, high frequency welded (HFW), DIN EN ISO 3183, L290NE/1.0484, APZ DIN EN 10204/3.2, TÜV114,3 × 3,6 mm

Manufacturing process

Standards		EN ISO 3183/PSL 1			EN ISO 3183/PSL 2	EN 1208-2
Type of pipe/ type of steel		L210	L210	L290-L485	L245–L555	
Seamless	S	•	•	•	•	•
Low frequency welded	LFW	•	•	•		
High frequency welded	HFW	•	•	•	•	•
Submerged arc welded	SW	•	•	•	•	•
Combiniert welded	COW	•	•	•	•	•

Materials comparison (Extract)

Standards	Material Number	EN ISO 3183	EN 10208-2	API 5L	Notes	EN ISO 3183	EN 10208-2
DIN EN ISO 3183	1.0457	L245	L245	Gr.B	Normalized	NE	NB
DIN EN 10208-2	1.0484	L290	L290	X42	Quenched tempered (Seamless only)	QE	QB
API 5L	1.0582	L360	L360	X52	Thermo-mech-anically rolled (welded only)	ME	MB
	1.8972	L415	L415	X60			

Size range

Seamless 10,3 to 711,0 mm
Welded 10,3 to 2.134 mm

Tolerance

Diameter / circularity acc. to attachment M / table M3
Wall thickness As per attachment M / table M4
The regulations of EN ISO 3183 / annex M are largely in accordance with those of EN 10208-2.

Samples, scopes of testing & test certificates

Inspection certificate DIN EN 10204 / 3.1 or 3.2
The regulations of EN ISO 3183 / annex M are largely in accordance with those of EN 10208-2. Mandatory Two check test for analysis.

Marking/labeling

Manufacturer stamps, standard, outside diameter an wall thickness, type of steel, type of pipe S (seamless) or W (welded), purchaser sign and identity number. Material marked with a coat of paint is optional.

PE coating

DIN	DIN EN	
30670 PE coating	10285	3-layer-process
	10287	2-layer-process
	10288	Sinter process

Minimum coat thickness

Nominal diameter	Minimum coat thickness / mm	
	Standards (n)	Strengthened (v)
< DN 100	1,8	2,5
> DN 100 ≤ DN 250	2,0	2,5
> DN 250 ≤ DN 500	2,2	2,9
> DN 500 ≤ DN 800	2,5	3,2
> DN 800	3,0	3,7

DIN EN 10305 Precision Steel Pipes

Precision steel pipes DIN EN 10305

Part 1: Seamless cold drawn tubes
Area of application: Automotive, mechanical engineering

Standards (formerly DIN)	State as delivered (previous designation)	Size range	EN materials (formerly DIN)	Notes
EN 10305-3 (DIN 2391-1/-2)	**+C** Cold finished, hard (BK) **+LC** Cold finished, soft (BKW) **+SR** Cold finished and stress-relieved (BKS) **+A** Annealed (GBK) **+N** Normalised (NBK)	4,0–260 mm	E215 (St 30 Al) E235 (St 35) E355 (St 52)	· Precisely defined tolerances · Specified surface roughness

Part 2: Welded cold drawn tubes
Area of application: Automotive, mechanical engineering

Standards (formerly DIN)	State as delivered (previous designation)	Size range	EN materials (formerly DIN)	Notes
EN 10305-2 (DIN 2393-1/-2)	**+C** Cold finished, hard (BK) **+LC** Cold finished, soft (BKW) **+SR** Cold finished and stress-relieved (BKS) **+A** Annealed (GBK) **+N** Normalised (NBK)	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

Part 3: Welded cold sized tubes
Area of application: Automotive, mechanical and plant engineering

Standards (formerly DIN)	State as delivered (previous designation)	Size range	EN materials (formerly DIN)	Insert strip
EN 10305-3 (DIN 2394-1/-2)	**+CR1** Usually not heat-treated, but suitable for final annealing (BKM) **+CR2** Heat treatment after welding, and sizing is not provided (BKM) **+A** After welding and sizing the pipes are annealed (GBK) **+N** After welding and sizing the pipes are normalised (NBK)	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)

Part 4: Seamless cold drawn tubes for hydraulic and pneumatic power systems
Area of application: Hydraulic and pneumatic power systems

Standards (formerly DIN)	Surface finish	Size range	EN materials (formerly DIN)	Notes
EN 10305-4 (DIN 2391-1/-2 in connection with DIN 1630)	· Phosphate-treated (bonderised) · Galvanised – chromated: with Cr6: yellow/olive-green Cr6-free: white/blue	4,0–80.0	E215 E235 (St 37.4) E355 (St 52.4)	· Precisely defined tolerances · Specified surface roughness · Suitable for conveying pressurised fluids

Precisions Steel Tubes with threaded ends

Welded tubes and cold sized square tubes & rectangular tubes

Application : Mechenical 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 normalised	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)

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

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)	· Galvanised 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
273,0															41,4	46,6	52,3	57,3	64,9
323,9																55,5	62,3	68,4	77,4
355,6																	68,6	75,3	85,2
406,4																		86,3	97,8
457,0																			110
508,0																			
		559,0																	
610,0																			
		660,0																	
711,0																			

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

High-performance Welded Steel Pipe

Welded Pipes / Tubes Acc to DIN EN 10220
Dimensions and masses for welded & tubes. DIN EN 10220, DIN 1630

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																			

Tolerances of the outer dia and wall thickness for electric welded pipes As per DIN EN 10217-2			
Outer Dia (OD) D	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)			

Tolerances of the outer dia and wall thickness for submerged arc welded pipes As per DIN EN 10217-5			
Outer Dia (OD) D	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

Stainless Steel & Austenitic Steel Pipes

Dimensions and masses weight per unit lengths of pipes according to DIN EN ISO 1127 – Table 3

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					
457,0										36,3		45,4		56,5					
508,0										40,4	45,5			62,9	70,4				
610,0										48,6		60,7			84,8	95,2			
711,0																	125		
813,0																		161	
914,0																			199

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
D1	± 15,0 % / min. ± 0,60 mm
D2	± 12,5 % / min. ± 0,40 mm
D3	± 10,0 % / min. ± 0,20 mm
D4	± 7,50 % / min. ± 0,15 mm
D4	± 5,00 % / min. ± 0,10 mm

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

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

Dimensions and wieght for circular pipes & tubes.

Outer Dia (OD) in mm	Scariest				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	•																			

[1)] The wall thickness is standardised acc. to this part of DIN EN 10305.

Masses weight in kg/m for wall thickness T in mm[1)]														
1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
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

Precisions Steel Pipes / Tubes DIN EN 10305-5

Dimensions and weight for square and rectangular steel Pipes / 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

[1)] Weight based on an average density of 7,85 kg /dm³ as per DIN EN 10305-5 table 6.

Steel Pipes ASME B 36.10 / 36.19

Dimensions and weights

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

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

DIN EN 1092-1 Flanges with PN Designation.
EN 1092-1 Stainless steel Flanges, 1092-1 Carbon steel Flanges 1092-1 Alloy steel Flanges.

The DIN EN 1092-1 European standard for steel flanges was developed with the help and support of the European body CEN & the 30 national member organisations belonging to the body.

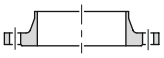
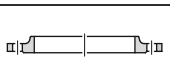
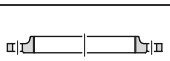
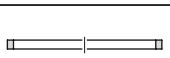
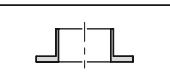
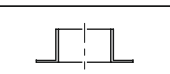
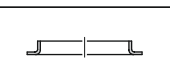
The standardisation committee of 30 member organisations – for Germany the German Institute for Standardisation (DIN); for Austria, Austrian Standards Institute (ONORM); for France, the AFNOR Group; for England, the British Standards Institution (BSI) and others – influenced the European standard EN 1092-1 as defined by their national standards.

Listed below are the major changes to the standard DIN EN 1092-1 with respect to the standard for flanges according to DIN.

1. Steel flange connection sizes such as the outside diameter, the bolt circle, number of screws and diameter of the screw holes acc. to DIN 2500 etc.
2. For all PN 16 flanges, the DN 10 to DN 40 dimensions do not apply.
3. According to DIN EN 1092-1, all facing surfaces must be machined.
4. Flanges PN 16 DN 65, the number of holes is 8. At the customer's request, 4-hole flanges can also be supplied.
5. Weld neck flanges type 11 PN 100 have been expanded to the sizes of DN 20 and DN 32.
6. Pipe connection dimensions from DN 1200 have been changed, e.g. ISO = 1220, = EN 1219, ISO = 1420.
7. BS EN 1092-1 henceforth contains additional materials. Which are divided into separate material groups.
8. For each category of material, there is a pressure-temperature correlation as per standards.
9. Manufacturing methods have been accredited (e.g.cast).
10. Welding conditions and tests are described.
11. Manufacturers of flanges as per DIN EN 1092-1 must be accredited as per the PED (Pressure Equipment Directive) to issue an acceptance test certificate as per EN 10204:20053.1 or 3.2.
12. Tolerances are specified in detail in DIN EN 1092-1.

Types of Flanges Acc. to DIN EN 1092-1

Flanges as per BS DIN EN 1092-1

	Nominal Pipe Size	EN Type / PN		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				
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 on DIN EN 1092-1

The following DIN standards are not included in DIN EN 1092-1 and, if needed, can be ordered acc. to the relevant DIN standards:

- Oval threaded flanges DIN 2558.
- Flange joints for vessels and process apparatus DIN 28030, 28031, 28032, 28034, 28036 and DIN 28038 as well as DIN 86041, DIN 86044 and DIN 28117.
- Flanges with chamfering for membrane seal welds acc. to DIN 2695.
- Slip-on flanges are available as type 12, PN 10 and PN 16 acc. to DIN EN 1092-1, or also acc. to DIN 86029/86030.
- In DIN EN 1092-1, EN standard sheets are shown in the respective flange types and respective nominal pressures. They conform to DIN standards,
- but have been withdrawn again from the DIN-standards. These withdrawn DIN standards are marked green in the table.
- Flanges with DIN pipe connection dimensions, such as DN 15/20, DN 25/30, DN 50/57, DN 100/108, can be delivered only acc. to DIN standards, because in all types and pressure ratings acc. to DIN EN 1092-1 only ISO pipe connection dimensions were recorded.
- Flanges for automated welding processes (machine welding flanges) are dimensioned acc. to PAS 1057-6 due to the tight tolerances.

Materials for DIN Flanges

Extract – DIN 2528

Steel grades – Short name	Material number	Application temperature °C	Base material [1] 1	2	3	4	Condition of delivery [2]	Chemical composition	Mechanical-technological properties	Test temperature
Non-alloy steels										
USt 37-2	1.0036	-10 to 300	•	•	•	•	U	DIN EN 10 025	DIN EN 10 025	Room temperature
RSt 37-2	1.0038	-10 to 300	•	•	•	•	U	DIN EN 10 025	DIN EN 10 025	Room temperature
St 52-3	1.0570	-20 to 300	•	•	•	•	N	DIN EN 10 025	DIN EN 10 025	-20°C
C 22.3	1.0427	-10 to 50	•	•	•	•	N	Table 3	Table 4	Room temperature
C 21	1.0432	-10 to 350	•	•	•	•	N	Table 3	Table 4	Room temperature
StE 355	1.0562	-20 to 300			•	•	N.V	DIN 17 103	DIN 17 103	-20°C
StE 355	1.0562	-20 to 300	•	•			N	DIN 17 102	DIN 17 103	-20°C
Non-alloy heat-resistant steels										
C 22.8	1.0460	-10 to 420	•	•	•	•	N	DIN 17 243	Table 4	Room temperature
H I	1.0345	-10 to 480	•				N	DIN 17 155	DIN 17 155	0°C
H II	1.0425	-10 to 480	•				N	DIN 17 155	DIN 17 155	0°C
WStE 355	1.0565	-20 to 400			•	•	N	DIN 17 103	DIN 17 103	-20°C
WStE 355	1.0565	-20 to 400	•	•			N	DIN 17 102	DIN 17 102	-20°C
Alloyed heat-resistant steels										
15 Mo 3	1.5415	-10 to 530	•				N	DIN EN 17 155	Table 4	Room temperature
15 Mo 3	1.5415	-10 to 530		•	•	•	N.V	DIN EN 17 243	Table 4	Room temperature
13 CrMo 4 4	1.7335	-10 to 570	•				V	DIN EN 17 155	Table 4	Room temperature
13 CrMo 4 4	1.7335	-10 to 570		•	•	•	V	DIN EN 17 243	Table 4	Room temperature
10 CrMo 9 10	1.7380	-10 to 600	•				V	DIN EN 17 155	Table 4	Room temperature
10 CrMo 9 10	1.7380	-10 to 600		•	•	•	V	DIN EN 17 243	Table 4	Room temperature
12 CrMo 19 5	1.7362	-10 to 650	•	•	•	•	V	Table 3	Table 4 and 6	Room temperature
Low temperature steels										
TStE 285	1.0488	-60 to 300			•	•	N.V	DIN EN 17 103	DIN EN 17 103	-50°C
TStE 285	1.0488	-60 to 300	•	•			N	DIN EN 17 102	DIN EN 17 102	-50°C
10 Ni 14	1.0570	-120 to 50	•	•	•	•	V	DIN EN 17 280	DIN EN 17 280	-120°C
TStE 355	1,0566	-60 to 300			•	•	N.V	DIN EN 17 103	DIN EN 17 103	-50°C
TStE 355	1.0566	-60 to 300	•	•			N	DIN EN 17 102	DIN EN 17 102	-50°C
Stainless steels										
X2 CrNi 19 11	1.4306	-270 to 550	•	•	•	•	A	DIN EN 17 440	DIN EN 17 440	Room temperature
X5 CrNi 18 10	1.4301	-200 to 550	•	•	•	•	A	DIN EN 17 440	DIN EN 17 440	Room temperature
X6 CrNiTi 18 10	1.4541	-270 to 550	•	•	•	•	A	DIN EN 17 440	DIN EN 17 440	Room temperature
X2 CrNiMo 17 13 2	1.4404	-200 to 550	•	•	•	•	A	DIN EN 17 440	DIN EN 17 440	Room temperature
X5 CrNiMo 17 12 2	1.4401	-200 to 550	•	•	•	•	A	DIN EN 17 440	DIN EN 17 440	Room temperature
X6 CrNiMoTi 17 12 2	1.4571	-270 to 550	•	•	•	•	A	DIN EN 17 440	DIN EN 17 440	Room temperature

[1] **1** Plate metal **2** Bar steel **3** Forging **4** Seamless rolled flange

[2] **U** Untreated **N** Normalised **V** Tempered **A** Solution-annealed and quenched

Materials for flanges DIN EN 1092-1

Extract Table 9

Group	Forgings			Flat Forgings		
	Material	Material number	Standard DIN EN	Material	Material number	Standard DIN EN
2E0						
3E0				P235GH	1.0345	10028-2
	P245GH	1.0352	10222-2	P265GH	1.0425	10028-2
3E1	P280GH	1.0426	10222-2	P295GH	1.0481	10028-2
4E0	16Mo3	1.5415	10222-2	16Mo3	1.5415	10028-2
5E0	13CrMo4-5	1.7335	10222-2	13CrMo4-5	1.7335	10028-2
6E0	11CrMo9-10	1.7385	10222-2	12CrMo9-10	1.7375	10028-2
				10CrMo9-10	1.7380	10028-2
6E1	X16CrMo5-1+NT	1.7385	10222-2			
7E0				P275NL1	1.0488	10028-3
				P275NL2	1.1104	10028-3
7E1				P355NL1	1.0566	10028-3
				P355NL2	1.1106	10028-3
7E2	15NiMn6	1.6228	10222-3	15NiMn6	1.6228	10028-4
				11MnNi5-3	1.6212	10028-4
	13NiMn6-3	1.6217	10222-3	13MnNi6-3	1.6217	10028-4
7E3	12Ni14	1.5637	10222-3	12Ni14	1.5637	10028-4
	X12Ni5	1.5680	10222-3	X12N5	1.5680	10028-4
	X8Ni9	1.5662	10222-3	X8Ni9	1.5662	10028-4
8E0						
8E2	P285NH	1.0477	10222-4	P275NH	1.0487	10028-3
	P285QH	1.0478	10222-4			
8E3	P355NH	1.0565	10222-4	P355N	1.0562	10028-3
	P355QH1	1.0571	10222-4	P355NH	1.0565	10028-3
9E0	X20CrMoV11-1	1.4922	10222-2			
9E1	X10CrMoVNb9-1	1.4903	10222-2	X10CrMoVNb9-1	1.4903	10028-2
10E0	X2CrNi18-9	1.4307	10222-5	X2CrNi18-9	1.4307	10028-7
				X2CrNi19-11	1.4306	10028-7
				X1CrNi25-21	1.4335	10028-7
10E1	X2CrNiN8-10	1.4311	10222-5	X2CrNiN18-10	1.4311	10028-7
11E0	X5CrNi18-10	1.4301	10222-5	X5CrNi18-10	1.4301	10028-7
	X6CrNi18-10	1.4948	10222-5	X6CrNi18-10	1.4948	10028-7
12E0	X6CrNiTi18-10	1.4541	10222-5	X6CrNiTi18-10	1.4541	10028-7
	X6CrNiNb18-10	1.4550	10222-5	X6CrNiNb18-10	1.4550	10028-7
	X6CrNiTiB18-10	1.4941	10222-5	X6CrNiTiB18-10	1.4941	10028-7
13E0	X2CrNiMo18-12-2	1.4404	10222-5	X2CrNiMo17-12-2	1.4404	10028-7
	X2CrNiMo18-12-3	1.4432	10222-5	X2CrNiMo17-12-3	1.4432	10028-7
	X2CrNiMo18-14-3	1.4435	10222-5	X2CrNiMo18-14-3	1.4435	10028-7
	X1CrNiMoCu25-20-5	1.4439	10222-5	X1NiCrMoCu25-20-5	1.4539	10028-7
				X1CrNiMoCu31-27-4	1.4563	10028-7
13E1	X2CrNiMoN17-11-2	1.4406	10222-5	X2CrNiMoN17-11-2	1.4406	10028-7
	X2CrNiMoN17-13-3	1.4429	10222-5	X2CrNiMoN17-13-3	1.4429	10028-7
				X2CrNiMoN17-13-5	1.4439	10028-7
				X1NiCrMoCuN25-20-7	1.4529	10028-7
				X1CrNiMoCuN20-18-7	1.4547	10028-7
14E0	X5CrNiMoN17-12-2	1.4401	10222-5	X5CrNiMo17-12-2	1.4401	10028-7
	X2CrNiMoN17-13-3	1.4436	10222-5	X3CrNiMo17-13-3	1.4436	10028-7
15E0	X6CrNiMoTi17-12-2	1.4571	10222-5	X6CrNiMoTi17-12-2	1.4571	10028-7
				X6CrNiMoNb17-12-2	1.4580	10028-7
16E0				X2CrNiN23-4	1.4362	10028-7
	X2CrNiMoN22-5-3	1.4462	10222-5	X2CrNiMoN22-5-3	1.4462	10028-7
	X2CrNiMoN25-7-4	1.4410	10222-5	X2CrNiMoN25-7-4	1.4410	10028-7

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

These materials may be used in pressure equipment according to article 3.3 of the PED (sound engineering practice) or in applications that are not covered by the PED. If they are used in pressure equipment according to categories I to IV according to the PED, they shall have either a

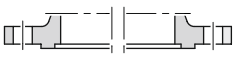
- European Approval of Material (EAM),or
- be covered by a Particular Material Appraisal (PMA).

PMA shall be made by the pressure equipment manufacturer and in categories III and IV, it shall have appraisal of the notified body that is responsible for the conformity assessment of the equipment. In the PMA it shall be proved, that the material fulfils the essential safety requirements of the PED.

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

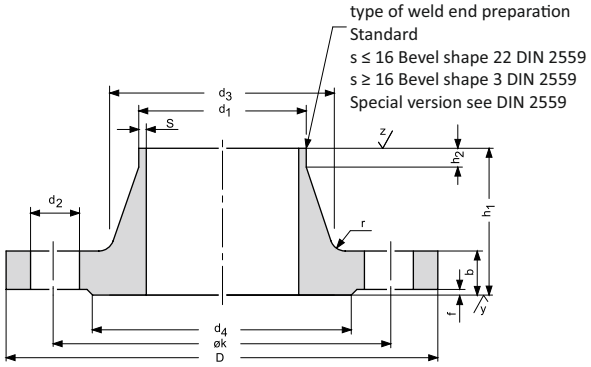
BS DIN EN 1092-1 Comparison with DIN 2526

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

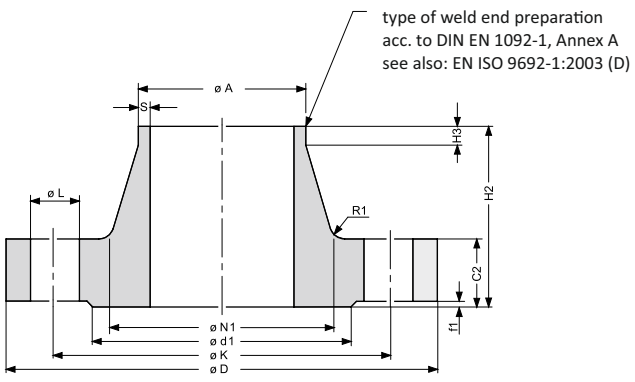
Flange	Designation As per DIN 2526			As per DIN EN 1092-1			Drawing
	Standard	Note	Facing	Facing	Ra in µm [4]	Ra in µm [4]	
Flat face	DIN 2641 / 2642 DIN 2655 / 2656 DIN 2673	No requirements	type A13	type A	3,2–12,5	12,5–50	
	DIN 2527 ≤ PN 40 DIN 2573 / 2576	Rz = 160, turned [1]	type B				
Raised face	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 to PN 160	type F	type C	0,8–3,2	3,2–12,5	
Groove	DIN 2512	PN 10 to PN 160	type N	type D	0,8–3,2	3,2–12,5	
Male	DIN 2513	PN 10 to PN 100	type V13	type E	3,2–12,5	12,5–50	
Female	DIN 2513	PN 10 to PN 100	type R13	type F	3,2–12,5	12,5–50	
O-Ring	DIN 2514	PN 10 to PN 40	type R14	type G	0,8–3,2	3,2–12,5	
O-Ring groove	DIN 2514	PN 10 to PN 40	type V14	type H	0,8–3,2	3,2–12,5	
Counter bore for ovale seal	DIN 2696	PN 63 to PN 400	type L				
Bevel for diaphragm welding seal	DIN 2695	PN 63 to 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.

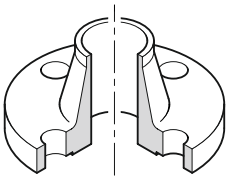
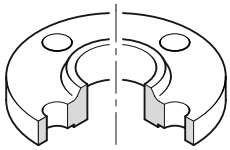
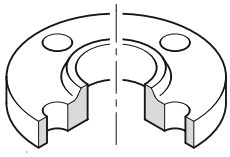
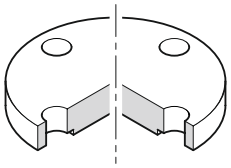
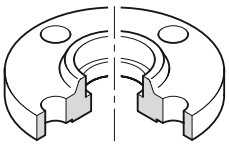
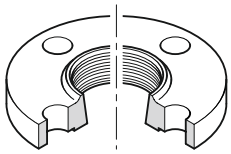
Measurement acc. to DIN



Measurement acc. to EN



Flanges As per ASME B 16.5

Flange types	Class	½"	¾"	1"	1¼"	1½"	2"	2½"	3"	3½"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"
		Dimensions																			
Weld Neck Flanges 	150[1)]	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	300[1)]	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	400[1)]	Dimension as Class 600									•	•	•	•	•	•	•	•	•	•	•
	600[1)]	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	900[1)]	Dimension as Class 1500							•		•	•	•	•	•	•	•	•	•	•	•
	1500	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•
	2500	•	•	•	•	•	•	•	•		•	•	•	•	•	•					
Slip-on Flanges 	150	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	300	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	400	Dimension as Class 600									•	•	•	•	•	•	•	•	•	•	•
	600	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	900	Dimension as Class 1500							•		•	•	•	•	•	•	•	•	•	•	•
	1500	•	•	•	•	•	•	•													
Lap Joint Flanges 	150	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	300	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	400	Dimension as Class 600									•	•	•	•	•	•	•	•	•	•	•
	600	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	900	Dimension as Class 1500							•		•	•	•	•	•	•	•	•	•	•	•
	1500	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•
	2500	•	•	•	•	•	•	•	•		•	•	•	•	•	•					
Blind Flanges 	150[1)]	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	300[1)]	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	400[1)]	Dimension as Class 600									•	•	•	•	•	•	•	•	•	•	•
	600[1)]	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	900[1)]	Dimension as Class 1500							•		•	•	•	•	•	•	•	•	•	•	•
	1500	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•
	2500	•	•	•	•	•	•	•	•		•	•	•	•	•	•					
Socket Welding Flanges 	150	•	•	•	•	•	•	•	•												
	300	•	•	•	•	•	•	•	•												
	600	•	•	•	•	•	•	•	•												
	1500	•	•	•	•	•	•	•													
Threaded Flanges 	150	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	300	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	400	Dimension as Class 600									•	•	•	•	•	•	•	•	•	•	•
	600								•	•	•	•	•	•	•	•	•	•	•	•	•
	900	Dimension as Class 1500							•		•	•	•	•	•	•	•	•	•	•	•
	1500	•	•	•	•	•	•	•													
	2500	•	•	•	•	•	•	•													

[1)] Dimensions ≥ 26" see ASME B 16.47 Series A and B.

Pressure ratings, Facings and Dimensions

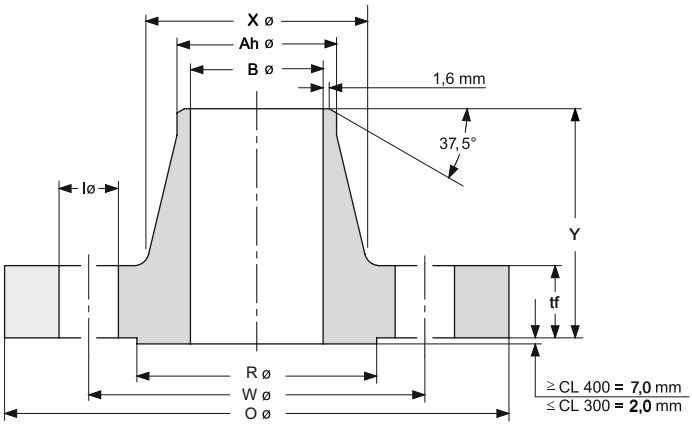
Nominal pressure comparison Class / bar / psi / API psi

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

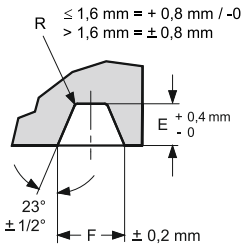
bar Greek barys, hard
psi Pounds per square inch

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

Dimensions acc. to ASME B 16.5



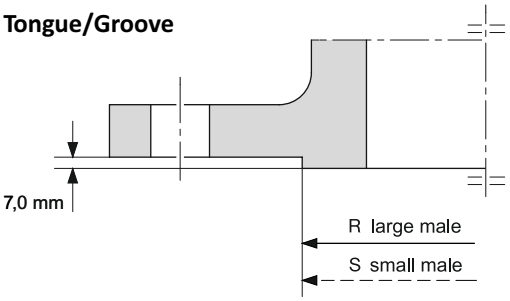
Ring Type Joint (RTJ)

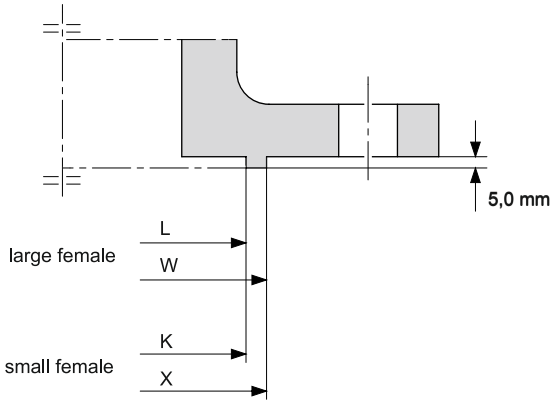


Facing

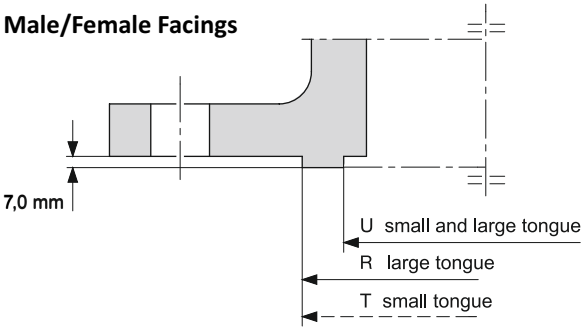
The facing is made by mechanical turning, resulting in the following surface conditions:

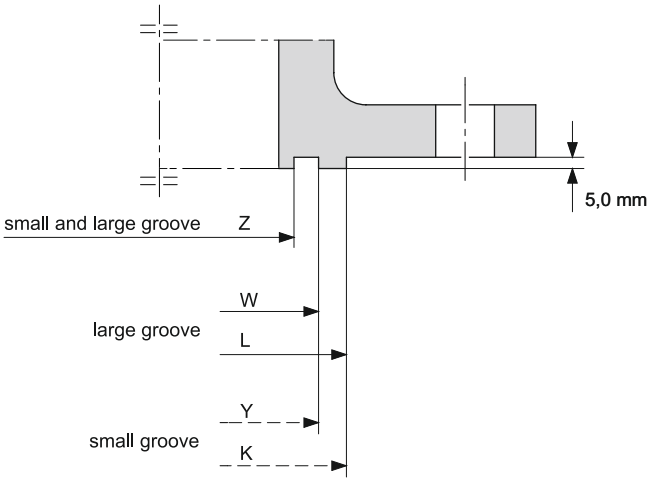
Tongue/Groove





Male/Female Facings





Buttweld Fittings Materials

Buttweld Fittings DIN EN 10253

1. Brief description and comparison

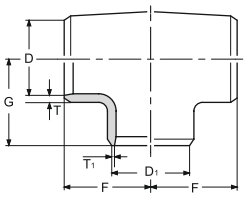
Buttweld Fittings	
DIN EN 10253 - 1	Non-alloy steel for general applications and without special test requirements
DIN EN 10253 - 2	Non-alloy and alloy ferritic steelswith special test requirements
DIN EN 10253 - 3	Wrought austenitic and austenitic-ferritic (duplex) stainless steels without special test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

Earlier issues	
DIN 2609	Buttwelding 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

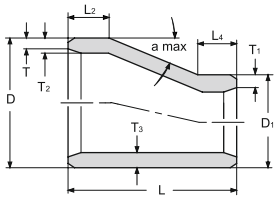
DIN EN 10253 establishes – in addition to the steel grades, mechanical properties, dimensions and tolerances, test requirements, test reports and identification – two types of fittings:

- **Fittings Type A:** Same wall thickness as the subsequent pipe (DIN 2605-1, DIN 2615-1, DIN 2616-1 und DIN 2617).
- **Fittings Type B:** 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).

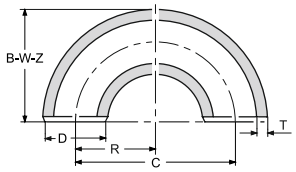
According to the calculation rules of DIN EN 13480-3, there are also, as opposed to DIN, caps of type A and B, in which, at a reduced utilization factor (Type A), the values lie in the range of 94 to 100%, as far as they can be calculated acc. to the standard.



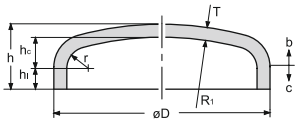
Tees acc. to
DIN EN 10253 Type A



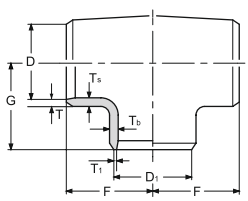
Eccentric reducers acc. to
DIN EN 10253 Type A/B



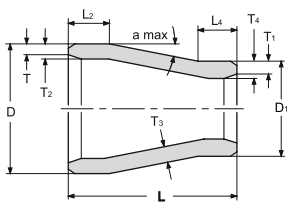
Elbows acc. to
DIN EN 10253 Type A



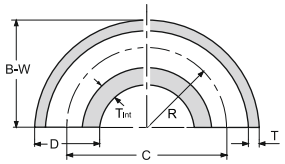
Caps acc. to
DIN EN 10253



Tees acc. to
DIN EN 10253 Type B



Concentric reducers acc. to
DIN EN 10253 Type B



Elbows acc. to
DIN EN 10253 Type B

2. Types of welding ends

Implementation of the ends acc. to DIN EN 120253			Implementation of the ends acc. to DIN 2559		
≤ 3 mm wall thickness	Plain or slightly bevelled ends		DIN 2559-1	≤ 3 mm wall thickness	
> 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 thickness	to be agreed		DIN 2559-3	> 16 mm wall thickness	

3. Comparison of dimension standards and tolerances

Weld end tolerances			
DIN EN 1053-2	DIN EN 1053-4		According to 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 **Outer Dia (OD)** applies, **Option 9** must be ordered.	D2	± 1% oder 5 mm	± 1% of the theoretical outside diameter (≤ 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]	

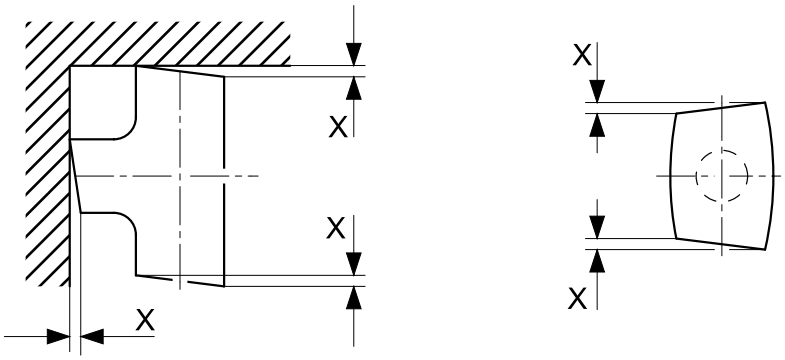
[1] Acc. to outer Dia (OD): the major value is applicable.
[2] Option 13: Fittings can be ordered in tolerances D3 or D4.

Wall thickness tolerances of welding ends							
Diameter	Wall thickness	DIN EN 1053-2		DIN EN 1053-2		DIN EN 1053-2	
		Minus	Plus	Minus	Plus	Minus	Plus
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	

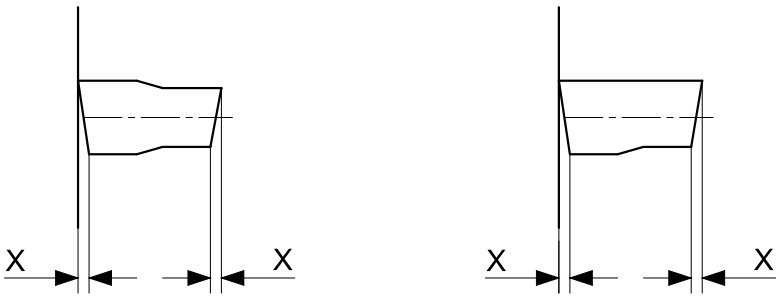
Tolerances of the fitting geometry		
DIN EN 10253-2	DIN EN 10253-4	DIN EN 2609
± 1% diameter at measuring point, min. 1 mm		
For 180° elbows, a tolerance P was created.		

Tolerances of the fitting geometry

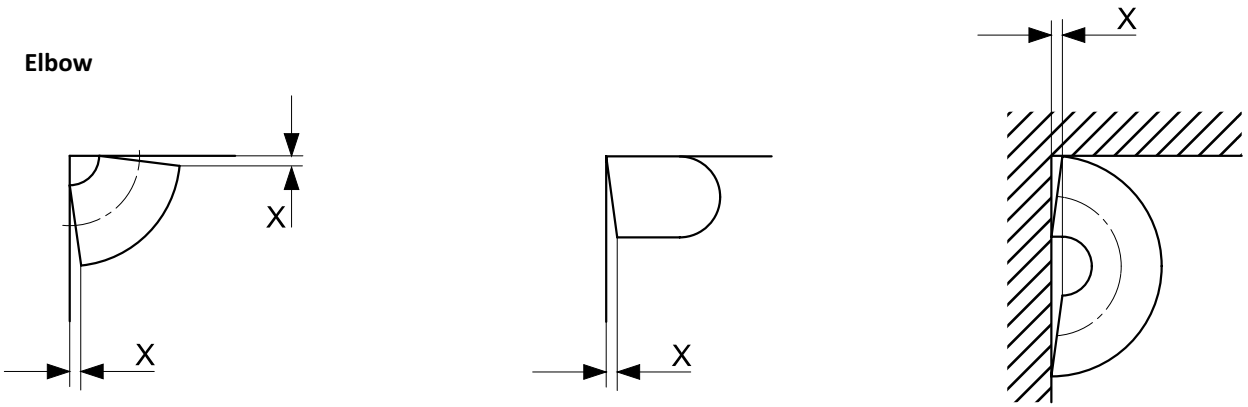
Tee



Reducer



Elbow



4. Radius for elbows

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	Comparable 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			

6. Identifications

Identification	DIN EN 10253-2	DIN EN 10253-4	DIN 2609
Manufacturers identification	•	•	•
Country of manufacture	•	•	
Standard	EN2	EN 10253-4	≤ DN 50 the “DIN” symbol is not necessary
Type A or B	Nur Type B	•	Only type 2
“W” to buttwelding	•	•	•
“S” to seamless fittings		•	•
Outside diameter	Rounded (e.g. 1939,7 = 140)[1)]	•	
Wall thickness	•[1)]	•	
Material	•	•	Symbo acc. to DIN 2609
Heat-number	•	•	•
Inspectors’sign	•	•	•

[1)] For fittings with D < 88,9 mm, markings may be omitted in the following order when the shape or size of the product does not permit the inclusion of all required markings.

Materials for Buttweld Fittings Acc. to BS DIN 2609

Table 2 – Extract

Materials group Index	Short name	Base material	Material number	Product form of base materials [1] 1	2	3	4	5	DIN	Application temperature in °C
A	St 37.0	St 37.0	1.0254	•					1629	–10 to 300
	St 37.0	St 37.0	1.0254		•				1626	–10 to 300
	St 37.0	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	St 44.0	1.0256		•				1626	–10 to 300
	St 44.0	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	St 52.0	1.0421		•				1626	–10 to 300
	St 52.0	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	St 35.8 I	1.0315		•				17 177	–10 to 420
	St 35.8 I	HI	1.0345			•			17 155	–10 to 420
	St 35.8 I	HII	1.0425			•			17 155	–10 to 420
	St 35.8 I	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	St 35.8 III	1.0315		•				17 177	–10 to 420
	St 35.8 III	HII	1.0425			•			17 155	–10 to 420
	St 35.8 III	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	15 Mo 3	1.5415		•				17 177	–10 to 530
	15 Mo 3	15 Mo 3	1.5415			•			17 155	–10 to 530
	15 Mo 3	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	13 CrMo 4 4	1.7335			•			17 155	–10 to 570
	13 CrMo 4 4	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	10 CrMo 9 10	1.7380			•			17 155	–10 to 600
	10 CrMo 9 10	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	X 5 CrNi 18 10	1.4301		•				17 457	–200 to 550
	X 5 CrNi 18 10	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	X 2 CrNi 19 11	1.4306		•				17 457	–200 to 550
	X 2 CrNi 19 11	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	X 6 CrNiTi 18 10	1.4541		•				17 457	–200 to 550
	X 6 CrNiTi 18 10	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	X 5 CrNiMo 17 12 2	1.4401		•				17 457	–200 to 550
	X 5 CrNiMo 17 12 2	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	X 2 CrNiMo 17 13 2	1.4404		•				17 457	–200 to 550
	X 2 CrNiMo 17 13 2	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	X 6 CrNiMoTi 17 12 2	1.4571						17 457	–200 to 550
	X 6 CrNiMoTi 17 12 2	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	WStE 355	1.0565		•				17 178	–20 to 400
	WStE 355	WStE 355	1.0565			•		•	17 102	–20 to 400
	WStE 355	WStE 355	1.0565				•		17 103	–20 to 400
S	TStE 355	TStE 355	1.0566	•					17 179	–60 to 50
	TStE 355	TStE 355	1.0566		•				17 178	–60 to 50
	TStE 355	TStE 355	1.0566			•		•	17 102	–60 to 50
	TStE 355	TStE 355	1.0566				•		17 103	–60 to 50
T	TStE 285	TStE 285	1.0488	•					17 179	–50 to 50
	TStE 285	TStE 285	1.0488		•				17 178	–50 to 50
	TStE 285	TStE 285	1.0488			•		•	17 102	–50 to 50
	TStE 285	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	10 Ni 14	1.5637		•				17 174	–105 to 50
	10 Ni 14	10 Ni 14	1.5637			•	•	•	17 280	–105 to 50

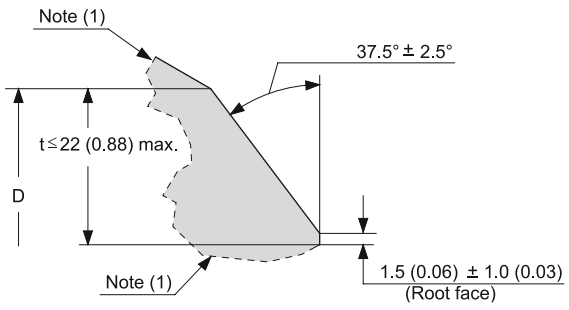
[1] **1** Seamless pipe/ Tubes **2** Welded pipe / Tubes **3** Plate metal **4** Forging **5** bar steel **6** Fittings

General standard of Buttweld Fittings As per ASME B 16.9

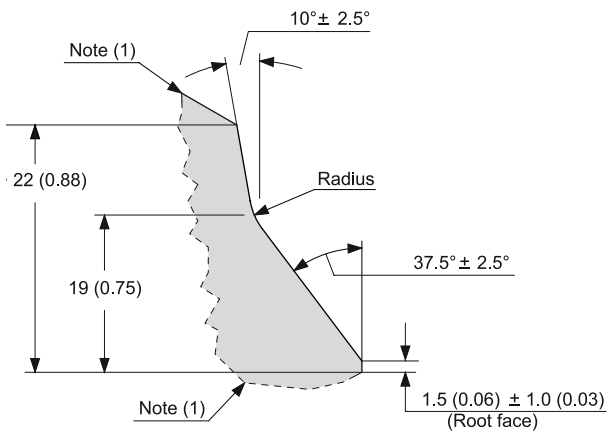
Types																													
	Elbows			Tees														Reducers concentric/ eccentric							Caps	Stub ends
OD 1	LR	SR	3D	Outside diameter 2														OD 1	Outside diameter 2							
½"	•			½"	⅜"	¼"												½"							•	•
¾"	•		•	¾"	½"	⅜"												¾"	½"	⅜"					•	•
1"	•	•	•	1"	¾"	½"												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.)

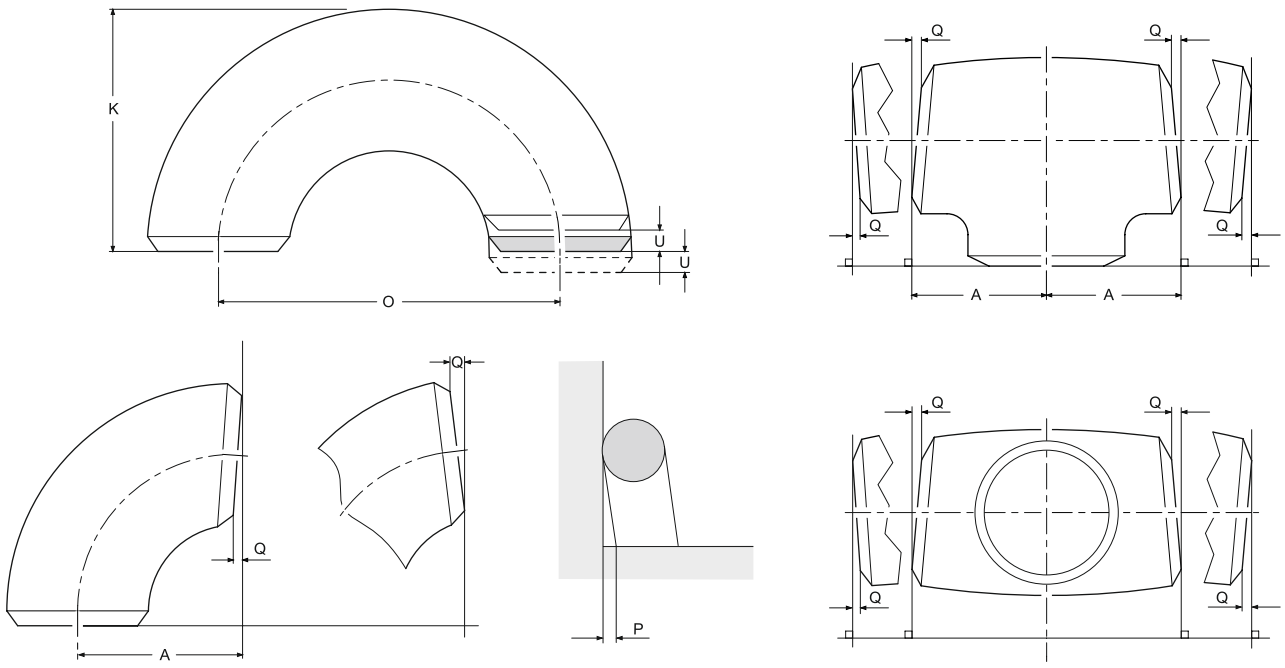
Sketch 1: Plain bevel



Sketch 2: Compound bevel



Tolerances As per ASME B 16.9



	All fittings			Elbows 90°/45° and tees	Reducers / Lap Joint Stub Ends	Elbows 180°			Elbows 3D	Caps
NPS	Outside diameter at bevel	Inside diameter at end	Wall thickness	Center to End	Overall length	Center to Center	Back to face	Alignment of Ends	Center to End	Overall 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

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”			

All data in mm

Quality system

We offer our customers

- Sourcing of raw materials and finished products from a qualified and audited vendor company.
- Continuous update of our logistics support and dispatch system to provide an up to date and reliable execution policy. class service
- Essential in-house material inspection using spectrometer for PMI analysis.
  Also outsource the inspecons through reputed inspecon agencies such as Bureau Veritas, Lloyd's, Applus, SGS. etc.
- Compare & analyze the inspection results in accordance with the advanced and updated specification standards and tolerances, Aesteiron is capable of manufacturing and conforming the products as per the latest standards used in the oil & gas industry.
- Our employees and technicians are regularly trained and equipped with the latest industry standards so as to help the customers with the appropriate technical demands of their requirements & also suggest them the suitable products as per their need.

Approval / certificate	Area of application	Certification authority
QM system in Acc. with DIN EN ISO : 9001 - 2015 No : 85 100 001 18175	Manufacturing and Supply of Stainless Steel, Duplex Steel, Carbon Steel and High Nickel Based Alloys, Quenched and Tempered Plate, Line Pipes, Tubings, Butt and Socket Weld Fittings, Forged Flanges and Bars in International and Domestic Market.	TÜVRheinland
QM system in Acc. with DIN EN ISO : 9001 - 2008 No : IND11.7124/A	Procurement and Sales of Ferrous and Non Ferrous Pipes, Sheets, Plates, Tubes, Coils, Bars, Flanges, Fittings and Customized Engineering Items for Domestic and Export Market.	Bureau veritas
QM system in Acc. with DIN EN ISO : 9001 - 2008 No : NAQC/IND/20160	Importer, Exporter and Stockist of Stainless Steel, Carbon Steel, Mild Steel & Alloy Steel.	NQAC International
QM system in Acc. with EN : 764-5 No : 01 202 IND/Q-18 0058	Certificate for the transfer of making (re-stamping) of metallic material article 4.2 and AD 2000 - Markblatt wo.	TÜVRheinland

Technical Segment

Flanges Surface

General

When 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 specified on the drawing, for example **"Surfaces acc. to DIN 3141 Series 2".**
If not specified, the characteristics given are to be viewed as processing symbols acc. to DIN 140 Sheet 2 and then finished.

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

Comparison of rugosity

Exact comparison is not possible since the following table has been drawned, up to allow the permissible 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

Steel 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

Conversion table – Roughness

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 / CLA 16
R_z 1,92 µm

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

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

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

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

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

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

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

Designation systems for DIN and EN steels

Letters and ref. numbers are to be written together without spaces. Numbers must be separated by hyphens.
The following list shows the most common materials indicating the mechanical properties at room temperature.

Steel grade				Tensile test at room temperature							Impact test	
	Material number		Material number	Tensile strength R_m	Yield point R_{eh} or $R_{p0.2}$ For wall thickness T in mm:				Elongation at rupture A in min. %		Minimum-average impact value KV t/transverse in J	
DIN		EN		MPa / N / mm²	T ≤ 16	16<T≤40	40<T≤60	60<T≤100	l / length	t / transverse	at 20° C	at 0° C
St 35.8	1.0305	P235GH	1.0345	360 to 500	235	225	215		25	23		27
St 45.8	1.0405	P265GH	1.0425	410 to 570	265	255	245		23	11		27
St 37.8	1.0315	P235GH	1.0345	360 to 500	235	225	215		25	23		27
St 42.8	1.0498	P265GH	1.0425	410 to 570	265	255	245		23	21		27
15 Mo 3	1.5415	16Mo3	1.5415	450 to 600	280	270	260		22	10	27	
13 CrMo 4-4	1.7335	13CrMo4-5	1.7335	440 to 590	290	290	280		22	20	27	
10 CrMo 9-10	1.7380	10CrMo9-10	1.7380	480 to 630	280	280	270		22	20	27	
14 Mov 6-3	1.7715	14MoV6-3	1.7715	460 to 610	320	320	310		20	18	27	
X 20 CrMoV 12-1	1.4922	X20CrMoV11-1	1.4922	690 to 840	490	490	490	490	17	14	27	
X 10 CrMoVNb 9-1	1.4903	X10CrMoVNb9-1	1.4903	630 to 830	450	450	450	450	19	17	27	
15 NiCuMoNb 5 (WB 36)	1.6368	15NiCuMoNb5-6-4	1.6368	610 to 780	440	440	440	440[1)]	19	17	27	

[1)] For wall thicknesses 60 mm < T ≤ 80 mm

The new short designations, principal symbols; DIN EN 10027-Part 1
This abbreviation is always followed by a number that corresponds to the minimum stretch value in MPa for the smallest product thickness.

S Structural steels
P Pressure vessel steels
L Line pipes
E Machinery steels
B Concrete reinforcement steel

Additional symbols (group 1) for short names; DIN EN 10027-Part 1

Impact value in Joules	at temperatures of °C
J 27 J	**R** +20
K 40 J	**0** 0
L 60 J	**2** –20
	3 –30
	4 –40
	5 –50
	6 –60

Impact value in Joules			Test temperature °C
27 J	40 J	27 J	
JR	KR	LR	+20
J0	K0	L0	0
J2	K2	L2	–20
J3	K3	L3	–30
J4	K4	L4	–40
J5	K5	L5	–50
J6	K6	L6	–60

Additional symbols (group 1 + 2) for short names; DIN EN 10027-1

B Gas bottles
C Special cold workability
D For hot-dip coatings
E For enamelling
F For forging
G Other characteristics (may be 1 to 2 digits)
H Material for high temperatures
H Hollow (structural steel)
L Low temperature
M Thermo-mechanically rolled
N Normalised
O Offshore
P Sheet pile steel
Q Quenched heat
R Room temperature
S Simple pressure vessels
S Structural steel
T Piping (tube)
W Weather-resistant
X High and low temperatures
an Chemical symbols for additionally required elements

Example			
old		**new**	
St 52-3	Steel Tensile strength 52 kp/mm² Quality grade 3 (27 J at –20° C)	**S355J2H**	Structural steels Yield point 355 N/mm² 27 J impact value –20° C Hollow
TStE 355	Fine grain steel for low temperatures Yield point 355 N/mm²	**P355NL1**	Steel for pressure vessels Yield strength 355 N/mm² Normalised Low temperature series 1
St 37.0	Steel Tensile strength 37 kp/mm² Standard grade	**P235TR1**	Steel for pressure vessels Yield strength 235 N/mm² Piping Inspection class 1
St 35.8	Steel Tensile strength 35 kp/mm² Heat-resistant	**P235GH TC1**	Steel for pressurised vessels Yield point 235 N/mm² Test class 1 Piping High temperature

Low-alloy steels (individual alloying element fractions less than 5%)

The first number corresponds to the 100-fold of the C-content, followed by the chem. symbols for the alloys characterising the steel, followed by the numbers indicating the alloy content of the alloying elements in the series.

Element	Factor
Cr, Co, Mn, Ni, Si, W	4
Al, Be, Cu, Mo, Nb, Pb, Ta, Ti, V, Zr	10
C, N, P, S	100
B	1000

X = High-alloy steels (at least one alloy element with more than 5% fraction)

The short name begins with “X” in front of the C-carbon content in hundredths of a percent. Then follow the abbreviations Cr, Ni, Mo (in full %) and the alloying elements Ti, Nb, V, Cu, N (less than 1%) as alloy symbols only, with no numerical value attached.

Element							
old	**new**	**old**	**new**	**old**	**new**	**old**	**new**
X20CrMoV12 1	X20CrMoV12-1	12CrMo 19 5	X11CrMo5	X5CrNi18 10	X5CrNi18-10	X6CrNiMoTi17 12 2	X6CrNiMoTi 17-12-2
X12CrMo9 1	X12CrMo9-1	12Ni19	X12Ni5	X6CrNiTi18 10	X6CrNiTi18-10	X8Ni9	X8Ni9

Materials comparison DIN / EN / ASTM

Finished parts

Pipes / Tubes				Flansche	
Material number	DIN	EN	ASTM	Material number	DIN
Non-alloy				**Non-alloy**	
1.0254	St 37.0	P234TR1	A 53 Grade A	1.0038	RSt 37-2
1.0570	St 52.3	S355J2H (1.0576)		1.0570	St 52-3
1.0305	St 35.8/I	P235GH TC1 (1.0345)	A 106 Grade A	1.0460	C 22.8
1.0305	St 35.8/III	P235GH TC2 (1.0345)		1.0432	C 21
1.0405	St 45.8/I	P265GH TC1 (1.0425)	A 106 Grade B	1.0352	
1.0405	St 45.8/III	P265GH TC2 (1.0425)			
Alloyed heat-resistant				**Alloyed heat-resistant**	
1.5415	15 Mo 3	16Mo3		1.5415	15 Mo 3
1.7335	13 CrMo 4 4	13CrMo4-4	A 335 Grade P11, P12	1.7335	13 CrMo 4 4
1.7380	10 CrMo 9 10	10CrMo9-10	A 335 Grade P22	1.7380	10 CrMo 9 10
1.7362	12 CrMo 19 5	X11CrMo5	A 335 Grade P5	1.7362	12 CrMo19 5
			A 335 Grade P9		
1.4903		X10CrMoVNb9-1	A 335 Grade P91	1.4903	
Low temperature				**Low temperature**	
1.5637	10 Ni 14	X12Ni14	A 333 Grade 3	1.5637	10 Ni 14
1.0356	TTSt 35 N	P215NL (1.0451)	A 333 Grade 1	1.0566	TStE 355
1.0356	TTSt 35 V	P255QL (1.0452)			
		P265NL (1.0453)	A 333 Grade 6		
Fine grain steels				**Fine grain steels**	
1.0486	StE 285		API 5L Grade X42	1.0486	StE 285
1.0562	StE 355	P355N	API 5L Grade X52	1.0562	StE 355
1.8902	StE 420	P420N	API 5L Grade X60	1.8902	StE 420
1.8905	StE 460	P460N	API 5L Grade X70	1.8905	StE 460
High yield steels				**High yield steels**	
1.0457	StE 240.7	L245NB/L245NE	API 5L Grade B		
1.0484	StE 290.7	L290NB/L290NE	API 5L Grade X42		
1.0582	StE 360.7	L360NB/L360NE	API 5L Grade X54		
1.8972	StE 415.7	L415NB/L415NE	API 5L Grade X60		
Stainless steel				**Stainless steel**	
1.4307		X2CrNi18-9	A 312 Grade TP304L	1.4307	
1.4306	X 2 CrNi 19 11	X2CrNi19-11	A 312 Grade TP304L	1.4306	
1.4301	X 5 CrNi 18 10	X5CrNi18-10	A 312 Grade TP304	1.4301	X 5 CrNi 18 10
1.4541	X 6 CrNiTi 18 10	X6CrNiTi18-10	A 312 Grade TP321	1.4541	X 6 CrNiTi 18 10
1.4550	X 6 CrNiNb 18-10	X6CrNiNb18-10	A 312 Grade TP347	1.4550	X 6 CrNiNb 18-10
1.4404	X 2 CrNiMo 17 13 2	X2CrNiMo17-12-2	A 312 Grade TP316L	1.4404	X 2 CrNiMo 17 13 2
1.4401	X 5 CrNiMo 17 12 2	X5CrNiMo17-12-2	A 312 Grade TP316	1.4401	X 5 CrNiMo 17 12 2
1.4571	X 6 CrNiMoTi 17 12 2	X6CrNiMoTi17-12-2	A 312 Grade TP316Ti	1.4571	X 6 CrNiMoTi 17 12 2
1.4429	X 2 CrNiMoN 17 13 3	X2CrNiMoN17-13-3	A 312 Grade TP316LN	1.4429	X 2 CrNiMoN 17 13 3
1.4436	X 5 CrNiMo 17 13 3	X3CrNiMo17-13-3	A 312 Grade TP316	1.4436	X 5 CrNiMo 17 13 3
1.4435	X 2 CrNiMoN 18 14 3	X2CrNiMoN18-14-3	A 312 Grade TP316L	1.4435	X 2 CrNiMoN 18 14 3
1.4439	X 2 CrNiMoN 17 13 5	X2NiCrMoN17-13-5	UNS S 31726	1.4439	X 2 CrNiMoN 17 13 5
1.4539	X 1 NiCrMoCuN 25 20 5	X1NiCrMoCuN25-20-5	UNS N 08904 (904L)	1.4539	X 1 NiCrMoCuN 25 20 5
1.4547		X1CrNiMoCuN20-18-7	UNS S 31254	1.4547	
1.4529	X 1 NiCrMoCuN 25 20 6	X1NiCrMoCuN25-20-7	UNS N 08926	1.4529	X 1 NiCrMoCuN 25 20 6
1.4462	X 2 CrMoN 22 5 3	X2CrNiMoN22-5-3	UNS S 31803 (Duplex)	1.4462	X 2 CrMoN 22 5 3
1.4410		X2CrNiMoN25-7-4	UNS S 32750 (Superduplex)	1.4410	

		Buttwelding Fittings			
EN	ASTM	Material number	DIN	EN	ASTM
		Non-alloy			
S235JR		1.0254	St 37.0	S235	
S235J2 (1.0577)					
P250GH		1.0305	St 35.8/I	P235GH (1.0345)	A 234 Grade WPA
	A 105	1.0305	St 35.8/III	P235GH (1.0345)	
P245GH		1.0405	St 45.8/I	P265GH (1.0425)	A 234 Grade WPB
		1.0405	St 45.8/III	P265GH (1.0425)	
		Alloyed heat-resistant			
16Mo3		1.5415	15 Mo 3	16Mo3	
13CrMo4-5	A 182 Grade F11, F12	1.7335	13 CrMo 4 4	13CrMo4-5	A 234 Grade WP11, WP12
11CrMo9-10(1.7383)	A 182 Grade F22	1.7380	10 CrMo 9 10	10CrMo9-10	A 234 Grade WP22
	A 182 Grade F5	1.7362	12 CrMo 19 5	X11CrMo5	A 234 Grade WP5
	A 182 Grade F9				A 234 Grade WP9
X10CrMoVNb9-1	A 182 Grade F91	1.4903		X10CrMoVNb9-1	A 234 Grade WP91
		Low temperature			
12Ni14	A 350 Grade LF3	1.5637	10 Ni 14	21Ni14	A 420 Grade WPL3
P355QH1	A 350 Grade LF2	1.0356	TTSt 35 N	P215NL (1.0451)	
		1.0356	TTSt 35 V		
				P265NL (1.0453)	A 420 Grade WPL6
		Fine grain steels			
	A 694 Grade F42	1.0486	StE 285		A 860 Grade WPHY42
P355N	A 694 Grade F52	1.0562	StE 355	P355N	A 860 Grade WPHY52
P420N	A 694 Grade F60	1.8902	StE 420		A 860 Grade WPHY60
P460N	A 694 Grade F70	1.8905	StE 460		A 860 Grade WPHY70
		High yield steels			
		1.0457	StE 240.7		
		1.0484	StE 290.7	L290NB/L290NE	A 860 Grade WPHY42
		1.0582	StE 360.7	L360NB/L360NE	A 860 Grade WPHY52
		1.8972	StE 415.7	L415NB/L415NE	A 860 Grade WPHY60
		Stainless steel			
X2CrNi18-9	A 182 Grade F304L	1.4307		X2CrNi18-8	A 182 Grade WP304L
		1.4306	X 2 CrNi 19 11	X2CrNi19-11	A 403 Grade WP304L
X5CrNi18-10	A 182 Grade F304	1.4301	X 5 CrNi 18 10	X5CrNi18-10	A 403 Grade WP304
X6CrNiTi18-10	A 182 Grade F321	1.4541	X 6 CrNiTi 18 10	X6CrNiTi18-10	A 403 Grade WP321
X6CrNiNb18-10	A 182 Grade F347	1.4550	X 6 CrNiNb 18-10	X6CrNiNb18-10	A 403 Grade WP347
X2CrNiMo17-12-2	A 182 Grade F316L	1.4404	X 2 CrNiMo 17 13 2	X2CrNiMo17-12-2	A 403 Grade WP316L
X5CrNiMo17-12-2	A 182 Grade F316	1.4401	X 5 CrNiMo 17 12 2	X5CrNiMo17-12-2	A 403 Grade WP316
X6CrNiMoTi17-12-2	A 182 Grade F316Ti	1.4571	X 6 CrNiMoTi 17 12 2	X6CrNiTi18-10	UNS S 31635
X2CrNiMoN17-13-3	A 182 Grade F316LN	1.4429	X 2 CrNiMoN 17 13 3	X2CrNiMoN17-13-3	A 403 Grade WP316LN
X3CrNiMo17-13-3	A 182 Grade F316	1.4436	X 5 CrNiMo 17 13 3	X3CrNiMo17-13-3	A 403 Grade WP316
X2CrNiMo18-14-3	A 182 Grade F316L	1.4435	X 2 CrNiMo 18 14 3	X2CrNiMo18-14-3	A 403 Grade WP316LN
X2CrNiMoN17-13-5	A 182 Grade F48	1.4439	X 2 CrNiMoN 17 13 5	X2CrNiMoN17-13-5	UNS S 31726
X1NiCrMoCu25-20-7	A 182 Grade F904L	1.4539	X 1 NiCrMoCuN 25 20 5	X1NiCrMoCu25-20-5	UNS N 08904 (904L)
X1CrNiMoCuN20-18-7	UNS S 31254	1.4547		X1CrNiMoCu20-18-7	UNS S 31254
X1NiCrMoCuN25-20-7	UNS N 08926	1.4529	X 1 NiCrMoCuN 25 20 6	X1CrNiMoCuN25-20-7	UNS N 08926
X2CrNiM0N22-5-3	A 182 Grade F51 (Duplex)	1.4462	X2 CrNiMoN 22 5 3	X2CrNiMoN22-5-3	UNS S 31803 (Duplex)
X2CrNiMoN25-7-4	A 182 Grade F53 (Superduplex)	1.4410		X2CrNiMoN25-7-4	UNS S 32750 (Superduplex)

Materials comparison DIN / EN / ASTM

Base material

Forged materials

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

[1)] The steel grade P250GH is available in Germany and widely used there. For systems requiring monitoring (such as TRD, PED, AD 2000 data sheets, TRG, TRbF, TRFL and KTA) the VdTUV WB 350/3 is used.

Seamless pipes

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

Notes for elbows and buttwelding fittings made from seamless pipe

DIN The technical delivery conditions for elbows and buttwelding fittings are standardised in DIN 2609. The material description and technical delivery conditions will not change.

EN The technical delivery conditions for elbows and buttwelding fittings are standardised in EN 10253. The material description and technical delivery conditions will not change.

ASTM Processing the seamless pipe acc. to ASME changes the quality standard as follows:

Non-alloy heat-resistant	– ASTM A 234 Grade WP	... (s.a.)
Alloy heat-resistant	– ASTM A 234 Grade W	... (s.a.)
Low temperature	– ASTM A 420 Grade WPL	... (s.a.)
High yield steels	– ASTM A 860 Grade WPHY	... (s.a.)
Stainless steel	– ASTM A 403 Grade W	... (s.a.)

Materials comparison DIN / EN / ASTM

Base material

Sheet metals

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

Welded pipes

	DIN			EN			ASTM	
	Material number	Material	Technical delivery conditions	Material number	Material	Technical delivery conditions	A	Grade
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		
Alloyed heat-resistant	1.5415	15 Mo 3	17177	1.5415	16Mo3	10217-2/5		
Low temperature	1.0356	TTSt 35 N	17174	1.0451	P215NL	10217-4/6	A 333	1
	1.0356	TTSt 35 V	17174	1.0452	P255QL	10217-4/6		
	1.5637	10 Ni 14	17174	1.5637	12Ni14	10217-4/6	A 333	3
	1.5680	12 Ni 19	17174	1.5680	X12Ni5	10217-4/6		
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		
High yield steels	1.0457	St 240.7	17172	1.0457	L245NB	10208-2	API 5L	B
	1.0484	St 290.7	17172	1.0484	L290NB	10208-2	API 5L	X42
	1.0582	StE 360.7	17172	1.0582	L360NB	10208-2	API 5L	X52
	1.8972	StE 415.7	17172	1.8972	L415NB	10208-2	API 5L	X60
Stainless Steel	1.4301	X 5 CrNi 18 10	17457	1.4301	X5CrNi18-10	10217-7	A 312	TP304
	1.4306	X 2 CrNi 19 11	17457	1.4307	X2CrNi18-9	10217-7	A 312	TP304L
	1.4541	X 6 CrNiTi 18 10	17440	1.4541	X6CrNiTi18-10	10222-5	182	TP321
	1.4401	X 5 CrNi 17 12 2	17440	1.4401	X5CrNiMo17-12-2	10222-5	182	TP316
	1.4404	X 2 CrNiMo 17 13 2	17440	1.4404	X2CrNiMo17-12-2	10222-5	182	TP316L
	1.4571	X 6 CrNiMoTi 17 12 2	17457	1.4471	X6CrNiMoTi17-12-2	10217-7	A 312	TP316Ti
	1.4529	X 1 NiCrMoCuN 25 20 6	VdTÜV WB 502	1.4529	X1NiCrMoCuN25-20-7	10217-7	A 312	N 08926
	1.4539	X 1 NiCrMoCu 25 20 5	VdTÜV WB 421	1.4539	X1NiCrMoCu25-20-5	10217-7	A 312	N 08904
	1.4462	X 2 CrNiMoN 22 5 3	VdTÜV WB 418	1.4462	X2CrNiMoN22-5-3	10217-7		

Notes for elbows and buttwelding fittings made from welded pipe

DIN The technical delivery conditions for elbows and buttwelding fittings are standardised in DIN 2609. The material description and technical delivery conditions will not change.

EN The technical delivery conditions for elbows and buttwelding fittings are standardised in EN 10253. The material description and technical delivery conditions will not change.

ASTM Processing the seamless pipe acc. to ASME changes the quality standard as follows:

Low temperature	– ASTM A 420 Grade WPL	... (s.a.)
High yield steels	– ASTM A 860 Grade WPHY	... (s.a.)
Stainless steel	– ASTM A 403 Grade W	... (s.a.)

Pipe construction standards

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

Publicly Available Specifications	Standard
Pipe classes for process plants	
Basic requirements for the development of pipe classes on the basis of EN 13480	PAS 1057-1
Pipe fittings - Special designs	PAS 1057-5
Flanges for automated welding processes	PAS 1057-6
Technical delivery conditions for pipe components made from non-alloy and allo steels with specified elevated temperature properties. Group 1.1 and 1.2 (CR ISO 15608)	PAS 1057-10
Technical delivery conditions for pipe components made from austenitic stainless steels, Group 8.1 (CR ISO 1568)	PAS 1057-11
Standard pipe classes PN 10 to PN 100 - Pipe components made from non-alloy and alloy steels with specified elevated temperature properties. Group 1.1 and 1.2 and austenitic stainless steels, Group 8.1 (CR ISO 15608)	PAS 1057-101

Seamless steel tubes for pressure purposes	Standard
Non-alloy steel tubes with specified room temperature properties	DIN EN 10216-1
Non-alloy and alloy steel tubes with specified elevated temperature properties	DIN EN 10216-2
Alloy fine grain steel tubes	DIN EN 10216-3
Non-alloy and alloy steel tubes with specified temperature properties	DIN EN 10216-4
Stainless steel tubes	DIN EN 10216-5

Welded steel tubes for pressure purposes	Standard
Non-alloy steel tubes with specified room temperature properties	DIN EN 10217-1
Electric welded non-alloy and alloy steel tubes with specified elevated temperature properties	DIN EN 10217-2
Alloy fine grain steel tubes	DIN EN 10217-3
Electric welded non-alloy steel tubes with specified low temperature properties	DIN EN 10217-4
Submerged arc welded non-alloy and steel tubes with specified elevated temperature properties	DIN EN 10217-5
Submerged arc welded non-alloy steel tubes with specified low temperature properties	DIN EN 10217-6
Stainless steel tubes	DIN EN 10217-7

Technical basics	Standard
Symbolic representation for use on engineering drawings	
Basic requirements	DIN 2429-1
Functional representation	DIN 2429-2
Guide for procurement of power station plant, equipment and systems	
High pressure piping systems	DIN EN 45510-7-1
Boiler and high pressure piping valves	DIN EN 45510-7-2
Pipeline components-Definition and selection of DN (diameter nominall)	DIN EN ISO 6708
Fluid power systems and components-Nominal pressures	ISO 2944
Identification of pipelines according to the fluid conveyed	DIN 2403

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

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

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

Flat products and forgings	Standard
Steel forgings for pressure purposes	DIN EN 10222-1 to 5
Flat products made of steels for pressure purposes	DIN EN 10228-1 to 6

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

Design rules for gasketed circular flanges connections	Standard
Calculation method	DIN EN 1591-1
Background information	DIN EN 1591-1 Bbl1
Gasket parameters	DIN EN 1591-2
Calculation method for metal to metal contact type flanged join	DIN CEN/TS 1591-3
Qualification of personnel competency in the assembly of bolted joints fitted to equipment subject to the PED	DIN CEN/TS 1591-4
Calculation method for full face gasketed joints	DIN CEN/TS 1591-5

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

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

Guideline for the ordering and manufacturing of pressure equipment according to PED 97/23/EC	Standard
General requirement	PAS 1010-1
Unfired pressure vessels	PAS 1010-2
Industrial pipin	PAS 1010-3
Pressure equipment	PAS 1010-4
Equipment with safety function	PAS 1010-5
Package units	PAS 1010-6

Comparing standards DIN / EN

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	2566	Type 13, PN 10 / 16
Screwed flanges	PN 25 / 40	2567	Type 13, PN 25 / 40
Screwed flanges	PN 64	2568	Type 13, PN 63
Screwed flanges	PN 100	2569	Type 13, PN 100
Flanges for welding	PN 6	2573	Type 01, PN 6
Flanges for welding	PN 10	2576	Type 01, PN 10
Welding neck flanges	PN 1–2.5	2630	Type 11, PN 2.5
Welding neck flanges	PN 6	2631	Type 11, PN 6
Welding neck flanges	PN 10	2632	Type 11, PN 10
Welding neck flanges	PN 16	2633	Type 11, PN 16
Welding neck flanges	PN 25	2634	Type 11, PN 25
Welding neck flanges	PN 40	2635	Type 11, PN 40
Welding neck flanges	PN 64	2636	Type 11, PN 63
Welding neck flanges	PN 100	2637	Type 11, PN 100
Welding neck flanges	PN 160	2638	Type 11, PN 160
Welding neck flanges	PN 250	2628	Type 11, PN 250
Welding neck flanges	PN 320	2629	Type 11, PN 320
Welding neck flanges	PN 400	2627	Type 11, PN 400
Loose flanges for type 32	PN 6	2641	Type 01, PN 6
Weld-on collar	PN 6	2641	Type 32, PN 6
Pressed collar	PN 6	2641	Type 37, PN 6
Loose flanges for type 32	PN 10	2642	Type 02, PN 10
Weld-on collar	PN 10	2642	Type 32, PN 10
Pressed collar	PN 10	2642	Type 37, PN 10
Loose flanges for type 32	PN 25	2655	Type 02, PN 25
Weld-on collar	PN 25	2655	Type 32, PN 25
Loose flanges for type 32	PN 40	2656	Type 02, PN 40
Weld-on collar	PN 40	2676	Type 32, PN 40
Loose flanges for type 34	PN 10	2673	Type 04, PN 10
Welding neck collar	PN 10	2673	Type 34, PN 10
Loose flanges for type 34	PN 16	2674	Type 04, PN 16
Welding neck collar	PN 16	2674	Type 34, PN 16
Loose flanges for type 34	PN 25	2675	Type 04, PN 25
Welding neck collar	PN 25	2675	Type 34, PN 25
Slip-on flanges for welding	PN 10	86 029[1)]	Type 12, PN 10
Slip-on flanges for welding	PN 16	86 030[1)]	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 vassels and process apparatus (apparatus flanged joints)		28 030	
Weld flanges for non-pressure vessels and process apparatus of non-alloy and stainless steel		28 031	
Weld flanges fr pressure vessels and process apparatus of non-alloy steel		28 032	
Welding neck flanges for pressure vessles and process apparatus		28 034	
Weld flanges for pressure vessels and process apparatus of stainless steel.		28 036	
Weld flanges with cylindical hub for pressure vessels and process apparatus of stainless steels		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**
Seamless circular steel tubes for pressure purposes	1629	10 297-1
Dimensions and converntional masses per unit length of seamless steel tubes	2448	10 297-1
Seamless circular fine grain steel tubes for structural steelwork	17 124	10 297-1
Seamless circular tubes of austenitic stainless steels 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	
Torispherical heads, semi-ellipsoidal heads	**DIN Standard**	
Torispherical heads	28 011	
Ellipsoidal heads	28 013	
U-bolts	**DIN Standard**	
U-bolts, galvanized	3570	

Standard overview ASME / ASTM / API

ASME standards	ASNE
Pipe Flanges and Flanged Fittings ≤ NPS 24	B 16.5
Pipe Flanges and Flanged Fittings > NPS 24 (prior MSS-SP44)	B 16.47 Series A
Pipe Flanges and Flanged Fittings > NPS 24 (prior API 605)	B 16.47 Series A
Orifice Flanges	B 16.36
Line Blanks	B 16.48
Buttwelding Fittings	B 16.9
Forged Steel Fittings	B 16.11
Welded and seamless wrought steel pipes / Dimensions and masses	B 36.10
Welded and seamless stainless steel pipes / Dimensions and masses	B 36.19
Metallic Gaskets for Pipe Flanges	B 16.20
Nonmetallic Flat Gaskets for Pipe Flanges	B 16.21
Buttwelding Ends	B 16.25
Pipe threads, General purpose (inch)	B 1.20.1

Sheets, strips, flat products	ASNE
Steel Plates made from Stainless and Heat-Resisting Chromium steels	A 179
Pressure vessel plates, alloy steel, nickel	A 203
Pressure vessel plates, alloy steel, molybdenum	A 204
Chromium and chromium-nickel stainless steel plates and stripes	A 240
Pressure vessel plates, carbon steel, low- and intermediate-tensile strength	A 285
Pressure vessel plates, alloy steel, chromium-molybdenum	A 387
Pressure vessel plates, carbon steel, for intermediate- and higher-temperature service	A 515
Pressure vessel plates, carbon steel, for moderate- and lower-temperature service	A 516

Steels for seamless and welded pipes	ASNE
Steel pipes, black and hot-dipped, zinc-coated	A 53
Cold worked austenitic stainless steel pipes	A 312
Steel pipes for low temperature service	A 333
Alloy- and non alloy steel tubes for low-temperature service	A 334
Steel pipes forgings for pressure and high-temperature service	A 335

Buttweld Fittings	ASNE
Carbon steel and alloy steel piping fittings for high-temperature service	A 234
Austenitic and stainless steel piping fittings	A 403
Piping fittings of wrought carbon steel and alloy steel for low-temperature service	A 420
Piping fittings for wrought ferritic, ferritic/austenitic, and martensitic stainless stells	A 815
Wrought high-strength ferritic steel Buttwelding Fittings	A 860

Seamless steel tubes and pipes	ASNE
Carbon steel pipes for high-temperature service	A 106
Cold-drawn low-carbon steel heat-exchanger and condenser tubes	A 179
Carbon-molybdenum alloy steel boiler and super-heater tubes	A 209
Carbon steel boiler and super-heater tubes	A 210
Ferritic and austenitic alloy steel boiler, super-heater and exchanger tubes	A 213
Ferritic alloy steel pipes for high-temperature service	A 335

Welded steel tubes and pipes	ASNE
Carbon steel and carbon-manganese steel boiler and super-heater tubes, electric-resistance-welded	A 178
Carbon steel heat-exchanger and condenser tubes, electric-resistance-welded	A 214
Austenitic steel boiler, super-heater, heat-exchanger, and condenser tubes	A 249
Ferritic alloy steel boiler and super-heater tubes, electric-resistance-welded	A 250
Chromium-nickel stainless steel pipes for high-temperature service	A 358
Steel pipes for use with high-pressure transmission systems, metal-arc-welded	A 381

Forged material	ASNE
Carbon steel forgings for piping applications	A 105
Carbon steel forgings, for general purpose piping	A 181
Forged and rolled alloy and stainless steel flanges for high-temperature service	A 182
Carbon steel forgings for pressure vessel components	A 266
Alloy steel forgings for pressure and high-temperature service	A 336
Carbon and low alloy steel forgings, requiring notch toughness testing	A 350
Carbon and ferritic alloy steel forged and bored pipe for high-temperature service	A 369
Carbon and alloy steel forgings for thick-walled pressure vessels	A 372
Carbon and alloy steel forgings for pipe flanges for high-pressure transmission service	A 694

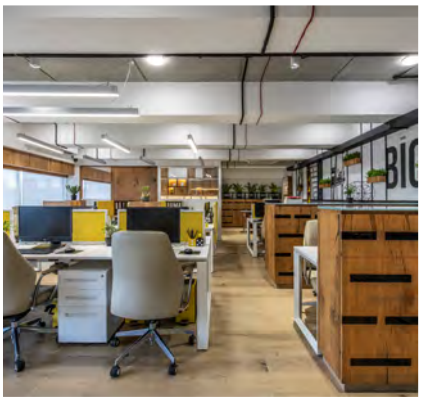
Fastenings, screws, nuts, bolts	ASNE
Alloy steel and stainless steel bolting materials for high-pressure service	A 193
Carbon and alloy steel nuts for bolts for high pressure and high temperature	A 194
Alloy steel and stainless steel bolting materials for low-temperature service	A 320

API steels	ASNE
Specification for casting and tubing	API 5 CT
Specification for drill pipe	API 5 D
Specification for line pipe	API L

OUR INFRASTRUCTURE

Our stockyard is fully modernized with over-head cranes, adequate stocks to fulfill your needs, and a highly experienced technical team to cater to you uninterrupted and ensure timely deliveries and offer after-sales services promptly to any of your queries or complaints.

Aimed at adding value to your business, our office premises are sufficiently equipped with the most modern amenities, sitting space, and connectivity to ensure a comfortable, happy work culture for our consultants.



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