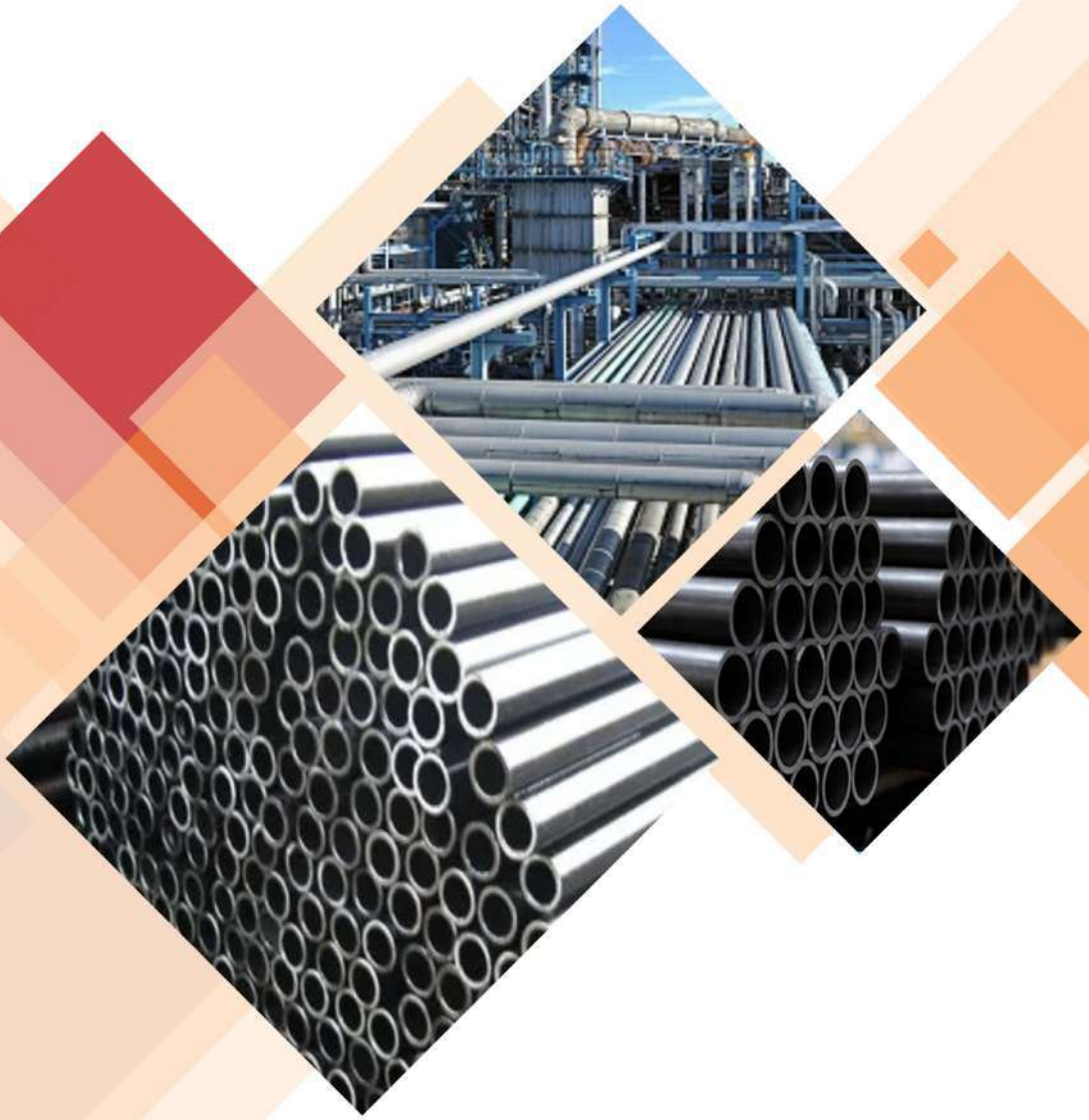
SHREE ARBUDA STEEL

"QUALITY MAKERS"



STAINLESS STEEL TUBES

CARBON STEEL TUBES

ALLOY STEEL TUBES

SHREE ARBUDA STEEL TUBES CONTENT

HOLLOW STRUCTURAL SECTION TUBES

STANDARDS	GRADE	CONDITION
EN 10210-2	S235 JRH S275 JOH S355 JOH S275 J2H S355 J2H	• Hot Finished (Rolled) • Cold Finished (Normalized)
	S275 NHS 275 NLH S355 NH S355 NLH S460 NH S460 NLH	• Hot Finished (Normalizing Rolled, Normalized) • Cold Finished (Normalized)
DIN 2448	Rst 37-2 St 44-2 St 37-3 St 44-3 St 52-3	• Hot Finished (Rolled) • Cold Finished (Normalized)
	St 52-3 StE 255 TStE 255 EStE 255 StE 285 TStE 285 EStE 285 StE 355 TStE 355 EStE 355 StE 420 TStE 420 EStE 420 StE 460 TStE 460 EStE 460	• Hot Finished (Normalizing Rolled, Normalized) • Cold Finished (Normalized)
NFA 49-501	TU E235 TU E275 TU E355 TU E450 Grade 2,3,4	• Hot Finished (Rolled) • Cold Finished (Normalized)

STANDARDS	GRADE	CONDITION
STN 42 5715/ ČSN 42 5716	11 353 11 453 11 503 11 523	Hot Finished
GOST 8732	1050: 10, 20 19281: 09G2S	

Note:

Dimension : As per standards or customers requirement

Surface : • Rust free • Scars free • No defects

Testing : • Chemical analysis • Tensile test • Impact test • Visual examination • NDT of weld

Marking : • Grade • Standard • Outer diameter • Thickness • Length • Heat no. or as per customer's requirement

Tube Ends : • Square cut ends • Free from excessive burrs • Beveled ends - protected with plastic end caps

Packaging : • Wooden boxes • Shrink wrapping • Bubble wrapping • Pallet - export quality

GENERAL & MECHANICAL ENGINEERING TUBES

STANDARDS	GRADE	CONDITION
EN 10294-1	E355	+ AR
	E355 J2	+ N
	E420 J2	+ N
	E470	+ AR
EN 10297-1	E235	+ AR, + N
	E275	+ AR, + N
	E315	+ AR, + N
	E355	+ AR, + N
EN 10305-1	E470	+ AR
	E275K2	+N
	E355K2	+N
	E460K2	+N
	E420 J2	+N
	C22E	+N
	C35E	+N
	C45E	+N
	C60E	+N
	38Mn6	+N
	41Cr4	+QT[+N]
	25CrMo4	+QT[+N]
	30CrMo4	+QT[+N]
	34CrMo4	+QT[+N]
	42CrMo4	+QT[+N]
	C10E	+N[+A]
	C15E	+N[+A]
	C15R	+N[+A]
	20NiCrMo2-2	+N[+A]
	16MnCr5	+N
BS 6323/3	HFS 3 (360)	Hot finished (as rolled)
	HFS 4 (410)	
	HFS 5 (490)	
	HFS 8 (450)	
	NF A 49-311	
NF A 49-311	TU 37-b	Hot finished (as rolled)
	TU 52-b	
	TU 56-b	
	TU XC3 5	

STANDARDS	GRADE	CONDITION
NF A 49-312	S 470M S 450MG2	Hot Finished (as Rolled, Normalized)
UNI 4991	Fe 35-1 Fe 45-1 Fe 52-1 Fe 55-1 Fe 35-2 Fe 45-2 Fe 52-2 Fe 55-2	Hot Finished (as Rolled), Cold Finished (Normalized)
UNI 7729	Fe 360 Fe 510 Fe 540	
ASTM	A513 Gr A A513 Gr B	Hot Finished (as rolled) Dimensions 1/8-3/8 (DN 6-10) Cold Finished and thereafter heat treated
	A519	Hot Finished (HF) Cold Finished (CW) • A(annealed) • N(normalized) • SR(stress relieved) • QT(quench and temp)
JIS	G3445	Seamless Tubes: S]Hot Finished : H Cold Finished : C

Note:

Dimension : As per standards or customers requirement

Surface : • Rust free • Scars free • No defects

Testing : • Chemical analysis • Tensile test • Impact test • Hardness • Hydrotest • Dimension • Flattening or Ring Expanding • Drift expanding • NDT Ultrasonic & Eddy Current Testing

Marking : • Grade • Standard • Outer diameter • Thickness • Length • Heat no. or as per customer's requirement

Tube Ends : • Square cut ends • Free from excessive burrs • Beveled ends - protected with plastic end caps

Packaging : • Wooden boxes • Shrink wrapping • Bubble wrapping • Pallet - export quality

PRESSURE EQUIPMENT SEAMLESS TUBES FOR ELEVATED TEMPERATURE (A)

STANDARDS	GRADE	CONDITION
EN 10216-1	P195TR1 P235TR1 P265TR1 P195TR2 P235TR2 P265TR2	Hot Finished : Quality TR1 • As Rolled • Normalizing Formed • Normalized Quality TR2 • Normalizing Formed • Normalized Cold Finished: Quality TR1 and TR2 • Normalized
DIN 2448	St 37.0 St 44.0 St 52.0	Hot Finished: • As Rolled • Condition N after normalizing only upon agreement Cold Finished: • Normalized – Condition NBK
BS 3600	360 430	Hot Finished: • As Rolled • Normalizing Cold Finished: • Normalized
NF A 49-112	TU E220A TU E235A	Hot Finished: • As Rolled Cold Finished: • Normalized
NF A 49-210	TU 37B TU 42B	Cold Finished: • Normalized
UNI 7287	Fe 320	Hot Finished: • As Rolled Cold Finished: • Normalized
STN 42 5715 ČSN 42 5716 [42 6710] [42 6711]	11 353 11 453 11 503 11 523 11 550 11 650 12 040 12 050 12 060	Hot Finished: • As Rolled condition .1 behind steel designation Cold Finished: • Normalized
PN-H 74219	R35, R45	Hot Finished: • As Rolled • Other condition according to agreement Cold Finished: • Normalized

STANDARDS	GRADE	CONDITION
JIS G3454	STPG 370 STPG 410	Hot Finished: • As Rolled Cold Finished: • Normalized
JIS G3455	STS 370 STS 410 STS 480	

Note:

Dimension : As per standards or customers requirement

Surface : • Rust free • Scars free • No defects

Testing : • Product analysis • Tensile test • Flattening or ring expanding • Drift expanding • NDT or Hydrotest

Marking : • Grade • Standard • Outer diameter • Thickness • Length • Heat no. or as per customer's requirement

Tube Ends : • Square cut ends • Free from excessive burrs • Beveled ends - protected with plastic end caps

Packaging : • Wooden boxes • Shrink wrapping • Bubble wrapping • Pallet - export quality

PRESSURE EQUIPMENT SEAMLESS TUBES FOR ELEVATED TEMPERATURE (B)

STANDARDS	GRADE	CONDITION
EN 10216-2	P195GH	+N (Normalized)
	P235GH	+N
	P265GH	+N
	16Mo3	+N
	14MoV6-3	+NT (Normalized + Tempered)
	10CrMo5-5	+NT
	13CrMo4-5	+NT
	10CrMo9-10	+NT
	11CrMo9-10	+QT (Quenched + Tempered)
	25CrMo4	+QT
DIN 2448	St 35.8 St 45.8 17Mn4 19Mn5 15Mo3	Hot Finished • As Rolled • Normalized Cold Finished • Normalized
	13CrMo4 4	Hot Finished • Tempered • Normalized and Tempered
	10CrMo9 10	Cold Finished • Normalized and Tempered
	14MoV6 3	Hot Finished Cold Finished • Normalized and Tempered (Both Methods)
BS 3059-1	320	Hot Finished • As rolled (HF) • Normalized (N) Cold Finished • Normalized
BS 3059-2	360 440	Cold Formed • Normalized
	243 420	N (N + T)
	622-490N	+ T or Ann (Tempered)
BS 3602-1	360 430	Hot Finished • As Rolled (HF) • Normalized (N) Cold Formed • Normalized

STANDARDS	GRADE	CONDITION
BS 3604-1	620-440	N + T*(is valid for HFS & CFS)
	621	N + T
	660	N + T
	622	N + T
NF A 49-211	TUE 220 TUE 250 TUE 275	Hot Finished • As Rolled • Normalized Cold Finished • Normalized
NF A 49-213	TU 37C TU 42C TU 48C TU 52C	Hot Finished • As Rolled • Normalized Cold Finished • Normalized
	TU 15D3	N
	TU 13CD4-04	N + T
	TU 10CD5-05	N + T
	TU 10CD9-10	N + T
UNI ISO 1129	C14 C18	Hot Finished • As Rolled • Normalized Cold Finished • Normalized
	16Mo5	N
	14CrMo3	N + T
	12CrMo9 10	N + T
STN 42 5715 ČSN 42 5716 (42 6710) (42 6711)	11 368 11 418 12 021 12 022 12 025 15 020	Hot Finished • As Rolled • Normalized Cold Finished • Normalized
	15 121 15 128 15 313	Hot Finished • Normalized & Tempered Cold Finished • Normalized & Tempered Condition
PN-H 74252	K10 K18	Hot Finished • As rolled • Normalized
	16M 10H2M 15HM 13HMF	Hot Finished Cold Finished • Normalized & Tempered

STANDARDS	GRADE	CONDITION
ASTM A106, ASTM A530	Grade A, B, C	Hot Finished • As Rolled Cold Finished • Normalized
ASTM A192		Hot Finished • As Rolled Cold Finished • Normalized
ASTM A209	Grade T1 Grade T1a Grade T1b	Hot Finished • Normalized Cold Finished • Normalized • Normalized + Tempered
ASTM A210	Grade A-1 Grade C	Hot Finished • As Rolled Cold Finished • Normalized
ASTM A213	T2, T11, T12, T21, T22, T24	Hot Finished • Normalized + Tempered Cold Finished • Normalized
ASTM A335	P1, P2, P11, P12, P21, P22, P24	Hot Finished • Normalized + Tempered Cold Finished • Normalized + Tempered
ASTM A556	Grade A2, B2, C2	Cold Finished • Normalized
JIS G3456	STPT 370, 410, 480	Hot Finished • As Rolled Cold Finished • Normalized + Tempered
JIS G3458	STPA 12, 20, 22, 23, 24	Hot Finished • Normalized + Tempered Cold Finished • Normalized + Tempered
JIS G3461	STB 340, 410, 510	Hot Finished • As Rolled (340,410) • Normalized (510) Cold Finished • Normalized
JIS G3462	STBA 12, 13, 20, 22, 23, 24	Hot Finished • Normalized + Tempered Cold Finished • Normalized + Tempered

Note:

Dimension : As per standards or customers requirement

Surface : • Rust free • Scars free • No defects

Testing : • Chemical analysis • Visual • Tensile test • Flattening or ring expanding • Drift expanding • Impact test • hydrostatic • NDT - Ultrasonic & Eddy Current • Material identification

Marking : • Grade • Standard • Outer diameter • Thickness • Length • Heat no. or as per customer's requirement

Tube Ends : • Square cut ends • Free from excessive burrs • Beveled ends - protected with plastic end caps

Packaging : • Wooden boxes • Shrink wrapping • Bubble wrapping • Pallet - export quality

ALLOY FINE GRAIN STEEL TUBES FOR PRESSURE EQUIPMENT

STANDARDS	GRADE	CONDITION
EN 10216-3	P355N P460N P355NH P460NH P275NL1 P355NL1 P460NL1 P275NL2 P355NL2 P460NL2	Hot Finished • At P355N and P355NH Normalizing Formed is enough • Other Steels Normalized Designation +N, Cold Finished • Normalized Designation +N
DIN 2448		Hot Finished • Normalizing formed • Normalized, Cold Finished • Normalized

Note:

Dimension : As per standards or customers requirement

Surface : • Rust free • Scars free • No defects • Free from surface defects

Testing : • Chemical analysis • Visual • Tensile test • Flattening or ring expanding • Drift expanding • Leak tightness • Impact test • Hydrostatic • NDT - Ultrasonic & Eddy Current • Material identification

Marking : • Grade • Standard • Outer diameter • Thickness • Length • Heat no. or as per customer's requirement

Tube Ends : • Square cut ends • Free from excessive burrs • Beveled ends - protected with plastic end caps

Packaging : • Wooden boxes • Shrink wrapping • Bubble wrapping • Pallet - export quality

PRESSURE EQUIPMENT SEAMLESS STEEL TUBES FOR LOW TEMPERATURE

STANDARDS	GRADE	CONDITION
EN 102216-4	P215NL P265NL 12Ni 14	+N +N +NT conditions valid for both hot and cold methods
DIN 2448	TTSt35N, 10Ni 14	N V(N) N– Normalized V – Quenched and Tempered Conditions valid for both Hot finished methods
BS 3600	430LT	Hot Finished • Normalizing Formed HF • Normalized N Cold Finished • Normalized N
	503LT (HFS,CFS)	Hot Finished Cold Finished • Normalized N • Normalized & Temp. N+T
NF A 49-215	TU 42BT	Cold Finished • Normalized N
	TU 10N9 TU 10N14	Cold Finished • Normalized N • Normalized & Temp. N+T
UNI 4991	C 15 C 20	Hot Finished • Normalized Cold Finished • Normalized
STN 42 5715 ČSN 42 5716	11 369 11 419 11 448 11 449 11 503	Hot Finished • Normalized Cold Finished • Normalized
A333, A999	Grade 1, 3, 6, 7	Hot Finished • Normalized Cold Finished • Normalized
A334	Grade 1, 3, 6, 7	Hot Finished • Normalized Cold Finished • Normalized
A524	Grade 1 & 2	

Note:

Dimension : As per standards or customers requirement

Surface : • Rust free • Scars free • No defects • Free from surface defects

Testing : • Chemical analysis • Visual • Tensile test • Dimension • Flattening or ring expanding • Drift expanding • Leak tightness • Hydrostatic • NDT • Material identification • Hardness

Marking : • Grade • Standard • Outer diameter • Thickness • Length • Heat no. or as per customer's requirement

Tube Ends : • Square cut ends • Free from excessive burrs • Beveled ends - protected with plastic end caps

Packaging : • Wooden boxes • Shrink wrapping • Bubble wrapping • Pallet - export quality

SEAMLESS TUBES FOR HEAT EXCHANGERS

STANDARDS	GRADE	CONDITION
DIN 1629	St37.0	Cold Finished • Normalized (NBK)
DIN 17175	St35.0 15Mo3	
DIN 17173	TTSt35N	
BS 3606	320	N
	440	N
	243	N,N+T
	620	N,N+T
	622	Cold Finished • Condition upon requirement
NF A 49-215	TU37C	N
	TU42C	N
	TU48C	N
	TU15D3	N
	TU13CD4-04	N + T
STN 42 6710 ČSN 42 6711	12 021 12 022 12 025 15 020	Cold Finished • Normalized
	15 121 15 128 15 313	Cold Finished • Normalized and Temper.
ASTM A179	A179	Cold Finished • Normalized
JIS G3461	STB340 STB410 STB510	Cold Finished • Normalized
JIS G3462	STBA12	

Note:

Dimension : As per standards or customers requirement

Surface : • Rust free • Scars free • No defects • Free from surface defects

Testing : • Chemical Analysis • Dimension • Visual • Tensile test • Flattening • Drift expanding • Hydrostatic test
• NDT - Ultrasonic, Eddy Current • Hardness

Marking : • Grade • Standard • Outer diameter • Thickness • Length • Heat no. or as per customer's requirement

Tube Ends : • Square cut ends • Free from excessive burrs • Beveled ends - protected with plastic end caps

Packaging : • Wooden boxes • Shrink wrapping • Bubble wrapping • Pallet - export quality

LINE PIPE

STANDARDS	GRADE	CONDITION
EN 10208-1	L235GA L210GA L245GA L290GA L360GA	Hot Finished • As rolled • Normalizing formed • Normalized Cold Finished • Normalized
EN 10208-2	L245NB L290NB L360NB L415NB	Hot Finished • Normalizing formed (N) • Normalized (N) Cold Finished • Normalized
DIN 2470-2/17172	StE210.7 StE240.7 StE290.7 StE320.7 StE360.7 StE415.7	Hot Finished • As rolled Cold Finished • Normalized
UNI 7088	Fe35-1 Fe45-1	
API 5L	Grade A Grade B GradeX42 Grade X46 Grade X52 Grade X60	

Note:

Dimension : As per standards or customers requirement

Surface : • Rust free • Scars free • Visually free from surface defects

Testing : • Chemical analysis • Dimension • Visual • Tensile test • Flattening • Drift expanding • Hydrostatic test • NDT - Ultrasonic, Eddy Current • Hardness

Marking : • Grade • Standard • Outer diameter • Thickness • Length • Heat no. or as per customer's requirement

Tube Ends : • Square cut ends • Free from excessive burrs • Beveled ends - protected with plastic end caps

Packaging : • Wooden boxes • Shrink wrapping • Bubble wrapping • Pallet - export quality

Structural Steel Tubes Chemical Composition (%)

Standards	Steel Grade	C	Si	Mn	Pmax	Smax	Cr	Ni	Mo	Cu	Other
DIN 17121	RSt 37-2	0.17 max	–	–	0.050	0.050	–	–	–	–	N 0.009
	St 44-2	0.21 max	–	–	0.050	0.050	–	–	–	–	N 0.009
	St 44-3	0.20 max	–	–	0.040	0.040	–	–	–	–	Al 0.020 min
	St 52-3	0.22 max	–	–	0.040	0.040	–	–	–	–	Al 0.020 min
DIN 17124	StE 255	0.18 max	0.40 max	0.50–1.30	0.035	0.030	0.30 max	0.30 max	0.08 max	0.20 max	Al 0.020 min
	TStE 255	0.16 max	0.40 max	0.50–1.30	0.030	0.025	0.30 max	0.30 max	0.08 max	0.20 max	Al 0.020 min
	EStE 255	0.16 max	0.40 max	0.50–1.30	0.025	0.015	0.30 max	0.30 max	0.08 max	0.20 max	Al 0.020 min
	StE 285	0.18 max	0.40 max	0.60–1.40	0.035	0.030	0.30 max	0.30 max	0.08 max	0.20 max	Al 0.020 min
	TStE 285	0.16 max	0.40 max	0.60–1.40	0.030	0.025	0.30 max	0.30 max	0.08 max	0.20 max	Al 0.020 min
	EStE 285	0.16 max	0.40 max	0.60–1.40	0.025	0.015	0.30 max	0.30 max	0.08 max	0.20 max	Al 0.020 min
	StE 355	0.20 max	0.10–0.50	0.90–1.65	0.035	0.030	0.30 max	0.30 max	0.08 max	0.20 max	Al 0.020 min
	TStE 355	0.18 max	0.10–0.50	0.90–1.65	0.030	0.025	0.30 max	0.30 max	0.08 max	0.20 max	Al 0.020 min
	EStE 355	0.18 max	0.10–0.50	0.90–1.65	0.025	0.015	0.30 max	0.30 max	0.08 max	0.20 max	Al 0.020 min
NFA 49-501	TUE 235	0.20 max	–	–	0.040	0.040	–	–	–	–	–
	TUE 275	0.22 max	–	–	0.040	0.040	–	–	–	–	–
EN 10210-1	S 235 JRH	0.17 max	–	1.40 max	0.045	0.045	–	–	–	–	N 0.009
	S 275 JOH	0.20 max	–	1.50 max	0.040	0.040	–	–	–	–	N 0.009
	S 275 J2H	0.20 max	–	1.50 max	0.035	0.035	–	–	–	–	–
	S 355 JOH	0.22 max	0.55 max	1.60 max	0.040	0.040	–	–	–	–	N 0.009
	S 355 J2H	0.22 max	0.55 max	1.60 max	0.035	0.035	–	–	–	–	–
	S 275 NH	0.20 max	0.40 max	0.50–1.40	0.035	0.030	0.30 max	0.30 max	0.10 max	0.35 max	V 0.05 max
	S 275 NLH	0.20 max	0.40 max	0.50–1.40	0.030	0.025	0.30 max	0.30 max	0.10 max	0.35 max	Nb 0.05 max
	S 355 NH	0.20 max	0.50 max	0.90–1.65	0.035	0.030	0.30 max	0.50 max	0.10 max	0.35 max	V 0.12 max
	S 355 NLH	0.18 max	0.50 max	0.90–1.65	0.030	0.025	0.30 max	0.50 max	0.10 max	0.35 max	Ti 0.03 max
	S 460 NH	0.20 max	0.60 max	1.00–1.70	0.035	0.030	0.30 max	0.80 max	0.10 max	0.70 max	V 0.20 max
	S 460 NLH	0.20 max	0.60 max	1.00–1.70	0.030	0.025	0.30 max	0.80 max	0.10 max	0.70 max	Al 0.020 min
STN,ČSN	11 353	0.18 max	–	–	0.050	0.050	–	–	–	–	–
	11 453	0.24 max	–	–	0.050	0.050	–	–	–	–	–
	11 503	0.18 max	0.55 max	1.60 max	0.035	0.035	0.30 max	0.30 max	–	0.30 max	Al 0.015 min, Nb 0.015-0.08
	11 523	0.22 max	0.55 max	1.60 max	0.035	0.035	–	–	–	–	Al 0.015 min
	11 550	0.40 max	–	–	0.050	0.050	–	–	–	–	–
	11 650	0.55 max	–	–	0.050	0.050	–	–	–	–	–
	12 040	0.32–0.40	0.15–0.40	0.50–0.80	0.040	0.040	0.25 max	0.30 max	–	0.30 max	–
	12 050	0.42–0.50	0.17–0.37	0.50–0.80	0.040	0.040	0.25 max	0.30 max	–	0.30 max	–
	12 060	0.52–0.60	0.15–0.40	0.50–0.80	0.040	0.040	–	–	–	0.30 max	–
ASTM A53*	GradeA	0.25	–	0.95	0.050	0.045	0.40 max	0.40 max	0.15 max	0.40 max	V 0.08 max
	GradeB	0.30	–	1.20	0.050	0.045	0.40 max	0.40 max	0.15 max	0.40 max	V 0.08 max

Standards	Steel Grade	C	Si	Mn	Pmax	Smax	Cr	Ni	Mo	Cu	Other
ASTM A519	MT 1010	0.05–0.15	–	0.30–0.60	0.040	0.050	–	–	–	–	–
	MT 1015	0.10–0.20	–	0.30–0.60	0.040	0.050	–	–	–	–	–
	MTX 1015	0.10–0.20	–	0.60–0.90	0.040	0.050	–	–	–	–	–
	MT 1020	0.15–0.25	–	0.30–0.60	0.040	0.050	–	–	–	–	–
	MTX 1020	0.15–0.25	–	0.70–1.00	0.040	0.050	–	–	–	–	–
	1008	0.10 max	–	0.30–0.50	0.040	0.050	–	–	–	–	–
	1010	0.08–0.13	–	0.30–0.60	0.040	0.050	–	–	–	–	–
	1012	0.10–0.15	–	0.30–0.60	0.040	0.050	–	–	–	–	–
	1015	0.13–0.18	–	0.30–0.60	0.040	0.050	–	–	–	–	–
	1016	0.13–0.18	–	0.60–0.90	0.040	0.050	–	–	–	–	–
	1017	0.15–0.20	–	0.30–0.60	0.040	0.050	–	–	–	–	–
	1018	0.15–0.20	–	0.60–0.90	0.040	0.050	–	–	–	–	–
	1019	0.15–0.20	–	0.70–1.00	0.040	0.050	–	–	–	–	–
	1020	0.18–0.23	–	0.30–0.60	0.040	0.050	–	–	–	–	–
	1021	0.18–0.23	–	0.60–0.90	0.040	0.050	–	–	–	–	–
	1022	0.18–0.23	–	0.70–1.00	0.040	0.050	–	–	–	–	–
	1025	0.22–0.28	–	0.30–0.60	0.040	0.050	–	–	–	–	–
	1026	0.22–0.28	–	0.60–0.90	0.040	0.050	–	–	–	–	–
	1030	0.28–0.34	–	0.60–0.90	0.040	0.050	–	–	–	–	–
	1035	0.32–0.37	–	0.60–0.90	0.040	0.050	–	–	–	–	–
	1040	0.37–0.44	–	0.60–0.90	0.040	0.050	–	–	–	–	–
	1045	0.43–0.50	–	0.60–0.90	0.040	0.050	–	–	–	–	–
	1050	0.48–0.55	–	0.60–0.90	0.040	0.050	–	–	–	–	–
	1518	0.15–0.21	–	1.10–1.40	0.040	0.050	–	–	–	–	–
	1524	0.19–0.25	–	1.35–1.65	0.040	0.050	–	–	–	–	–
	1541	0.36–0.44	–	1.35–1.65	0.040	0.050	–	–	–	–	–
DIN 1629	St 37.0	0.17 max	–	–	0.040	0.040	–	–	–	–	–
	St 44.0	0.21 max	–	–	0.040	0.040	–	–	–	–	–
	St 52.0	0.22 max	–	–	0.040	0.035	–	–	–	–	Al 0.020 min
DIN 1630	St 37.4	0.17 max	0.35 max	0.35 min	0.040	0.040	–	–	–	–	Al 0.020 min
	St 44.4	0.20 max	0.35 max	0.40 min	0.040	0.040	–	–	–	–	Al 0.020 min
	St 52.4	0.22 max	0.55 max	1.60 max	0.040	0.035	–	–	–	–	Al 0.020 min
DIN 17204	C22	0.17–0.24	0.40 max	0.30–0.60	0.045	0.045	–	–	–	–	–
	Ck22	0.17–0.24	0.40 max	0.30–0.60	0.035	0.035	–	–	–	–	–
	Cm22	0.17–0.24	0.40 max	0.30–0.60	0.035	0.035	–	–	–	–	–
	C35	0.32–0.39	0.40 max	0.50–0.80	0.045	0.045	–	–	–	–	–
	Ck35	0.32–0.39	0.40 max	0.50–0.80	0.035	0.035	–	–	–	–	–
	Cm35	0.32–0.39	0.40 max	0.50–0.80	0.035	0.035	–	–	–	–	–

Standards	Steel Grade	C	Si	Mn	Pmax	Smax	Cr	Ni	Mo	Cu	Other
DIN 17204	C45	0.42–0.50	0.40 max	0.50–0.80	0.045	0.045	–	–	–	–	–
	Ck45	0.42–0.50	0.40 max	0.50–0.80	0.035	0.035	–	–	–	–	–
	Cm45	0.42–0.50	0.40 max	0.50–0.80	0.035	0.035	–	–	–	–	–
	C55	0.52–0.60	0.40 max	0.60–0.90	0.045	0.045	–	–	–	–	–
	Ck55	0.52–0.60	0.40 max	0.60–0.90	0.035	0.035	–	–	–	–	–
	Cm55	0.52–0.60	0.40 max	0.60–0.90	0.035	0.035	–	–	–	–	–
DIN 17210	C10	0.07–0.13	0.40 max	0.30–0.60	0.045	0.045	–	–	–	–	–
	Ck10	0.07–0.13	0.40 max	0.30–0.60	0.035	0.035	–	–	–	–	–
	C15	0.12–0.18	0.40 max	0.30–0.60	0.045	0.045	–	–	–	–	–
	Ck15	0.12–0.18	0.40 max	0.30–0.60	0.035	0.035	–	–	–	–	–
	Cm15	0.12–0.18	0.40 max	0.30–0.60	0.035	0.035	–	–	–	–	–
	16MnCr5	0.14–0.19	0.40 max	1.00–1.30	0.035	0.035	0.80–1.10	–	–	–	–
BS 6323/3	HFS 3	0.20 max	0.35 max	0.90 max	0.050	0.050	–	–	–	–	–
	HFS 4	0.25 max	0.35 max	1.20 max	0.050	0.050	–	–	–	–	–
	HFS 5	0.23 max	0.50 max	1.50 max	0.050	0.050	–	–	–	–	–
	HFS 8	0.40–0.55	0.35 max	0.50–0.90	0.050	0.050	–	–	–	–	–
UNI 663	Fe 35-1	0.18 max	–	–	0.045	0.045	–	–	–	–	–
	Fe 45-1	0.22 max	–	–	0.045	0.045	–	–	–	–	–
	Fe 55-1	0.36 max	–	–	0.045	0.045	–	–	–	–	–
	Fe 35-2	0.17 max	0.10–0.35	0.40 min	0.035	0.035	–	–	–	–	–
	Fe 45-2	0.22 max	0.10–0.35	0.50 min	0.035	0.035	–	–	–	–	–
	Fe 55-2	0.36 max	0.10–0.35	0.50 min	0.035	0.035	–	–	–	–	–
UNI 7729	Fe 360	0.17 max	0.36 max	0.40 – 0.80	0.045	0.045	–	–	–	–	–
	Fe 510	0.20 max	0.50 max	1.50 min	0.040	0.040	–	–	–	–	–
	Fe 540	0.32-0.38	0.15 - 0.40	0.50 – 0.80	0.035	0.035	–	–	–	–	–
NFA 49-311	TU 37-b	0.20 max	0.40 max	0.85 max	0.045	0.045	–	–	–	–	–
	TU 52-b	0.22 max	0.55 max	1.60 max	0.045	0.045	–	–	–	–	–
	TU XC35	0.30–0.40	0.10–0.45	0.40–0.90	0.040	0.040	–	–	–	–	–
NFA 49-312	S470M	0.15–0.22	0.50 max	1.00–1.70	0.030	0.040	–	–	–	0.30 max	V 0.08–0.15
	S450MG2	0.15–0.22	0.50 max	1.00–1.70	0.030	0.040	–	–	–	0.30 max	V 0.08–0.15
EN 10083-2	C22E	0.17–0.24	0.40 max	0.40–0.70	0.035	0.035	0.40 max	0.40 max	0.10 max	–	–
	C22R	0.17–0.24	0.40 max	0.40–0.70	0.035	0.040	0.40 max	0.40 max	0.10 max	–	–
	C25E	0.22–0.29	0.40 max	0.40–0.70	0.035	0.035	0.40 max	0.40 max	0.10 max	–	–
	C25R	0.22–0.29	0.40 max	0.40–0.70	0.035	0.040	0.40 max	0.40 max	0.10 max	–	–
	C30E	0.27–0.34	0.40 max	0.50–0.80	0.035	0.035	0.40 max	0.40 max	0.10 max	–	–
	C30R	0.27–0.34	0.40 max	0.50–0.80	0.035	0.040	0.40 max	0.40 max	0.10 max	–	–
	C35E	0.32–0.39	0.40 max	0.50–0.80	0.035	0.035	0.40 max	0.40 max	0.10 max	–	–
	C35R	0.32–0.39	0.40 max	0.50–0.80	0.035	0.040	0.40 max	0.40 max	0.10 max	–	–

Standards	Steel Grade	C	Si	Mn	Pmax	Smax	Cr	Ni	Mo	Cu	Other
EN 10083-2	C40E	0.37–0.44	0.40 max	0.50–0.80	0.035	0.035	0.40 max	0.40 max	0.10 max	–	–
	C40R	0.37–0.44	0.40 max	0.50–0.80	0.035	0.040	0.40 max	0.40 max	0.10 max	–	–
	C45E	0.42–0.50	0.40 max	0.50–0.80	0.035	0.035	0.40 max	0.40 max	0.10 max	–	–
	C45R	0.42–0.50	0.40 max	0.50–0.80	0.035	0.040	0.40 max	0.40 max	0.10 max	–	–
	C50E	0.47–0.55	0.40 max	0.60–0.90	0.035	0.035	0.40 max	0.40 max	0.10 max	–	–
	C50R	0.47–0.55	0.40 max	0.60–0.90	0.035	0.040	0.40 max	0.40 max	0.10 max	–	–
	C55E	0.52–0.60	0.40 max	0.60–0.90	0.035	0.035	0.40 max	0.40 max	0.10 max	–	–
	C55R	0.52–0.60	0.40 max	0.60–0.90	0.035	0.040	0.40 max	0.40 max	0.10 max	–	–
	28Mn6	0.25- 0.32	0.40 max	1.30–1.65	0.030	0.035	0.40 max	0.40 max	0.10 max	–	–
	C22	0.17–0.24	0.40 max	0.40–0.70	0.045	0.045	0.40 max	0.40 max	0.10 max	–	–
	C25	0.22–0.29	0.40 max	0.40–0.70	0.045	0.045	0.40 max	0.40 max	0.10 max	–	–
	C30	0.27–0.34	0.40 max	0.50–0.80	0.045	0.045	0.40 max	0.40 max	0.10 max	–	–
	C35	0.32–0.39	0.40 max	0.50–0.80	0.045	0.045	0.40 max	0.40 max	0.10 max	–	–
	C40	0.37–0.44	0.40 max	0.50–0.80	0.045	0.045	0.40 max	0.40 max	0.10 max	–	–
	C45	0.42–0.50	0.40 max	0.50–0.80	0.045	0.045	0.40 max	0.40 max	0.10 max	–	–
	C50	0.47–0.55	0.40 max	0.60–0.90	0.045	0.045	0.40 max	0.40 max	0.10 max	–	–
	C55	0.52–0.60	0.40 max	0.60–0.90	0.045	0.045	0.40 max	0.40 max	0.10 max	–	–
EN 10084	C10E	0.07–0.13	0.40 max	0.30–0.60	0.035	0.035	–	–	–	–	–
	C10R	0.07–0.13	0.40 max	0.30–0.60	0.035	0.040	–	–	–	–	–
	C15E	0.12–0.18	0.40 max	0.30–0.60	0.035	0.035	–	–	–	–	–
	C15R	0.12–0.18	0.40 max	0.30–0.60	0.035	0.040	–	–	–	–	–
	C16E	0.12–0.18	0.40 max	0.60–0.90	0.035	0.035	–	–	–	–	–
	C16R	0.12–0.18	0.40 max	0.60–0.90	0.035	0.040	–	–	–	–	–
	16MnCr5	0.14–0.19	0.40 max	1.00–1.30	0.035	0.035	0.80–1.10	–	–	–	–
EN 102941	E355+AR	0.22 max	0.50 max	1.50 max	0.045	0.050	0.30 max	0.40 max	0.08 max	0.30 max	V 0.10 max
	E355+N	0.22 max	0.50 max	1.50 max	0.045	0.050	0.30 max	0.40 max	0.08 max	0.30 max	V 0.10 max
	20MnV6+AR	0.16–0.22	0.10–0.50	1.30–1.70	0.045	0.050	0.30 max	0.40 max	0.08 max	0.30 max	V 0.08–0.15
	20MnV6+N	0.16–0.22	0.10–0.50	1.30–1.70	0.045	0.050	0.30 max	0.40 max	0.08 max	0.30 max	V 0.08–0.15
	E235	0.17 max	0.35 max	1.20 max	0.030	0.035	–	–	–	–	–
	E275	0.21 max	0.35 max	1.40 max	0.030	0.035	–	–	–	–	–
	E315	0.21 max	0.30 max	1.50 max	0.030	0.035	–	–	–	–	–
	E355	0.22 max	0.55 max	1.60 max	0.030	0.035	–	–	–	–	–
	E275K2	0.20 max	0.40 max	0.50–1.40	0.030	0.030	0.30 max	0.30	0.10 max	0.35 max	V 0.05 max Ti 0.03 max Al 0.02 min
	E355K2	0.20 max	0.50 max	0.90–1.65	0.030	0.030	0.30 max	0.50	0.10 max	0.35 max	V 0.12 max Ti 0.05 max Al 0.02 min
	C60E	0.57-0.65	0.40 max	0.60-0.90	0.035	0.035	–	–	–	–	–

Standards	Steel Grade	C	Si	Mn	Pmax	Smax	Cr	Ni	Mo	Cu	Other
EN 10297-1	38Mn6	0.34–0.42	0.15–0.30	1.40–1.65	0.035	0.035	–	–	–	–	–
	25CrMo4	0.22–0.29	0.40 max	0.60–0.90	0.035	0.035	0.90–1.20	–	0.15–0.30	–	–
	34CrMo4	0.30–0.37	0.40 max	0.60–0.90	0.035	0.035	0.90–1.20	–	0.15–0.30	–	–
	42CrMo4	0.38–0.45	0.40 max	0.60–0.90	0.035	0.035	0.90–1.20	–	0.15–0.30	–	–
	20NiCrMo2-2	0.17–0.23	0.40 max	0.65–0.95	0.035	0.035	0.35–0.70	0.40–0.70	0.15–0.25	–	–
GOST 1050	10	0.07–0.14	0.17–0.37	0.35–0.65	–	–	0.15 max	–	–	–	–
	20	0.17–0.24	0.17–0.37	0.35–0.65	–	–	0.25 max	–	–	–	–
	35	0.32–0.40	0.17–0.37	0.50–0.80	–	–	0.25 max	–	–	–	–
	45	0.42–0.50	0.17–0.37	0.50–0.80	–	–	0.25 max	–	–	–	–
GOST 19281	09G2S	0.12 max	0.50–0.80	1.30–1.70	–	–	0.30 max	0.30 max	–	0.30 max	–
JIS G3445	STKM 11A	0.12 max	0.35 max	0.60 max	0.040	0.040	–	–	–	–	–
	STKM 12A	0.20 max	0.35 max	0.60 max	0.040	0.040	–	–	–	–	–
	STKM 12B	0.20 max	0.35 max	0.60 max	0.040	0.040	–	–	–	–	–
	STKM 12C	0.20 max	0.35 max	0.60 max	0.040	0.040	–	–	–	–	–
	STKM 13A	0.25 max	0.35 max	0.30–0.90	0.040	0.040	–	–	–	–	–
	STKM 13B	0.25 max	0.35 max	0.30–0.90	0.040	0.040	–	–	–	–	–
	STKM 13C	0.25 max	0.35 max	0.30–0.90	0.040	0.040	–	–	–	–	–
	STKM 14A	0.30 max	0.35 max	0.30–1.00	0.040	0.040	–	–	–	–	–
	STKM 14B	0.30 max	0.35 max	0.30–1.00	0.040	0.040	–	–	–	–	–
	STKM 14C	0.30 max	0.35 max	0.30–1.00	0.040	0.040	–	–	–	–	–
	STKM 15A	0.25–0.35	0.35 max	0.30–1.00	0.040	0.040	–	–	–	–	–
	STKM 15C	0.25–0.35	0.35 max	0.30–1.00	0.040	0.040	–	–	–	–	–
	STKM 16A	0.35–0.45	0.40 max	0.40–1.00	0.040	0.040	–	–	–	–	–
	STKM 16C	0.35–0.45	0.40 max	0.40–1.00	0.040	0.040	–	–	–	–	–
	STKM 17A	0.45–0.55	0.40 max	0.40–1.00	0.040	0.040	–	–	–	–	–
	STKM 17C	0.45–0.55	0.40 max	0.40–1.00	0.040	0.040	–	–	–	–	–
	STKM 18A	0.18 max	0.55 max	1.50 max	0.040	0.040	–	–	–	–	–
	STKM 18B	0.18 max	0.55 max	1.50 max	0.040	0.040	–	–	–	–	–
	STKM 18C	0.18 max	0.55 max	1.50 max	0.040	0.040	–	–	–	–	–
	STKM 19A	0.25 max	0.55 max	1.50 max	0.040	0.040	–	–	–	–	–
	STKM 19C	0.25 max	0.55 max	1.50 max	0.040	0.040	–	–	–	–	–
	STKM 20A	0.25 max	0.55 max	1.60 max	0.040	0.040	–	–	–	–	V 0.15 max
PN-H 84019	10	0.07–0.14	0.15–0.40	0.35–0.65	0.040	0.040	0.30 max	0.30 max	0.10 max	0.30 max	–
	20	0.17–0.24	0.15–0.40	0.35–0.65	0.040	0.040	–	–	–	–	–
	35	0.32–0.39	0.10–0.40	0.50–0.80	0.040	0.040	–	–	–	–	–
	45	0.42–0.50	0.10–0.40	0.50–0.80	0.040	0.040	–	–	–	–	–

Structural Steel Tubes Mechanical Properties

Standards	Steel Grade	Re		Rm			A5 min %
		min MPa	min ksi	min MPa	max MPa	min ksi	
DIN 17121	RSt 37-2	235	–	340	470	–	26
	St 44-2	275	–	410	540	–	22
	St 44-3	275	–	410	540	–	22
	St 52-3	355	–	490	630	–	22
DIN 17124	StE 255	255	–	360	480	–	25
	TStE 255	255	–	360	480	–	25
	EStE 255	255	–	360	480	–	25
	StE 285	285	–	390	510	–	24
	TStE 285	285	–	390	510	–	24
	EStE 285	285	–	390	510	–	24
	StE 355	355	–	490	630	–	22
	TStE 355	355	–	490	630	–	22
	EStE 355	355	–	490	630	–	22
NFA 49-501	TUE 235	235	–	340	480	–	25
	TUE 275	275	–	410	550	–	22
EN 10210-1	S 235 JRH	235	–	340	470	–	26
	S 275 JOH	275	–	410	560	–	22
	S 275 J2H	275	–	410	560	–	22
	S 355 JOH	355	–	490	630	–	22
	S 355 J2H	355	–	490	630	–	22
	S 275 NH	275	–	370	510	–	24
	S 275 NLH	275	–	370	510	–	24
	S 355 NH	355	–	470	630	–	22
	S 355 NLH	355	–	470	630	–	22
	S 460 NH	460	–	550	720	–	17
	S 460 NLH	460	–	550	720	–	17
STN,ČSN	11 353	235	–	340	440	–	25
	11 453	265	–	441	539	–	21
	11 503	355	–	490	630	–	22
	11 523	353	–	510	628	–	23
	11 550	315	–	540	640	–	17
	11 650	365	–	640	735	–	12
	12 040	295	–	–	530	–	18
	12 050	325	–	–	590	–	17
	12 060	375	–	–	640	–	13
ASTM A53*	GradeA	205	30	330	–	48	–

Standards	Steel Grade	Re		Rm			A5 min %
		min MPa	min ksi	min MPa	max MPa	min ksi	
ASTM A53*	Grade B	240	35	415	–	60	–
ASTM A519	1020	221	32	345	–	50	25
	1025	241	35	379	–	55	25
	1035	276	40	448	–	65	20
	1045	310	45	517	–	75	15
	1050	345	50	552	–	80	10
DIN 1629	St 37.0	235	–	350	480	–	25
	St 44.0	275	–	420	550	–	21
	St 52.0	355	–	500	650	–	21
DIN 1630	St 37.4	235	–	350	480	–	25
	St 44.4	275	–	420	550	–	21
	St 52.4	355	–	500	650	–	21
DIN 17204	C22	260	–	420	550	–	21
	Ck22	260	–	420	550	–	21
	Cm22	260	–	420	550	–	21
	C35	300	–	520	670	–	17
	Ck35	300	–	520	670	–	17
	Cm35	300	–	520	670	–	17
	C45	350	–	610	760	–	16
	Ck45	350	–	610	760	–	16
	Cm45	350	–	610	760	–	16
	C55	370	–	670	820	–	14
	Ck55	370	–	670	820	–	14
	Cm55	370	–	670	820	–	14
BS 6323/3	HFS 3	215	–	360	–	–	24
	HFS 4	235	–	410	–	–	22
	HFS 5	340	–	490	–	–	20
	HFS 8	340	–	540	–	–	18
UNI 663	Fe 35-1	240	–	350	450	–	25
	Fe 45-1	260	–	450	550	–	21
	Fe 55-1	340	–	550	650	–	17
	Fe 35-2	240	–	350	450	–	28
	Fe 45-2	260	–	450	550	–	23
	Fe 55-2	340	–	550	650	–	18
UNI 7729	Fe 360	215	–	360	480	–	24
	Fe 510	355	–	510	660	–	20
	Fe 540	275	–	540	660	–	20

Standards	Steel Grade	Re		Rm			A5 min %
		min MPa	min ksi	min MPa	max MPa	min ksi	
NFA 49-311	TU 37-b	220	–	360	–	–	20
	TU 52-b	345	–	510	–	–	17
	TU XC35	320	–	540	–	–	16
NFA 49-312	S470M	470	–	620	–	–	18
	S450MG2	450	–	550	720	–	22
EN 10083-2	C22E	240	–	430	–	–	24
	C22R	240	–	430	–	–	24
	C25E	260	–	470	–	–	22
	C25R	260	–	470	–	–	22
	C30E	280	–	510	–	–	20
EN 10083-2	C30R	280	–	510	–	–	20
	C35E	300	–	550	–	–	18
	C35R	300	–	550	–	–	18
	C40E	320	–	580	–	–	16
	C40R	320	–	580	–	–	16
	C45E	340	–	620	–	–	14
	C45R	340	–	620	–	–	14
	C50E	355	–	650	–	–	12
	C50R	355	–	650	–	–	12
	C55E	370	–	680	–	–	11
	C55R	370	–	680	–	–	11
	C22	240	–	430	–	–	24
	C25	260	–	470	–	–	22
	C30	280	–	510	–	–	20
	C35	300	–	550	–	–	18
	C40	320	–	580	–	–	16
	C45	340	–	620	–	–	14
	C50	355	–	650	–	–	12
	C55	370	–	680	–	–	11
EN 102941	E355+AR	355	–	490	–	–	18
	E355+N	355	–	490	–	–	20
	20MnV6+AR	470	–	650	–	–	17
	20MnV6+N	420	–	600	–	–	19
EN 10297-1	E235	235	–	360	–	–	25
	E275	275	–	410	–	–	22
	E315	315	–	450	–	–	21
	E355	355	–	490	–	–	20

Standards	Steel Grade	Re		Rm			A5 min %
		min MPa	min ksi	min MPa	max MPa	min ksi	
EN 10297-1	E275K2	275	–	410	–	–	22
	E355K2	355	–	490	–	–	20
	C60E	390	–	710	–	–	10
	38Mn6	400	–	670	–	–	14
GOST 1050	10	205	–	330	–	–	31
	20	245	–	410	–	–	25
	35	315	–	530	–	–	20
	45	355	–	600	–	–	16
GOST 19281	09G2S	345	–	490	–	–	21
JIS G3445	STKM 11A	–	–	290	–	–	35
	STKM 12A	175	–	340	–	–	35
	STKM 12B	275	–	390	–	–	25
	STKM 12C	355	–	470	–	–	20
	STKM 13A	215	–	370	–	–	30
	STKM 13B	305	–	440	–	–	20
	STKM 13C	380	–	510	–	–	15
	STKM 14A	245	–	410	–	–	25
	STKM 14B	355	–	500	–	–	15
	STKM 14C	410	–	550	–	–	15
	STKM 15A	275	–	470	–	–	22
	STKM 15C	430	–	580	–	–	12
	STKM 16A	325	–	510	–	–	20
	STKM 16C	460	–	620	–	–	12
	STKM 17A	345	–	550	–	–	20
	STKM 17C	480	–	650	–	–	10
	STKM 18A	275	–	440	–	–	25
	STKM 18B	315	–	490	–	–	23
	STKM 18C	380	–	510	–	–	15
	STKM 19A	315	–	490	–	–	23
	STKM 19C	410	–	550	–	–	15
	STKM 20A	390	–	540	–	–	23

Room Temperature Pressure Purpose Tubes Chemical Composition (%)

Standards	Steel Grade	C	Si	Mn	Pmax	Smax	Cr	Ni	Mo	Cu	Other
STN, ČSN	11 353	0.18 max	–	–	0.050	0.050	–	–	–	–	–
	11 453	0.24 max	–	–	0.050	0.050	–	–	–	–	–
	11 503	0.18 max	0.55 max	1.60 max	0.035	0.035	0.30 max	0.30 max	–	0.30 max	Al 0.015min, Nb 0.015-0.08
	11 523	0.22 max	0.55 max	1.60 max	0.035	0.035	–	–	–	–	Al 0.015 min
ASTM A 53	Grade A	0.25	0.95	–	0.050	0.045	–	–	–	–	–
	Grade B	0.30	1.20	–	0.050	0.045	–	–	–	–	–
DIN 1629	St 37.0	0.17 max	–	–	0.040	0.040	–	–	–	–	–
	St 44.0	0.21 max	–	–	0.040	0.040	–	–	–	–	–
	St 52.0	0.22 max	–	–	0.040	0.035	–	–	–	–	Al 0.020 min
DIN 1630	St 37.4	0.17 max	0.35 max	0.35 min	0.040	0.040	–	–	–	–	Al 0.020 min
	St 44.4	0.20 max	0.35 max	0.40 min	0.040	0.040	–	–	–	–	Al 0.020 min
	St 52.4	0.22 max	0.55 max	1.60 min	0.040	0.035	–	–	–	–	Al 0.020 min
BS 3601	360	0.17 max	0.35 max	0.40–0.80	0.040	0.040	–	–	–	–	Al 0.06 max
	430	0.21 max	0.35 max	0.40–1.20	0.040	0.040	–	–	–	–	Al 0.06 max
NFA 49-112	TU E 220A	0.20 max	0.40 max	0.85 max	0.045	0.045	–	–	–	–	–
	TU E 235A	0.24 max	0.40 max	1.05 max	0.045	0.045	–	–	–	–	–
EN 10216-1	P 195 TR1	0.13 max	0.35 max	0.70 max	0.025	0.020	0.30 max	0.30 max	0.08 max	0.30 max	V 0.02 max Ti 0.04 max
	P 195 TR2	0.13 max	0.35 max	0.70 max	0.030	0.025	0.30 max	0.30 max	0.08 max	0.30 max	V 0.02 max Ti 0.04 max Al 0.02 max
	P 235 TR1	0.16 max	0.35 max	1.20 max	0.025	0.020	0.30 max	0.30 max	0.08 max	0.30 max	V 0.02 max Ti 0.04 max
	P 235 TR2	0.16 max	0.35 max	1.20 max	0.030	0.025	0.30 max	0.30 max	0.08 max	0.30 max	V 0.02 max Ti 0.04 max Al 0.02 max
	P 265 TR1	0.20 max	0.40 max	1.40 max	0.025	0.020	0.30 max	0.30 max	0.08 max	0.30 max	V 0.02 max Ti 0.04 max
	P 265 TR2	0.20 max	0.40 max	1.40 max	0.025	0.020	0.30 max	0.30 max	0.08 max	0.30 max	V 0.02 max Ti 0.04 max Al 0.02 max
GOST 1050	10	0.07–0.14	0.17–0.37	0.35–0.65	–	–	0.15 max	–	–	–	–
	20	0.17–0.24	0.17–0.37	0.35–0.65	–	–	0.25 max	–	–	–	–
	35	0.32–0.40	0.17–0.37	0.50–0.80	–	–	0.25 max	–	–	–	–
	45	0.42–0.50	0.17–0.37	0.50–0.80	–	–	0.25 max	–	–	–	–
JIS G3454	STPG 370	0.25 max	0.35 max	0.30–0.90	0.040	0.040	–	–	–	–	–
	STPG 410	0.30 max	0.35 max	0.30–1.00	0.040	0.040	–	–	–	–	–
JIS G3455	STS 370	0.25 max	0.10–0.35	0.30–1.10	0.035	0.035	–	–	–	–	–
	STS 410	0.30 max	0.10–0.35	0.30–1.40	0.035	0.035	–	–	–	–	–
	STS 480	0.33 max	0.10–0.35	0.30–1.50	0.035	0.035	–	–	–	–	–

Standards	Steel Grade	C	Si	Mn	Pmax	Smax	Cr	Ni	Mo	Cu	Other
PN-H 84023/07	R35	0.07–0.16	0.12–0.35	0.40–0.75	0.040	0.040	0.30 max	0.30 max	0.10 max	0.30 max	–
	R45	0.16–0.22	0.12–0.35	0.60–1.2	0.040	0.040	0.30 max	0.30 max	0.10 max	0.30 max	–
	R55	0.32–0.40	0.20–0.35	0.60–0.85	0.045	0.045	0.30 max	0.30 max	0.10 max	0.30 max	–

Room Temperature Pressure Purpose Tubes Mechanical Properties

Standards	Steel Grade	Re		Rm			A5 min %
		min MPa	min ksi	min MPa	max MPa	min ksi	
STN, ČSN	11 353	235	–	340	440	–	25
	11 453	265	–	441	539	–	21
	11 503	355	–	490	630	–	22
	11 523	353	–	510	628	–	23
ASTM A 53	Grade A	205	30	330	–	48	–
	Grade B	240	35	415	–	60	–
DIN 1629	St 37.0	235	–	350	480	–	25
	St 44.0	275	–	420	550	–	21
	St 52.0	355	–	500	650	–	21
DIN 1630	St 37.4	235	–	350	480	–	25
	St 44.4	275	–	420	550	–	21
	St 52.4	355	–	500	650	–	21
BS 3601	360	235	–	360	500	–	25
	430	275	–	430	570	–	22
NFA 49-112	TU E 220A	220	–	360	500	–	23
	TU E 235A	235	–	410	550	–	21
EN 10216-1	P 195 TR1	195	–	320	440	–	27
	P 195 TR2	195	–	320	440	–	27
	P 235 TR1	235	–	360	500	–	25
	P 235 TR2	235	–	360	500	–	25
	P 265 TR1	265	–	410	570	–	21
	P 265 TR2	265	–	410	570	–	21
GOST 1050	10	205	–	330	–	–	31
	20	245	–	410	–	–	25
	35	315	–	530	–	–	20
	45	355	–	600	–	–	16
JIS G3454	STPG 370	215	–	370	–	–	30
	STPG 410	245	–	410	–	–	25
JIS G3455	STS 370	215	–	370	–	–	30
	STS 410	245	–	410	–	–	25
	STS 480	275	–	480	–	–	25

Standards	Steel Grade	Re		Rm			A5 min %
		min MPa	min ksi	min MPa	max MPa	min ksi	
PN-H 84023/07	R35	215	–	360	–	–	24
	R45	255	–	430	–	–	22
	R55	295	–	540	–	–	17

Boiler Tubes Chemical Composition (%)

Standards	Steel Grade	C	Si	Mn	Pmax	Smax	Cr	Ni	Mo	Cu	Other
STN, ČSN	11 368	0.15 max	0.35 max	0.40 min	0.040	0.040	0.30 max	0.30 max	–	0.30 max	–
	11 418	0.20 max	0.35 max	0.50 max	0.040	0.040	0.30 max	0.30 max	–	0.30 max	–
	12 021	0.07–0.15	0.17–0.35	0.35–0.60	0.040	0.040	0.25 max	0.25 max	–	0.25 max	–
	12 022	0.15–0.22	0.17–0.37	0.50–0.80	0.040	0.040	0.25 max	0.25 max	–	0.25 max	–
	12 025	0.14–0.20	0.17–0.37	0.60–1.00	0.040	0.040	0.25 max	0.25 max	–	0.25 max	V 0.05–0.09
	15 020	0.12–0.20	0.15–0.37	0.50–0.80	0.040	0.040	–	–	0.25–0.35	–	Al 0.015 min
	15 121	0.10–0.18	0.15–0.35	0.40–0.70	0.040	0.040	0.70–1.30	–	0.40–0.60	–	–
	15 128	0.10–0.18	0.15–0.40	0.45–0.70	0.040	0.040	0.50–0.75	–	0.40–0.60	–	V 0.22–0.35
	15 313	0.08–0.15	0.15–0.40	0.40–0.80	0.035	0.035	2.00–2.50	–	0.90–1.10	–	–
BS 3059/1	320	0.16 max	0.10–0.35	0.30–0.70	0.040	0.040	–	–	–	–	–
BS 3059/2	360	0.17 max	0.10–0.35	0.40–0.80	0.035	0.035	–	–	–	–	–
	440	0.12–0.18	0.10–0.35	0.90–1.20	0.035	0.035	–	–	–	–	–
	243	0.12–0.20	0.10–0.35	0.40–0.80	0.035	0.035	–	–	0.25–0.35	–	Al 0.012 max
	620-460	0.10–0.15	0.10–0.35	0.40–0.70	0.035	0.035	0.70–1.10	–	0.45–0.65	–	Al 0.020 max
ASTM A 106 A 556 (Grade A2)	Grade A	0.25	0.10 min	0.27–0.93	0.035	0.035	–	–	–	–	–
	Grade B	0.30	0.10 min	0.29–1.06	0.035	0.035	–	–	–	–	–
	Grade C	0.35	0.10 min	0.29–1.06	0.035	0.035	–	–	–	–	–
ASTM A 192	–	0.06–0.18	0.25 max	0.27–0.63	0.035	0.035	–	–	–	–	137HB/77HRB
ASTM A 209	Grade T1	0.10–0.20	0.10–0.50	0.30–0.80	0.025	0.025	–	–	0.44–0.65	–	–
	Grade T1a	0.15–0.25	0.10–0.50	0.30–0.80	0.025	0.025	–	–	0.44–0.65	–	–
	Grade T1b	0.14 max	0.10–0.50	0.30–0.80	0.025	0.025	–	–	0.44–0.65	–	–
ASTM A 210	Grade A-1	0.27 max	0.10 min	0.93 max	0.035	0.035	–	–	–	–	–
	Grade C	0.35 max	0.10 min	0.29–1.06	0.035	0.035	–	–	–	–	–
ASTM A 213 A 335 (Grade P)	Grade T11	0.05–0.15	0.50–1.00	0.30–0.60	0.025	0.025	1.00–1.50	0.40 max	0.44–0.65	–	–
	Grade T12	0.05–0.15	0.50 max	0.30–0.61	0.025	0.025	0.80–1.25	–	0.44–0.65	–	–
	Grade T22	0.05–0.15	0.50 max	0.30–0.60	0.025	0.025	1.90–2.60	–	0.87–1.13	–	–
	Grade T24	0.05–0.10	0.15–0.45	0.30–0.70	0.020	0.010	2.20–2.60	–	0.90–1.10	–	V, Ti, B
	Grade T2	0.10–0.20	0.10–0.30	0.30–0.61	0.025	0.025	0.50–0.81	–	0.44–0.65	–	–
	Grade T21	0.05–0.15	0.50 max	0.30–0.60	0.025	0.025	2.65–3.35	–	0.80–1.06	–	–

Standards	Steel Grade	C	Si	Mn	Pmax	Smax	Cr	Ni	Mo	Cu	Other
ASTM A 213 A 335 (Grade P)	Grade T5	0.15 max	0.50 max	0.30–0.60	0.025	0.025	4.00–6.00	–	0.45–0.65	–	–
	Grade T91	0.08–0.12	0.20–0.50	0.30–0.60	0.020	0.010	8.00–9.50	–	0.85–1.05	–	V, Nb
DIN 17175	St 35.8	0.17 max	0.10–0.35	0.40–0.80	0.040	0.040	–	–	–	–	–
	St 45.8	0.21 max	0.10–0.35	0.40–1.20	0.040	0.040	–	–	–	–	–
	17Mn4	0.14–0.20	0.20–0.40	0.90–1.20	0.040	0.040	0.30 max	–	–	–	–
	19Mn5	0.17–0.22	0.30–0.60	1.00–1.30	0.040	0.040	0.30 max	–	–	–	–
	15Mo3	0.12–0.20	0.10–0.35	0.40–0.80	0.035	0.035	–	–	0.25–0.35	–	–
	13CrMo44	0.10–0.18	0.10–0.35	0.40–0.70	0.035	0.035	0.70–1.10	–	0.45–0.65	–	–
	10CrMo9 10	0.08-0.15	0.50 max	0.40-0.70	0.035	0.035	2.00-2.50	–	0.90-1.20	–	–
	14MoV6 3	0.10-0.18	0.10-0.35	0.40-0.70	0.035	0.035	0.30-0.60	–	0.50-0.70	–	V 0.22-0.32
UNI 5462	C14	0.17 max	0.10–0.35	0.40 max	0.035	0.035	–	–	–	–	–
	C18	0.21 max	0.10–0.35	0.50 max	0.035	0.035	–	–	–	–	–
	16Mo5	0.12–0.20	0.15–0.35	0.50–0.80	0.035	0.035	–	–	0.45–0.65	–	–
NFA 49-211	TU E220	0.17 max	0.35 max	0.85 max	0.030	0.030	–	–	–	–	–
	TU E250	0.23 max	0.40 max	1.05 max	0.030	0.030	–	–	–	–	–
	TU E275	0.25 max	0.45 max	1.40 max	0.030	0.030	–	–	–	0.25 max	Sn 0.03 max
NFA 49-213	TU 37C	0.18 max	0.05–0.35	0.30–0.80	0.040	0.040	–	–	–	0.25 max	Sn 0.03 max
	TU 42C	0.22 max	0.07–0.40	0.40–1.05	0.040	0.040	–	–	–	0.25 max	Sn 0.03 max
	TU 48C	0.24 max	0.09–0.40	0.60–1.30	0.040	0.040	–	–	–	0.25 max	Sn 0.03 max
	TU 52C	0.22 max	0.13–0.55	0.95–1.60	0.040	0.040	–	–	–	0.25 max	Sn 0.03 max
	TU 15D3	0.10–0.22	0.10–0.40	0.40–0.90	0.040	0.040	0.40 max	0.30 max	0.21–0.39	0.25 max	Sn 0.03 max
	TU 13CD4-04	0.08–0.20	0.05–0.40	0.30–0.80	0.035	0.035	0.65–1.15	0.30 max	0.41–0.69	0.25 max	Sn 0.03 max
	TU 15CD2-05	0.08-0.20	0.05-0.40	0.40-1.00	0.035	0.035	0.30-0.75	0.30 max	0.41-0.64	0.25 max	Sn 0.03 max
EN 10216-2	P195GH	0.13 max	0.35 max	0.70 max	0.025	0.020	0.30 max	0.30 max	0.08 max	0.30 max	V 0.02 max Ti 0.04 max Al 0.020 min
	P235GH	0.16 max	0.35 max	1.20 max	0.025	0.020	0.30 max	0.30 max	0.08 max	0.30 max	V 0.02 max Ti 0.04 max Al 0.020 min
	P265GH	0.20 max	0.40 max	1.40 max	0.025	0.020	0.30 max	0.30 max	0.08 max	0.30 max	V 0.02 max Ti 0.04 max Al 0.020 min
	14MoV 6-3	0.10-0.18	0.10-0.35	0.40-0.70	0.025	0.020	0.30-0.60	–	0.50-0.70	–	V 0.22-0.32
	16Mo3	0.12–0.20	0.15–0.35	0.40–0.90	0.025	0.020	–	–	0.25–0.35	–	Al 0.040 max
	13CrMo4-5	0.10–0.17	0.15–0.35	0.40–0.70	0.025	0.020	0.70–1.15	–	0.40–0.60	–	Al 0.040 max
GOST 1050	10	0.07–0.14	0.17–0.37	0.35–0.65	–	–	0.15 max	–	–	–	–
	20	0.17–0.24	0.17–0.37	0.35–0.65	–	–	0.25 max	–	–	–	–
	35	0.32–0.40	0.17–0.37	0.50–0.80	–	–	0.25 max	–	–	–	–
	45	0.42–0.50	0.17–0.37	0.50–0.80	–	–	0.25 max	–	–	–	–

Standards	Steel Grade	C	Si	Mn	Pmax	Smax	Cr	Ni	Mo	Cu	Other
GOST 4543	10G2	0.07–0.15	0.17–0.37	1.20–1.60	–	–	–	–	–	–	–
	15ChM	0.11–0.18	0.17–0.37	0.40–0.70	–	–	0.80–1.10	–	0.40–0.65	–	–
GOST 20072	12Ch1MF	0.10–0.15	0.17–0.37	0.40–0.70	0.030	0.025	0.90–1.20	0.30 max	0.25–0.35	–	V 0.15–0.30
JIS G3456	STPT370	0.25 max	0.10–0.35	0.30–0.90	0.035	0.035	–	–	–	–	–
	STPT410	0.30 max	0.10–0.35	0.30–1.00	0.035	0.035	–	–	–	–	–
	STPT480	0.33 max	0.10–0.35	0.30–1.00	0.035	0.035	–	–	–	–	–
JIS G3458	STPA12	0.10–0.20	0.10–0.50	0.30–0.80	0.035	0.035	–	0.45–0.65	–	–	–
	STPA22	0.15 max	0.50 max	0.30–0.60	0.035	0.035	0.80–1.25	0.45–0.65	–	–	–
JIS G3461	STB340	0.18 max	0.35 max	0.30–0.60	0.035	0.035	–	–	–	–	–
	STB410	0.32 max	0.35 max	0.30–0.80	0.035	0.035	–	–	–	–	–
	STB510	0.25 max	0.35 max	1.00–1.50	0.035	0.035	–	–	–	–	–
JIS G3462	STBA12	0.10–0.20	0.10–0.50	0.30–0.80	0.035	0.035	–	0.45–0.65	–	–	–
	STBA22	0.15 max	0.50 max	0.30–0.60	0.035	0.035	0.80–1.25	0.45–0.65	–	–	–
PN-H 84024	K10	0.17 max	0.10–0.35	0.40 min	0.045	0.045	0.20 max	0.35 max	–	0.25 max	–
	K18	0.16–0.22	0.10–0.35	0.60 min	0.045	0.045	0.20 max	0.35 max	–	0.25 max	–
	16M	0.12–0.20	0.15–0.35	0.50–0.80	0.040	0.040	0.30 max	0.35 max	0.25–0.35	0.25 max	Al 0.020 max
	15HM	0.11–0.18	0.15–0.35	0.40–0.70	0.040	0.040	0.70–1.10	0.35 max	0.40–0.55	0.25 max	Al 0.020 max

Boiler Tubes Mechanical Properties

Standards	Steel Grade	Re		Rm			A5 min %
		min MPa	min ksi	min MPa	max MPa	min ksi	
STN, ČSN	11 368	245	–	350	440	–	26
	11 418	255	–	400	490	–	24
	12 021	235	–	340	470	–	25
	12 022	255	–	410	570	–	21
	12 025	320	–	440	600	–	23
	15 020	270	–	450	600	–	22
	15 121	295	–	440	590	–	22
	15 128	365	–	490	690	–	18
	15 313	265	–	480	630	–	20
BS 3059/1	320	195	–	320	480	–	25
BS 3059/2	360	235	–	360	500	–	24
	440	245	–	440	580	–	21
	243	275	–	480	630	–	22
	620-460	180	–	460	610	–	22

Standards	Steel Grade	Re		Rm			A5 min %
		min MPa	min ksi	min MPa	max MPa	min ksi	
ASTM A 106 A 556 (Grade A2)	GradeA	205	30	330	–	48	35
	GradeB	240	35	415	–	60	30
	GradeC	275	40	485	–	70	30
ASTM A 192	–	180	26	325	–	47	35
ASTM A 209	Grade T1	205	30	380	–	55	30
	Grade T1a	195	28	365	–	53	30
	Grade T1b	220	32	415	–	60	30
ASTM A 210	Grade A-1	255	37	415	–	60	30
	Grade C	275	40	485	–	70	30
ASTM A 213 A 335 (Grade P)	Grade T11	205	30	415	–	60	30
	Grade T12	220	32	415	–	60	30
	Grade T22	205	30	415	–	60	30
	Grade T24	415	60	585	–	85	20
	Grade T2	205	30	380	–	55	30
	Grade T21	205	30	415	–	60	30
ASTM A 213 A 335 (Grade P)	Grade T5	205	30	415	–	60	30
	Grade T91	415	60	585	–	85	20
DIN 17175	St 35.8	235	–	360	480	–	25
	St 45.8	255	–	410	530	–	21
	17Mn4	270	–	460	580	–	23
	19Mn5	310	–	510	610	–	19
	15Mo3	270	–	450	600	–	22
	13CrMo44	290	–	440	590	–	22
	10CrMo9 10	280	–	450	600	–	20
	14MoV6 3	320	–	460	610	–	20
UNI 5462	C14	240	–	350	450	–	28
	C18	260	–	450	550	–	23
	16Mo5	290	–	450	550	–	22
NFA 49-211	TU E220	220	–	370	490	–	26
	TU E250	250	–	410	530	–	23
	TU E275	275	–	470	590	–	20
NFA 49-213	TU 37C	220	–	360	460	–	–
	TU 42C	235	–	410	510	–	–
	TU 48C	275	–	470	570	–	–
	TU 52C	350	–	510	630	–	–

Standards	Steel Grade	Re		Rm			A5 min %
		min MPa	min ksi	min MPa	max MPa	min ksi	
NFA 49-213	TU 15D3	265	–	430	550	–	22
	TU 13CD4-04	290	–	440	590	–	22
	TU 15CD2-05	275	–	440	570	–	22
EN 10216-2	P195GH	195	–	320	440	–	27
	P235GH	235	–	360	500	–	25
	P265GH	265	–	410	570	–	21
	14MoV 6-3	320	–	460	610	–	20
	16Mo3	280	–	450	600	–	22
	13CrMo4-5	290	–	440	590	–	22
GOST 1050	10	205	–	330	–	–	31
	20	245	–	410	–	–	25
	35	315	–	530	–	–	20
	45	355	–	600	–	–	16
GOST 4543	10G2	245	–	420	–	–	22
	15ChM	275	–	440	–	–	21
GOST 20072	12Ch1MF	235	–	410	–	–	21
JIS G3456	STPT370	215	–	370	–	–	30
	STPT410	245	–	410	–	–	25
	STPT480	275	–	480	–	–	25
JIS G3458	STPA12	205	–	380	–	–	30
	STPA22	205	–	410	–	–	30
JIS G3461	STB340	175	–	340	–	–	35
	STB410	255	–	410	–	–	25
	STB510	295	–	510	–	–	25
JIS G3462	STBA12	205	–	380	–	–	30
	STBA22	205	–	410	–	–	30
PN-H 84024	K10	235	–	340	440	–	25
	K18	255	–	440	540	–	21
	16M	285	–	440	540	–	22
	15HM	295	–	440	570	–	22

Fine Grain Steel Chemical Composition (%)

Standards	Steel Grade	C	Si	Mn	Pmax	Smax	Cr	Ni	Mo	Cu	Other
DIN 17179	StE 255	0.18 max	0.40 max	0.50-1.30	0.035	0.030	0.30 max	0.30 max	0.08 max	0.20 max	Al 0.020 min
	WStE 255	0.18 max	0.40 max	0.50-1.30	0.035	0.030	0.30 max	0.30 max	0.08 max	0.20 max	Al 0.020 min
	TStE 255	0.16 max	0.40 max	0.50-1.30	0.030	0.025	0.30 max	0.30 max	0.08 max	0.20 max	Al 0.020 min
	EStE 255	0.16 max	0.40 max	0.50-1.30	0.025	0.015	max.0,30	0.30 max	0.08 max	0.20 max	Al 0.020 min
	StE 285	0.18 max	0.40 max	0.60-1.40	0.035	0.030	0.30 max	0.30 max	0.08 max	0.20 max	Al 0.020 min
	WStE 285	0.18 max	0.40 max	0.60-1.40	0.035	0.030	0.30 max	0.30 max	0.08 max	0.20 max	Al 0.020 min
	TStE 285	0.16 max	0.40 max	0.60-1.40	0.030	0.025	0.30 max	0.30 max	0.08 max	0.20 max	Al 0.020 min
	EStE 285	0.16 max	0.40 max	0.60-1.40	0.025	0.015	0.30 max	0.30 max	0.08 max	0.20 max	Al 0.020 min
	StE 355	0.20 max	0.10-0.50	0.90-1.65	0.035	0.030	0.30 max	0.30 max	0.08 max	0.20 max	Al 0.020 min
	WStE 355	0.20 max	0.10-0.50	0.90-1.65	0.035	0.030	0.30 max	0.30 max	0.08 max	0.20 max	Al 0.020 min
	TStE 355	0.18 max	0.10-0.50	0.90-1.65	0.030	0.025	0.30 max	0.30 max	0.08 max	0.20 max	Al 0.020 min
	EStE 355	0.18 max	0.10-0.50	0.90-1.65	0.025	0.015	0.30 max	0.30 max	0.08 max	0.20 max	Al 0.020 min
EN 10216-3	P275NL1	0.16 max	0.40 max	0.50-1.50	0.025	0.020	0.30 max	0.50 max	0.08 max	0.30 max	V 0.05 max Ti 0.04 max Al 0.020 min
	P275NL2	0.16 max	0.40 max	0.50-1.50	0.025	0.015	0.30 max	0.50 max	0.08 max	0.30 max	Ti 0.04 max V 0.05 max Al 0.020 min
	P355N	0.20 max	0.50 max	0.90-1.70	0.025	0.020	0.30 max	0.50 max	0.08 max	0.30 max	V 0.10 max Ti 0.04 max Al 0.020 min
	P355NH	0.20 max	0.50 max	0.90-1.70	0.025	0.020	0.30 max	0.50 max	0.08 max	0.30 max	V 0.10 max Ti 0.04 max Al 0.020 min
	P355NL1	0.18 max	0.50 max	0.90-1.70	0.025	0.015	0.30 max	0.50 max	0.08 max	0.30 max	V 0.10 max Ti 0.04 max Al 0.020 min
	P355NL2	0.18 max	0.50 max	0.90-1.70	0.025	0.020	0.30 max	0.50 max	0.08 max	0.30 max	V 0.10 max Ti 0.04 max Al 0.020 min
	P460N	0.20 max	0.60 max	1.00-1.70	0.025	0.020	0.30 max	0.80 max	0.10 max	0.70 max	V 0.20 max Ti 0.04 max Al 0.020 min
	P460NH	0.20 max	0.60 max	1.00-1.70	0.025	0.020	0.30 max	0.80 max	0.10 max	0.70 max	V 0.20 max Ti 0.04 max Al 0.020 min
	P460NL1	0.20 max	0.60 max	1.00-1.70	0.025	0.020	0.30 max	0.80 max	0.10 max	0.70 max	V 0.20 max Ti 0.04 max Al 0.020 min
	P460NL2	0.20 max	0.60 max	1.00-1.70	0.025	0.015	0.30 max	0.80 max	0.10 max	0.70 max	V 0.20 max Ti 0.04 max Al 0.020 min

Fine Grain Steel Mechanical Properties

Standards	Steel Grade	Re		Rm			A5 min %
		min MPa	min ksi	min MPa	max MPa	min ksi	
DIN 17179	StE 255	255	–	360	480	–	25
	WStE 255	255	–	360	480	–	25
	TStE 255	255	–	360	480	–	25
	EStE 255	255	–	360	480	–	25
	StE 285	285	–	390	510	–	24
	WStE 285	285	–	390	510	–	24
	TStE 285	285	–	390	510	–	24
	EStE 285	285	–	390	510	–	24
	StE 355	355	–	490	630	–	22
	WStE 355	355	–	490	630	–	22
	TStE 355	355	–	490	630	–	22
	EStE 355	355	–	490	630	–	22
EN 10216-3	P275NL1	275	–	390	530	–	24
	P275NL2	275	–	390	530	–	24
	P355N	355	–	490	650	–	22
	P355NH	355	–	490	650	–	22
	P355NL1	355	–	490	650	–	22
	P355NL2	355	–	490	650	–	22
	P460N	460	–	560	730	–	19
	P460NH	460	–	560	730	–	19
	P460NL1	460	–	560	730	–	19
	P460NL2	460	–	560	730	–	19

Pressure Tubes for Low Temperature Chemical Composition (%)

Standards	Steel Grade	C	Si	Mn	Pmax	Smax	Cr	Ni	Mo	Cu	Other
STN, ČSN	11 369	0.14 max	0.35 max	0.80 max	0.040	0.040	0.30 max	0.30 max	–	0.30 max	Al 0.020 min
	11 419	0.20 max	0.35 max	0.80 max	0.040	0.040	0.30 max	0.30 max	–	0.30 max	Al 0.020 min
	11 448	0.20 max	0.40 max	1.30 max	0.035	0.035	0.30 max	0.20 max	–	0.30 max	–
	11 449	0.15 max	0.40 max	1.50 max	0.035	0.035	0.30 max	0.20 max	–	0.30 max	Al 0.020 min
	11 503	0.18 max	0.55 max	1.60 max	0.035	0.035	0.30 max	0.30 max	–	0.30 max	Al 0.015 min
ASTM A 333	Grade 1	0.30 max	–	0.40-1.06	0.025	0.025	–	–	–	–	–
	Grade 3	0.19 max	0.18-0.37	0.31-0.64	0.025	0.025	–	3.18-3.82	–	–	–
	Grade 6	0.30 max	0.10 min	0.29-1.06	0.025	0.025	–	–	–	–	–
ASTM A 334	Grade 1	0.30 max	–	0.40-1.06	0.025	0.025	–	–	–	–	–
	Grade 3	0.19 max	0.18-0.37	0.31-0.64	0.025	0.025	–	3.18-3.82	–	–	–
	Grade 6	0.30 max	0.10 min	0.29-1.06	0.025	0.025	–	–	–	–	–
	Grade 7	0.19 max	0.13-0.32	0.90 max	0.025	0.025	–	2.03-2.57	–	–	–
ASTM A 524		0.21 max	0.10-0.40	0.90-1.35	0.035	0.035	–	–	–	–	–
DIN 17173	TT St 35N	0.17 max	0.35 max	0.40 min	0.030	0.025	–	–	–	–	Al 0.020 min
	10Ni14	0.15 max	0.35 max	0.30-0.80	0.025	0.020	–	3.25-3.75	–	–	V 0.05 max
BS 3603	430LT	0.20 max	0.35 max	0.60-1.20	0.035	0.035	–	–	–	–	Al 0.020 min
	503LT	0.15 max	0.15-0.35	0.30-0.80	0.025	0.020	–	3.25-3.75	–	–	Al 0.020 min
NFA 49-215	TU 42BT	0.22 max	0.40 max	1.15 max	0.040	0.040	–	–	–	–	–
	TU 10N9	0.17 max	0.35 max	1.00 max	0.035	0.035	–	2.00-2.60	–	–	–
	TU 10N14	0.17 max	0.40 max	0.75 max	0.035	0.035	–	3.20-3.80	–	–	–
EN 10216-4	P 215 NL	0.15 max	0.35 max	0.40-1.20	0.030	0.020	0.30 max	0.30 max	0.08 max	0.30 max	V 0.02 max Ti 0.03 max Al 0.020 min
	P 265 NL	0.20 max	0.40 max	0.60-1.40	0.030	0.020	0.30 max	0.30 max	0.08 max	0.30 max	V 0.02 max Ti 0.03 max Al 0.020 min
	12Ni14	0.15 max	0.15-0.35	0.30-0.80	0.025	0.010	–	3.25-3.75	–	0.30 max	V 0.05 max
UNI 5949	C 15	0.15 max	0.15-0.35	1.00 max	0.035	0.035	–	–	–	–	–
	C 20	0.20 max	0.15-0.35	1.00 max	0.035	0.035	–	–	–	–	–

Pressure Tubes for Low Temperature Mechanical Properties

Standards	Steel Grade	Re		Rm			A5 min %
		min MPa	min ksi	min MPa	max MPa	min ksi	
STN, ČSN	11 369	226	–	353	441	–	–
	11 419	255	–	400	490	–	–
	11 448	275	–	430	580	–	22
	11 449	295	–	430	530	–	22
	11 503	355	–	490	630	–	22
ASTM A 333	Grade 1	205	30	380	–	55	35
	Grade 3	240	35	450	–	65	30
	Grade 6	240	35	415	–	60	30
ASTM A 334	Grade 1	205	30	380	–	55	35
	Grade 3	240	35	450	–	65	30
	Grade 6	240	35	415	–	60	30
	Grade 7	240	35	450	–	65	30
ASTM A 524	–	240	35	414	586	60	30
DIN 17173	TT St 35N	225	–	340	460	–	25
	10Ni14	335	–	470	640	–	20
BS 3603	430LT	275	–	430	570	–	22
	503LT	245	–	440	590	–	16
NFA 49-215	TU 42BT	235	–	410	510	–	23
	TU 10N9	245	–	450	–	–	20
	TU 10N14	245	–	450	–	–	20
EN 10216-4	P 215 NL	215	–	360	480	–	25
	P 265 NL	265	–	410	570	–	24
	12Ni14	345	–	440	620	–	20
UNI 5949	C 15	220	–	350	500	–	28
	C 20	250	–	450	600	–	24

Heat-Exchanger Tubes Chemical Composition (%)

Standards	Steel Grade	C	Si	Mn	Pmax	Smax	Cr	Ni	Mo	Cu	Other
STN, ČSN	11 368	0.15 max	0.35 max	0.40 min	0.040	0.040	0.30 max	0.30 max	–	0.30 max	–
	11 418	0.20 max	0.35 max	0.50 max	0.040	0.040	0.30 max	0.30 max	–	0.30 max	–
	12 021	0.07–0.15	0.17–0.35	0.35–0.60	0.040	0.040	0.25 max	0.25 max	–	0.25 max	–
	12 022	0.15–0.22	0.17–0.37	0.50–0.80	0.040	0.040	0.25 max	0.25 max	–	0.25 max	–
	12 025	0.14–0.20	0.17–0.37	0.60–1.00	0.040	0.040	0.25 max	0.25 max	–	0.25 max	V 0.05–0.09
	15 020	0.12–0.20	0.15–0.37	0.50–0.80	0.040	0.040	–	–	0.25–0.35	–	Al 0.015 min
	15 121	0.10–0.18	0.15–0.35	0.40–0.70	0.040	0.040	0.70–1.30	–	0.40–0.60	–	–
	15 128	0.10–0.18	0.15–0.40	0.45–0.70	0.040	0.040	0.50–0.75	–	0.40–0.60	–	V 0.22–0.35
ASTM A 161	Grade C	0.10–0.20	0.25 max	0.30–0.80	0.035	0.035	–	–	–	–	–
	Grade T-1	0.10–0.20	0.10–0.50	0.30–0.80	0.025	0.025	–	–	0.44–0.65	–	–
ASTM A 179	–	0.06–0.18	–	0.27–0.63	0.035	0.035	–	–	–	–	72HRB max
ASTM A 199	Grade T4	0.05–0.15	0.50–1.00	0.30–0.60	0.025	0.025	2.15–2.85	0.40 max	0.44–0.65	–	V 0.18–0.25 0.04 max
	Grade T11	0.05–0.15	0.50–1.00	0.30–0.60	0.025	0.025	1.00–1.50	–	0.44–0.65	–	–
ASTM A 335	Grade P12	0.05–0.15	0.50 max	0.30–0.61	0.025	0.025	0.80–1.25	–	0.44–0.65	–	–
DIN 1629	St 37.0	0.17 max	–	–	0.040	0.040	–	–	0,25–0,35	–	–
DIN 17175	St 35.8	0.17 max	0.10–0.35	0.40–0.80	0.040	0.040	–	–	–	–	–
	15Mo3	0.12–0.20	0.10–0.35	0.40–0.80	0.035	0.035	–	–	–	–	–
BS 3606	320	0.16 max	–	0.30–0.70	0.050	0.050	–	–	–	–	–
	440	0.12–0.18	0.10–0.35	0.90–1.20	0.040	0.035	–	–	–	–	–
	243	0.12–0.20	0.10–0.35	0.40–0.80	0.040	0.040	–	–	0.25–0.35	–	Al 0.12 max
	620	0.10–0.15	0.10–0.35	0.40–0.70	0.040	0.040	0.70–1.10	–	0.45–0.65	–	Al 0.20 max
UNI 5462	16Mo5	0.12–0.20	0.15–0.35	0.50–0.80	0.035	0.035	–	–	0.45–0.65	–	–
NFA 49-215	TU 37c	0.18 max	0.05–0.27	0.30–0.80	0.045	0.045	–	–	–	0.25 max	Sn 0.03
	TU 42c	0.22 max	0.07–0.40	0.40–1.05	0.045	0.045	–	–	–	0.25 max	Sn 0.03
	TU 48c	0.24 max	0.09–0.40	0.60–1.30	0.045	0.045	–	–	–	0.25 max	Sn 0.03
	TU 15D3	0.10–0.22	0.10–0.40	0.40–0.90	0.040	0.040	0.40 max	0.30 max	0.21–0.39	0.25 max	Sn 0.03
	TU 13CD4-04	0.08–0.20	0.05–0.40	0.30–0.80	0.035	0.035	0.65–1.15	0.30 max	0.61–0.69	0.25 max	Sn 0.03
EN 10216-2	P 235 GH	0.16 max	0.35 max	1.20 max	0.025	0.020	0.30 max	0.30 max	0.08 max	0.30 max	V 0.02 max Ti 0.04 max Al 0.020 min
	16Mo3	0.12-0.20	0.15-0.35	0.40-0.80	0.030	0.025	–	–	0.25-0.35	–	Al 0.040 max
GOST 1050	10	0.07–0.14	0.17–0.37	0.35–0.65	–	–	0.15 max	–	–	–	–
	20	0.17–0.24	0.17–0.37	0.35–0.65	–	–	0.25 max	–	–	–	–
GOST 4543	10G2	0.07–0.15	0.17–0.37	1.20–1.60	–	–	–	–	–	–	–

Standards	Steel Grade	C	Si	Mn	Pmax	Smax	Cr	Ni	Mo	Cu	Other
JIS G3461	STB 340	0.18 max	0.35 max	0.30–0.60	0.035	0.035	–	–	–	–	–
	STB 10	0.32 max	0.35 max	0.30–0.80	0.035	0.035	–	–	–	–	–
	STB 510	0.25 max	0.35 max	1.00–1.50	0.035	0.035	–	–	–	–	–
JIS G3462	STBA 12	0.10–0.20	0.10–0.50	0.30–0.80	0.035	0.035	–	–	0.45–0.65	–	–
	STBA 22	0.15 max	0.50 max	0.30–0.60	0.035	0.035	0.80–1.25	–	0.45–0.65	–	–

Heat-Exchanger Tubes Mechanical Properties

Standards	Steel Grade	Re		Rm			A5 min %
		min MPa	min ksi	min MPa	max MPa	min ksi	
STN, ČSN	11 368	245	–	350	440	–	26
	11 418	255	–	400	490	–	24
	12 021	235	–	340	470	–	25
	12 022	255	–	410	570	–	21
	12 025	320	–	440	600	–	23
	15 020	270	–	450	600	–	22
	15 121	295	–	440	590	–	22
	15 128	365	–	490	690	–	18
ASTM A 161	Grade C	179	26	324	–	47	35
	Grade T-1	207	30	379	–	55	30
ASTM A 179	–	180	26	325	–	47	35
ASTM A 199	Grade T4	170	25	415	–	60	30
	Grade T11	170	25	415	–	60	30
ASTM A 335	Grade P12	220	32	415	–	60	30
DIN 1629	St 37.0	235	–	350	480	–	25
DIN 17175	St 35.8	235	–	360	480	–	25
	15Mo3	270	–	450	600	–	22
BS 3606	320	195	–	–	–	–	21
	440	265	–	440	–	–	21
	243	250	–	450	–	–	22
	620	180	–	460	–	–	22
UNI 5462	16Mo5	290	–	450	550	–	22
NFA 49-215	TU 37c	220	–	360	450	–	–
	TU 42c	235	–	410	510	–	–
	TU 48c	275	–	470	570	–	–

Standards	Steel Grade	Re		Rm			A5 min %
		min MPa	min ksi	min MPa	max MPa	min ksi	
NFA 49-215	TU 15D3	265	–	430	530	–	22
	TU 13CD4-04	290	–	440	590	–	22
EN 10216-2	P 235 GH	235	–	360	500	–	25
	16Mo3	280	–	450	600	–	22
GOST 1050	10	205	–	330	–	–	31
	20	245	–	410	–	–	25
GOST 4543	10G2	245	–	420	–	–	22
JIS G3461	STB 340	175	–	340	–	–	35
	STB 10	255	–	410	–	–	25
	STB 510	295	–	510	–	–	25
JIS G3462	STBA 12	205	–	380	–	–	30
	STBA 22	205	–	410	–	–	30

Line Pipe Chemical Composition (%)

Standards	Steel Grade	C	Si	Mn	Pmax	Smax	Cr	Ni	Mo	Cu	Other
API5L	Grade A	0.22 max	–	0.90 max	0.030	0.030	–	–	–	–	–
	Grade B	0.27 max	–	1.15 max	0.030	0.030	–	–	–	–	–
	Grade X42	0.29 max	–	1.25 max	0.030	0.030	–	–	–	–	–
	Gr. X46, X52	0.31 max	–	1.35 max	0.030	0.030	–	–	–	–	–
DIN 1629	St 37.0	0.17 max	–	–	0.040	0.040	–	–	–	–	–
DIN 17172	StE 210.7	0.17 max	0.45 max	0.35 min	0.040	0.035	–	–	–	–	–
	StE 240.7	0.17 max	0.45 max	0.40 min	0.040	0.035	–	–	–	–	–
	StE 290.7	0.22 max	0.45 max	0.50–1.10	0.040	0.035	–	–	–	–	–
	StE 320.7	0.22 max	0.45 max	0.70–1.30	0.040	0.035	–	–	–	–	–
	StE 360.7	0.22 max	0.55 max	0.90–1.50	0.040	0.035	–	–	–	–	–
UNI 7088	Fe 35-1	0.18 max	–	–	0.045	0.045	–	–	–	–	–
	Fe 45-1	0.22 max	–	–	0.045	0.045	–	–	–	–	–
UNI 7287	Fe 320	–	–	–	0.060	0.060	–	–	–	–	–
EN 10208-1	L 210 GA	0.21 max	0.40 max	0.90 max	0.030	0.030	–	–	–	–	Al 0.015 – 0.060
	L 235 GA	0.16 max	0.40 max	1.20 max	0.030	0.030	–	–	–	–	Al 0.015 – 0.060
	L 245 GA	0.20 max	0.40 max	1.15 max	0.030	0.030	–	–	–	–	Al 0.015 – 0.060
	L 290 GA	0.20 max	0.40 max	1.40 max	0.030	0.030	–	–	–	–	Al 0.015 – 0.060
	L 360 GA	0.22 max	0.55 max	1.45 max	0.030	0.030	–	–	–	–	Al 0.015 – 0.060
EN 10208-2	L 245 NB	0.16 max	0.40 max	1.10 max	0.025	0.020	–	–	–	–	–
	L 290 NB	0.17 max	0.40 max	1.20 max	0.025	0.020	–	–	–	–	V/ Ti 0.05/ 0.04 max
	L 360 NB	0.20 max	0.45 max	1.60 max	0.025	0.020	–	–	–	–	V/ Ti 0.10/ 0.04 max
	L 415 NB	0.21 max	0.45 max	1.60 max	0.025	0.020	–	–	–	–	V/ Ti 0.15/ 0.04 max

Line Pipe Mechanical Properties

Standards	Steel Grade	Re		Rm			A5 min %
		min MPa	min ksi	min MPa	max MPa	min ksi	
API5L	Grade A	207	30	331	–	48	–
	Grade B	241	35	413	–	60	–
	Grade X42	289	42	413	–	60	–

Standards	Steel Grade	Re		Rm			A5 min %
		min MPa	min ksi	min MPa	max MPa	min ksi	
API5L	Gr. X46, X52	317	46	434	–	63	–
DIN 1629	St 37.0	235	–	350	480	–	25
DIN 17172	StE 210.7	210	–	320	440	–	26
	StE 240.7	240	–	370	490	–	24
	StE 290.7	290	–	420	540	–	23
	StE 320.7	320	–	460	580	–	21
	StE 360.7	360	–	510	630	–	20
UNI 7088	Fe 35-1	240	–	350	450	–	25
	Fe 45-1	260	–	450	550	–	21
UNI 7287	Fe 320	320	–	530	–	–	15
EN 10208-1	L 210 GA	210	–	335	475	–	25
	L 235 GA	235	–	370	510	–	23
	L 245 GA	245	–	415	555	–	22
	L 290 GA	290	–	415	555	–	21
	L 360 GA	360	–	460	620	–	20
EN 10208-2	L 245 NB	245–440	–	415	–	–	22
	L 290 NB	290–440	–	415	–	–	21
	L 360 NB	360–510	–	460	–	–	20
	L 415 NB	415–565	–	520	–	–	18

Precision Cold Drawn Seamless Tubes Chemical Composition (%)

Standards	Steel Grade	C	Si	Mn	Pmax	Smax	Cr	Ni	Mo	Cu	Other
STN,ČSN	11 353	0.18 max	–	–	0.050	0.050	–	–	–	–	–
	11 453	0.24 max	–	–	0.050	0.050	–	–	–	–	–
	11 503	0.18 max	0.40 max	1.40 max	0.035	0.035	0.30 max	0.30 max	–	0.30 max	Nb 0.015-0.08
	11 523	0.20 max	0.55 max	1.60 max	0.050	0.045	–	–	–	–	Al 0.015 min
	11 550	0.40 max	–	–	0.050	0.050	–	–	–	–	–
	11 650	0.55 max	–	–	0.050	0.050	–	–	–	–	–
	12 040	0.32–0.40	0.15–0.40	0.50–0.80	0.040	0.040	0.25 max	0.30 max	–	0.30 max	–
	12 050	0.42–0.50	0.17–0.37	0.50–0.80	0.040	0.040	0.25 max	0.30 max	–	0.30 max	–
	12 060	0.52–0.60	0.15–0.40	0.50–0.80	0.040	0.040	0.25 max	0.30 max	–	0.30 max	–
ASTM A 53	Grade A	0.25	–	0.95	0.050	0.045	–	–	–	–	–
	Grade B	0.30	–	1.20	0.050	0.045	–	–	–	–	–
ASTM A 519	MT 1010	0.05–0.15	–	0.30–0.60	0.040	0.050	–	–	–	–	–
	MT 1015	0.10–0.20	–	0.30–0.60	0.040	0.050	–	–	–	–	–
	MT X 1015	0.10–0.20	–	0.60–0.90	0.040	0.050	–	–	–	–	–
	MT 1020	0.15–0.25	–	0.30–0.60	0.040	0.050	–	–	–	–	–
	MT X 1020	0.15–0.25	–	0.70–1.00	0.040	0.050	–	–	–	–	–
	1008	0.10 max	–	0.30–0.50	0.040	0.050	–	–	–	–	–
	1010	0.08–0.13	–	0.30–0.60	0.040	0.050	–	–	–	–	–
	1012	0.10–0.15	–	0.30–0.60	0.040	0.050	–	–	–	–	–
	1015	0.13–0.18	–	0.30–0.60	0.040	0.050	–	–	–	–	–
	1016	0.13–0.18	–	0.60–0.90	0.040	0.050	–	–	–	–	–
	1017	0.15–0.20	–	0.30–0.60	0.040	0.050	–	–	–	–	–
	1018	0.15–0.20	–	0.60–0.90	0.040	0.050	–	–	–	–	–
	1019	0.15–0.20	–	0.70–1.00	0.040	0.050	–	–	–	–	–
	1020	0.18–0.23	–	0.30–0.60	0.040	0.050	–	–	–	–	–
	1021	0.18–0.23	–	0.60–0.90	0.040	0.050	–	–	–	–	–
	1022	0.18–0.23	–	0.70–1.00	0.040	0.050	–	–	–	–	–
	1025	0.22–0.28	–	0.30–0.60	0.040	0.050	–	–	–	–	–
	1026	0.22–0.28	–	0.60–0.90	0.040	0.050	–	–	–	–	–
	1030	0.28–0.34	–	0.60–0.90	0.040	0.050	–	–	–	–	–
	1035	0.32–0.38	–	0.60–0.90	0.040	0.050	–	–	–	–	–
	1040	0.38–0.44	–	0.60–0.90	0.040	0.050	–	–	–	–	–
	1045	0.43–0.50	–	0.60–0.90	0.040	0.050	–	–	–	–	–
	1050	0.48–0.55	–	0.60–0.90	0.040	0.050	–	–	–	–	–
	1518	0.15–0.21	–	1.10–1.40	0.040	0.050	–	–	–	–	–
	1524	0.19–0.25	–	1.35–1.65	0.040	0.050	–	–	–	–	–
	1541	0.36–0.44	–	1.35–1.65	0.040	0.050	–	–	–	–	–

Standards	Steel Grade	C	Si	Mn	Pmax	Smax	Cr	Ni	Mo	Cu	Other
DIN 1629	St 37.0	0.17 max	–	–	0.040	0.040	–	–	–	–	–
	St 44.0	0.21 max	–	–	0.040	0.040	–	–	–	–	–
	St 52.0	0.22 max	0.55 max	1.60 max	0.040	0.035	–	–	–	–	Al 0.020 min
DIN 1630	St 37.4	0.17 max	0.35 max	0.35 min	0.040	0.040	–	–	–	–	Al 0.020 min
	St 44.4	0.20 max	0.35 max	0.40 min	0.040	0.040	–	–	–	–	Al 0.020 min
	St 52.4	0.22 max	0.55 max	1.60 max	0.040	0.035	–	–	–	–	Al 0.020 min
DIN 2391-2	St 35	0.17 max	0.35 max	0.40 min	0.025	0.025	–	–	–	–	–
	St 45	0.21 max	0.35 max	0.40 min	0.025	0.025	–	–	–	–	–
	St 52	0.22 max	0.35 max	1.60 max	0.025	0.025	–	–	–	–	–
DIN 17204	C22	0.17–0.24	0.40 max	0.30–0.60	0.045	0.045	–	–	–	–	–
	Ck22	0.17–0.24	0.40 max	0.30–0.60	0.035	0.035	–	–	–	–	–
	Cm22	0.17–0.24	0.40 max	0.30–0.60	0.035	0.035	–	–	–	–	–
	C35	0.32–0.39	0.40 max	0.50–0.80	0.045	0.045	–	–	–	–	–
	Ck35	0.32–0.39	0.40 max	0.50–0.80	0.035	0.035	–	–	–	–	–
	Cm35	0.32–0.39	0.40 max	0.50–0.80	0.035	0.035	–	–	–	–	–
	C45	0.42–0.50	0.40 max	0.50–0.80	0.045	0.045	–	–	–	–	–
	Ck45	0.42–0.50	0.40 max	0.50–0.80	0.035	0.035	–	–	–	–	–
	Cm45	0.42–0.50	0.40 max	0.50–0.80	0.035	0.035	–	–	–	–	–
	34CrMo4	0.30–0.37	0.40 max	0.60–0.90	0.035	0.035	0.90–1.20	–	0.15–0.30	–	–
DIN 17210	C15	0.12–0.18	0.40 max	0.30–0.60	0.045	0.045	–	–	–	–	–
	Ck15	0.12–0.18	0.40 max	0.30–0.60	0.035	0.035	–	–	–	–	–
	Cm15	0.12–0.18	0.40 max	0.30–0.60	0.035	0.035	–	–	–	–	–
	16MnCr5	0.14–0.19	0.40 max	1.00–1.30	0.035	0.035	0.80–1.10	–	–	–	–
BS 6323	CFS 3	0.20 max	0.35 max	0.60–1.00	0.050	0.050	–	–	–	–	–
	CFS 4	0.25 max	0.35 max	1.20 max	0.050	0.050	–	–	–	–	–
	CFS 5	0.23 max	0.50 max	1.50 max	0.050	0.050	–	–	–	–	–
	CFS 6	0.30–0.40	0.35 max	0.50–0.90	0.050	0.050	–	–	–	–	–
	CFS 7	0.20–0.30	0.35 max	1.20–1.50	0.050	0.050	–	–	–	–	–
	CFS 8	0.40–0.55	0.35 max	0.50–0.90	0.050	0.050	–	–	–	–	–
UNI 663	Fe 35-1	0.18 max	–	–	0.045	0.045	–	–	–	–	–
	Fe 45-1	0.22 max	–	–	0.045	0.045	–	–	–	–	–
	Fe 55-1	0.36 max	–	–	0.045	0.045	–	–	–	–	–
	Fe 35-2	0.17 max	0.10–0.35	0.40 min	0.035	0.035	–	–	–	–	–
	Fe 45-2	0.22 max	0.10–0.35	0.50 min	0.035	0.035	–	–	–	–	–
	Fe 55-2	0.36 max	0.10–0.35	0.50 min	0.035	0.035	–	–	–	–	–
UNI 7945	Fe 280	0.13 max		0.60 max	0.050	0.050	–	–	–	–	–
	Fe 320	0.16 max		0.70 max	0.050	0.050	–	–	–	–	–
	Fe 360	0.17 max	0.35 max	0.80 max	0.050	0.050	–	–	–	–	–

Standards	Steel Grade	C	Si	Mn	Pmax	Smax	Cr	Ni	Mo	Cu	Other
UNI 7945	Fe 410	0.21 max	0.35 max	1.20 max	0.050	0.050	–	–	–	–	–
	Fe 490	0.23 max	0.35 max	1.50 max	0.050	0.050	–	–	–	–	–
NFA 49-310	TU 37-b	0.18 max	0.35 max	0.80 max	0.040	0.040	–	–	–	–	–
	TU 52-b	0.20 max	0.50 max	1.50 max	0.040	0.040	–	–	–	–	–
NFA 49-312	S470M	0.15–0.22	0.50 max	1.00–1.70	0.030	0.040	–	–	–	0.30 max	V 0.08–0.15
	S450MG2	0.15–0.22	0.50 max	1.00–1.70	0.030	0.040	–	–	–	0.30 max	V 0.08–0.15
EN 10216-1	P 195 TR1	0.13 max	0.35 max	0.70 max	0.030	0.025	0.30 max	0.30 max	0.30 max	0.30 max	V 0.02 max Ti 0.03 max
	P 195 TR2	0.13 max	0.35 max	0.70 max.	0.030	0.025	0.30 max	0.30 max	0.08 max	0.30 max	V 0.02 max Ti 0.03 max Al 0.02 min
	P 235 TR1	0.16 max	0.35 max	1.20 max	0.030	0.025	0.30 max	0.30 max	0.08 max	0.30 max	V 0.02 max Ti 0.03 max
	P 235 TR2	0.16 max	0.35 max	1.20 max	0.030	0.025	0.30 max	0.30 max	0.08 max	0.30 max	V 0.02 max Ti 0.03 max Al 0.02 min
	P 265 TR1	0.20 max	0.40 max	1.40 max	0.030	0.025	0.30 max	0.30 max	0.08 max	0.30 max	V 0.02 max Ti 0.03 max
	P 265 TR2	0.20 max	0.40 max	1.40 max	0.030	0.025	0.30 max	0.30 max	0.08 max	0.30 max	V 0.02 max Ti 0.03 max Al 0.02 min
EN 10216-3	P 355 N	0.20 max	0.50 max	0.90–1.70	0.030	0.025	0.30 max	0.50 max	0.08 max	0.30 max	V 0.10 max Ti 0.03 max Al 0.02 min
EN 10294-1	E235	0.18 max	0.35 max	1.20 max	0.045	0.045	–	–	–	–	–
EN 10297-1	E275	0.21 max	0.35 max	1.40 max	0.045	0.045	–	–	–	–	–
	E315	0.21 max	0.30 max	1.50 max	0.045	0.045	–	–	–	–	–
	E355	0.22 max	0.55 max	1.60 max	0.045	0.045	–	–	–	–	–
	E275K2	0.20 max	0.40 max	1.40 max	0.035	0.030	0.30 max	0.30	max.0,10	0.35 max	V 0.05 max
	E355K2	0.20 max	0.50 max	1.65 max	0.035	0.030	0.30 max	0.50	max.0,10	0.35 max	V 0.12 max
	C22	0.17–0.24	0.40 max	0.40–0.70	0.045	0.045	–	–	–	–	–
	C35	0.32–0.39	0.40 max	0.50–0.80	0.045	0.045	–	–	–	–	–
	C45	0.42–0.50	0.40 max	0.50–0.80	0.045	0.045	–	–	–	–	–
	C60	0.57–0.65	0.40 max	0.60–0.90	0.045	0.045	–	–	–	–	–
	38Mn6	0.34–0.42	0.35 max	1.40–1.65	0.035	0.035	–	–	–	–	–
	20MnV6	0.16–0.22	0.10–0.50	1.30–1.70	0.035	0.040	–	–	–	–	V 0.15 max
EN 10305-1	E 215	0.10 max	0.05 max	0.70 max	0.025	0.025	–	–	–	–	Al 0.025 min
	E 235	0.17 max	0.35 max	1.20 max	0.025	0.025	–	–	–	–	–
	E 355	0.22 max	0.55 max	1.60 max	0.025	0.025	–	–	–	–	–
	E 255	0.21 max	0.35 max	0.40-1.10	0.025	0.025	–	–	–	–	–

Standards	Steel Grade	C	Si	Mn	Pmax	Smax	Cr	Ni	Mo	Cu	Other
EN 10305-1	26Mn5	0.20–0.30	0.40 max	1.20–1.50	0.035	0.035	–	–	–	–	–
	C 35E	0.32–0.39	0.40 max	0.50–0.80	0.035	0.035	0.40 max	–	0.10 max	–	–
	C 45E	0.42–0.55	0.40 max	0.50–0.80	0.035	0.035	0.40 max	–	0.10 max	–	–
	20V1(E410)	0.16–0.22	0.10–0.50	1.30–1.70	0.030	0.035	–	–	–	–	V 0.08–0.15
	26Mo2	0.22–0.29	0.40 max	1.50 max	0.035	0.035	–	0.40 max	0.15–0.25	–	–
	25CrMo4	0.22–0.29	0.40 max	0.60–0.90	0.035	0.035	0.90–1.20	0.40 max	0.15–0,30	–	–
	42CrMo4	0.38–0.45	0.40 max	0.60–0.90	0.035	0.035	0,90–1,20	–	0.15–0.30	–	–
GOST 1050	10	0.07–0.14	0.17–0.37	0.35–0.65	–	–	0.15 max	–	–	–	–
	20	0.17–0.24	0.17–0.37	0.35–0.65	–	–	0.25 max	–	–	–	–
	35	0.32–0.40	0.17–0.37	0.50–0.80	–	–	0.25 max	–	–	–	–
	45	0.42–0.50	0.17–0.37	0.50–0.80	–	–	0.25 max	–	–	–	–
GOST 19281	09G2S	0.12 max	0.50–0.80	1.30–1.70	–	–	0.30 max	0.30 max	–	0.30 max	–
JIS G3445	STKM 11A	0.12 max	0.35 max	0.60 max	0.040	0.040	–	–	–	–	–
	STKM 12A	0.20 max	0.35 max	0.60 max	0.040	0.040	–	–	–	–	–
	STKM 12B	0.20 max	0.35 max	0.60 max	0.040	0.040	–	–	–	–	–
	STKM 12C	0.20 max	0.35 max	0.60 max	0.040	0.040	–	–	–	–	–
	STKM 13A	0.25 max	0.35 max	0.30–0.90	0.040	0.040	–	–	–	–	–
	STKM 13B	0.25 max	0.35 max	0.30–0.90	0.040	0.040	–	–	–	–	–
	STKM 13C	0.25 max	0.35 max	0.30–0.90	0.040	0.040	–	–	–	–	–
	STKM 14A	0.30 max	0.35 max	0.30–1.00	0.040	0.040	–	–	–	–	–
	STKM 14B	0.30 max	0.35 max	0.30–1.00	0.040	0.040	–	–	–	–	–
	STKM 14C	0.30 max	0.35 max	0.30–1.00	0.040	0.040	–	–	–	–	–
	STKM 15A	0.25–0.35	0.35 max	0.30–1.00	0.040	0.040	–	–	–	–	–
	STKM 15C	0.25–0.35	0.35 max	0.30–1.00	0.040	0.040	–	–	–	–	–
	STKM 16A	0.35–0.45	0.40 max	0.40–1.00	0.040	0.040	–	–	–	–	–
	STKM 16C	0.35–0.45	0.40 max	0.40–1.00	0.040	0.040	–	–	–	–	–
	STKM 17A	0.45–0.55	0.40 max	0.40–1.00	0.040	0.040	–	–	–	–	–
	STKM 17C	0.45–0.55	0.40 max	0.40–1.00	0.040	0.040	–	–	–	–	–
	STKM 18A	0.18 max	0.55 max	1.50 max	0.040	0.040	–	–	–	–	–
	STKM 18B	0.18 max	0.55 max	1.50 max	0.040	0.040	–	–	–	–	–
	STKM 18C	0.18 max	0.55 max	1.50 max	0.040	0.040	–	–	–	–	–
	STKM 19A	0.25 max	0.55 max	1.50 max	0.040	0.040	–	–	–	–	–
	STKM 19C	0.25 max	0.55 max	1.50 max	0.040	0.040	–	–	–	–	–
	STKM 20A	0.25 max	0.55 max	1.50 max	0.040	0.040	–	–	–	–	–
JIS G3454	STPG 370	0.25 max	0.35 max	0.30–0.90	0.040	0.040	–	–	–	–	–
	STPG 410	0.30 max	0.35 max	0.30–1.00	0.040	0.040	–	–	–	–	–
JIS G3455	STS 370	0.25 max	0,10–0,35	0.30–1.10	0.035	0.035	–	–	–	–	–
	STS 410	0.30 max	0.10–0.35	0.30–1.40	0.035	0.035	–	–	–	–	–

Standards	Steel Grade	C	Si	Mn	Pmax	Smax	Cr	Ni	Mo	Cu	Other
JIS G3455	STS 480	0.33 max	0.10–0.35	0.30–1.50	0.035	0.035	–	–	–	–	–
JIS G3456	STPT 370	0.25 max	0.10–0.35	0.30–0.90	0.035	0.035	–	–	–	–	–
	STPT 410	0.30 max	0.10–0.35	0.30–1.00	0.035	0.035	–	–	–	–	–
	STPT 480	0.33 max	0.10–0.35	0.30–1.00	0.035	0.035	–	–	–	–	–
PN-H 84018	18G2A	0.20 max	0.20–0.55	1.0–1.6	0.040	0.040	0.30 max	0.30 max	–	–	–
	18G2	0.22 max	0.20–0.55	1.0–1.6	0.050	0.040	–	–	–	–	–
PN-H 84019	10	0.07–0.14	0.15–0.40	0.35–0.65	0.040	0.040	0.30 max	0.30 max	0.10 max	0.30 max	–
	20	0.17–0.24	0.15–0.40	0.35–0.65	0.040	0.040	0.30 max	0.30 max	0.10 max	0.30 max	–
	35	0.32–0.39	0.10-0.40	0.50–0.80	0.040	0.040	0.30 max	0.30 max	0.10 max	0.30 max	–
	45	0.42–0.50	0.10-0.40	0.50–0.80	0.040	0.040	0.30 max	0.30 max	0.10 max	0.30 max	–
	55	0.52-0.60	0.10-0.40	0.60-0.90	0.040	0.040	0.30 max	0.30 max	0.10 max	0.30 max	0.050 max
PN-H 84023/07	R35	0.07–0.16	0.12–0.35	0.40–0.70	0.040	0.040	0.30 max	0.30 max	0.10 max	0.30 max	–
	R45	0.16–0.22	0.12–0.35	0.60–1.20	0.040	0.040	0.30 max	0.30 max	0.10 max	0.30 max	–
	R55	0.32–0.40	0.20-0.35	0.60–0.85	0.045	0.045	0.30 max	0.30 max	0.10 max	0.30 max	–
	R65	0.45-0.52	0.20-0.35	0.60-0.85	0.045	0.045	–	–	–	–	–

Precision Cold Drawn Seamless Tubes Mechanical Properties

Standards	Steel Grade	Re		Rm			A5 min %
		min MPa	min ksi	min MPa	max MPa	min ksi	
STN,ČSN	11 353	235	–	340	440	–	25
	11 453	265	–	441	539	–	21
	11 503	355	–	490	630	–	22
	11 523	353	–	510	628	–	23
	11 550	314	–	539	637	–	17
	11 650	363	–	637	735	–	12
	12 040	295	–	530	530	–	18
	12 050	325	–	590	590	–	17
	12 060	375	–	640	640	–	13
ASTM A 53	Grade A	205	30	330	–	48	–
	Grade B	240	35	415	–	60	–
ASTM A519	1020	221	32	345	–	50	25
	1025	241	35	379	–	55	25
	1035	276	40	448	–	65	20
	1045	310	45	517	–	75	15
	1050	345	50	552	–	80	10
DIN 1629	St 37.0	235	–	350	–	480	25
	St 44.0	275	–	420	–	550	21

Standards	Steel Grade	Re		Rm			A5 min %
		min MPa	min ksi	min MPa	max MPa	min ksi	
DIN 1629	St 52.0	355	–	500	–	650	21
DIN 1630	St 37.4	235	–	350	–	480	25
	St 44.4	275	–	420	–	550	21
	St 52.4	355	–	500	–	650	21
DIN 2391-2	St 35	235	–	340	–	470	25
	St 45	255	–	440	–	570	21
	St 52	355	–	490	–	630	22
DIN 17204	C22	260	–	420	–	550	21
	Ck22	260	–	420	–	550	21
	Cm22	260	–	420	–	550	21
	C35	300	–	520	–	670	17
	Ck35	300	–	520	–	670	17
	Cm35	300	–	520	–	670	17
	C45	350	–	610	–	760	16
	Ck45	350	–	610	–	760	16
	Cm45	350	–	610	–	760	16
BS 6323	CFS 3	215	–	360	–	–	24
	CFS 4	235	–	410	–	–	22
	CFS 5	340	–	490	–	–	20
	CFS 6	280	–	460	–	–	21
	CFS 7	–	–	–	–	–	–
	CFS 8	340	–	540	–	–	18
UNI 663	Fe 35-1	240	–	350	450	–	25
	Fe 45-1	260	–	450	550	–	21
	Fe 55-1	340	–	550	650	–	17
	Fe 35-2	240	–	350	450	–	28
	Fe 45-2	260	–	450	550	–	23
	Fe 55-2	340	–	550	650	–	18
UNI 7945	Fe 280	155	–	280	–	–	25
	Fe 320	195	–	320	–	–	25
	Fe 360	215	–	360	–	–	24
	Fe 410	235	–	410	–	–	22
	Fe 490	285	–	490	–	–	21
NFA 49-310	TU 37-b	240	–	360	500	–	25
	TU 52-b	350	–	510	650	–	22
NFA 49-312	S470M	470	–	620	620	–	18
	S450MG2	450	–	550	720	–	22

Standards	Steel Grade	Re		Rm			A5 min %
		min MPa	min ksi	min MPa	max MPa	min ksi	
EN 10216-1	P 195 TR1	195	–	320	440	–	27
	P 195 TR2	195	–	320	440	–	27
	P 235 TR1	235	–	360	500	–	23
	P 235 TR2	235	–	360	500	–	23
	P 265 TR1	265	–	410	570	–	22
	P 265 TR2	265	–	410	570	–	22
EN 10216-3	P 355 N	355	–	490	650	–	22
EN 10294-1	E235	235	–	360	–	–	25
EN 10297-1	E275	275	–	410	–	–	22
	E315	315	–	450	–	–	21
	E355	355	–	490	–	–	20
	E275K2	275	–	410	–	–	
	E355K2	355	–	490	–	–	20
	C22	260	–	420	–	–	21
	C35	300	–	520	–	–	17
	C45	350	–	610	–	–	16
	C60	390	–	720	–	–	13
	38Mn6	400	–	670	–	–	14
	20MnV6	420	–	600	–	–	19
EN 10305-1	E 215	215	–	290	430	–	30
	E 235	235	–	340	480	–	25
	E 355	355	–	490	630	–	22
	E 255	255	–	440	570	–	21
	C 35E	280	–	460	–	–	21
	C 45E	340	–	540	–	–	18
	20V1(E410)	410	–	550	700	–	22
GOST 1050	10	205	–	330	–	–	31
	20	245	–	410	–	–	25
	35	315	–	530	–	–	20
	45	355	–	600	–	–	16
GOST 19281	09G2S	345	–	490	–	–	21
JIS G3445	STKM 11A		–	290	–	–	35
	STKM 12A	175	–	340	–	–	35
	STKM 12B	275	–	390	–	–	25
	STKM 12C	355	–	470	–	–	20

Standards	Steel Grade	Re		Rm			A5 min %
		min MPa	min ksi	min MPa	max MPa	min ksi	
JIS G3445	STKM 13A	215	–	370	–	–	30
	STKM 13B	305	–	440	–	–	20
	STKM 13C	380	–	510	–	–	15
	STKM 14A	245	–	410	–	–	25
	STKM 14B	355	–	500	–	–	15
	STKM 14C	410	–	550	–	–	15
	STKM 15A	275	–	470	–	–	22
	STKM 15C	430	–	580	–	–	12
	STKM 16A	325	–	510	–	–	20
	STKM 16C	460	–	620	–	–	12
	STKM 17A	345	–	550	–	–	20
	STKM 17C	480	–	650	–	–	10
	STKM 18A	275	–	440	–	–	25
	STKM 18B	315	–	490	–	–	23
	STKM 18C	380	–	510	–	–	15
	STKM 19A	315	–	490	–	–	23
	STKM 19C	410	–	550	–	–	15
	STKM 20A	390	–	540	–	–	23
JIS G3454	STPG 370	215	–	370	–	–	30
	STPG 410	245	–	410	–	–	25
JIS G3455	STS 370	215	–	370	–	–	30
	STS 410	245	–	410	–	–	25
	STS 480	275	–	480	–	–	25
JIS G3456	STPT 370	215	–	370	–	–	30
	STPT 410	245	–	410	–	–	25
	STPT 480	275	–	480	–	–	25
PN-H 84018	18G2A	365	–	510	–	–	22
PN-H 84019	10	195	–	345	–	–	25
	20	225	–	440	–	–	21
	35	255	–	540	–	–	17
	45	295	–	640	–	–	14
	55	380	–	680	–	–	11
PN-H 84023/07	R35	215	–	360	–	–	24
	R45	255	–	430	–	–	22
	R55	295	–	540	–	–	17
	R65	380	–	640	–	–	16

Pressure Piping Tubes Chemical Composition (%)

Standards	Steel Grade	C	Si	Mn	Pmax	Smax	Cr	Ni	Mo	Cu	Other
STN, ČSN	11 369	0.14 max	0.35 max	0.80 max	0.040	0.040	0.30 max	0.30 max	–	0.30 max	Al min.0,020
	11 373	0.20 max	–	–	0.050	0.050	–	–	–	–	–
	11 375	0.17 max	–	–	0.045	0.045	–	–	–	–	–
	11 416	0.20 max	0.35 max	0.50 max	0.040	0.040	–	–	–	–	–
	11 425	0.22 max	–	–	0.050	0.000	–	–	–	–	–
	11 503	0.18 max	0.40 max	1.40 max	0.035	0.050	0.30 max	0.30 max	–	0.30 max	Al 0.010 min
	11 523	0.20 max	0.55 max	1.60 max	0.050	0.045	–	–	–	–	Al 0.015 min
	15 020	0.12–0.20	0.15–0.37	0.50–0.80	0.040	0.040	–	–	0.25–0.35	–	Al 0.015 min
	15 121	0.10–0.18	0.15–0.35	0.40–0.70	0.040	0.040	0.70–1.30	–	0.40–0.60	–	–
	15 128	0.10–0.18	0.15–0.40	0.40–0.70	0.040	0.040	0.50–0.75	–	0.40–0.60	–	V 0.22–0.35
API 5L	Grade A	0.22 max	–	0.90 max	0.030	0.030	–	–	–	–	–
	Grade B	0.27 max	–	1.15 max	0.030	0.030	–	–	–	–	–
	Grade X42	0.29 max	–	1.25 max	0.030	0.030	–	–	–	–	–
	Grade X46	0.31 max	–	1.35 max	0.030	0.030	–	–	–	–	–
	Grade X52	0.31 max	–	1.35 max	0.030	0.030	–	–	–	–	–
ASTM A 285	Grade A	0.17 max	–	0.90 max	0.035	0.045	–	–	–	–	–
	Grade B	0.22 max	–	0.90 max	0.035	0.045	–	–	–	–	–
	Grade C	0.28 max	–	0.90 max	0.035	0.045	–	–	–	–	–
BS 3601	Grade 430	0.25 max	0.50 max	1.20 max	0.040	0.040	–	–	–	–	–
BS 3602–2	Grade 430	0.25 max	0.10–0.35	0.61–1.40	0.030	0.030	–	–	–	–	–
	Grade 490	0.22 max	0.10–0.40	0.91–1.60	0.030	0.030	–	–	–	–	–
BS 6323–7	SAW 4	0.25 max	0.35 max	1.20 max	0.050	0.050	–	–	–	–	–
	SAW 5	0.23 max	0.50 max	1.50 max	0.050	0.050	–	–	–	–	–
GOST 20295	10	0.07–0.14	0.17–0.37	0.35–0.65	–	–	0.15 max	–	–	–	–
	20	0.17–0.24	0.17–0.37	0.35–0.65	–	–	0.25 max	–	–	–	–
	35	0.32–0.40	0.17–0.37	0.50–0.80	–	–	0.25 max	–	–	–	–
	45	0.42–0.50	0.17–0.37	0.50–0.80	–	–	0.25 max	–	–	–	–
DIN 1615	St 33	–	–	–	–	–	–	–	–	–	–
DIN 1626	St 37.0	0.17 max	–	–	0.040	0.040	–	–	–	–	–
	St 44.0	0.21 max	–	–	0.040	0.040	–	–	–	–	–
	St 52.0	0.22 max	–	–	0.040	0.035	–	–	–	–	–
DIN 1628	St 37.4	0.17 max	0.35 max	0.35 min	0.040	0.040	–	–	–	–	–
	St 44.4	0.20 max	0.35 max	0.40 min	0.040	0.040	–	–	–	–	–
	St 52.4	0.22 max	0.55 max	1.60 max	0.040	0.035	–	–	–	–	–
DIN 17120	USt 37.2	0.17 max	–	–	0.050	0.050	–	–	–	–	–
	RSt 37-2	0.17 max	–	–	0.050	0.050	–	–	–	–	–

Standards	Steel Grade	C	Si	Mn	Pmax	Smax	Cr	Ni	Mo	Cu	Other
DIN 17120	St 37-3	0.17 max	–	–	0.040	0.040	–	–	–	–	–
	St 44-2	0.21 max	–	–	0.050	0.050	–	–	–	–	–
	St 44-3	0.20 max	–	–	0.040	0.040	–	–	–	–	–
	St 52-3	0.22 max	–	–	0.040	0.040	–	–	–	–	–
DIN 17 123	StE 255	0.18 max	0.40 max	0.50–1.30	0.035	0.030	0.30 max	0.30 max	0.08 max	max.0,20	Al 0.020 min
DIN 17 178	TStE 255	0.16 max	0.40 max	0.50–1.30	0.030	0.025	0.30 max	0.30 max	0.08 max	0.20 max	Al 0.020 min
	EStE 255	0.16 max	0.40 max	0.50–1.30	0.025	0.015	0.30 max	0.30 max	0.08 max	0.20 max	Al 0.020 min
	StE 285	0.18 max	0.40 max	0.60–1.40	0.035	0.030	0.30 max	0.30 max	0.08 max	0.20 max	Al 0.020 min
	TStE 285	0.16 max	0.40 max	0.60–1.40	0.030	0.025	0.30 max	0.30 max	0.08 max	0.20 max	Al 0.020 min
	EStE 285	0.16 max	0.40 max	0.60–1.40	0.025	0.015	0.30 max	0.30 max	0.08 max	0.20 max	Al 0.020 min
	StE 355	0.20 max	0.10–0.50	0.90–1.65	0.035	0.030	0.30 max	0.30 max	0.08 max	0.20 max	Al 0.020 min
	TStE 355	0.18 max	0.10–0.50	0.90–1.65	0.030	0.025	0.30 max	0.30 max	0.08 max	0.20 max	Al 0.020 min
	EStE 355	0.18 max	0.10–0.50	0.90–1.65	0.025	0.015	0.30 max	0.30 max	0.08 max	0.20 max	Al 0.020 min
	StE 420	0.20 max	0.10–0.60	1.00–1.70	0.035	0.030	0.30 max	1.00 max	0.10 max	0.20 max	Al 0.020 min
	TStE 420	0.20 max	0.10–0.60	1.00–1.70	0.030	0.025	0.30 max	1.00 max	0.10 max	0.20 max	Al 0.020 min
	EStE 420	0.20 max	0.10–0.60	1.00–1.70	0.025	0.020	0.30 max	1.00 max	0.10 max	0.20 max	Al 0.020 min
	StE 460	0.20 max	0.10–0.60	1.00–1.70	0.035	0.030	0.30 max	1.00 max	0.10 max	0.20 max	Al 0.020 min
	TStE 460	0.20 max	0.10–0.60	1.00–1.70	0.030	0.025	0.30 max	1.00 max	0.10 max	0.20 max	Al 0.020 min
	EStE 460	0.20 max	0.10–0.60	1.00–1.70	0.025	0.030	0.30 max	1.00 max	0.10 max	0.20 max	Al 0.020 min
DIN 17155	H I.	0.16 max	0.35 max	0.40–1.20	0.035	0.035	–	–	–	–	–
	H II.	0.20 max	0.35 max	0.50–1.30	0.035	0.035	–	–	–	–	–
DIN 17172	StE 210.7	0.17 max	0.45 max	0.35 min	0.040	0.035	–	–	–	–	–
	StE 240.7	0.17 max	0.45 max	0.40 min	0.040	0.035	–	–	–	–	–
	StE 290.7	0.22 max	0.45 max	0.50–1.10	0.040	0.035	–	–	–	–	–
	StE 320.7	0.22 max	0.45 max	0.70–1.30	0.040	0.035	–	–	–	–	–
	StE 360.7	0.22 max	0.55 max	0.90–1.50	0.040	0.035	–	–	–	–	–
DIN 17174	TT St 35N	0.17 max	0.35 max	0.40 min	0.030	0.025	–	–	–	–	Al 0.020 min
EN 10025	S 355 J2G3	0.20 max	0.55 max	1.60 max	0.035	0.035	–	–	–	–	–
EN 10208-1	L 210 GA	0.21 max	0.40 max	0.90 max	0.030	0.030	–	–	–	–	–
	L 235 GA	0.16 max	0.40 max	1.20 max	0.030	0.030	–	–	–	–	–
	L 245 GA	0.20 max	0.40 max	1.15 max	0.030	0.030	–	–	–	–	–
	L 290 GA	0.20 max	0.40 max	1.40 max	0.030	0.030	–	–	–	–	–
	L 360 GA	0.22 max	0.55 max	1.45 max	0.030	0.030	–	–	–	–	–
EN 10208-2	L 245 NB	0.16 max	0.40 max	1.10 max	0.025	0.020	–	–	–	–	–
	L 290 NB	0.17 max	0.40 max	1.20 max	0.025	0.020	–	–	–	–	V 0.05 max Ti 0.04 max

Standards	Steel Grade	C	Si	Mn	Pmax	Smax	Cr	Ni	Mo	Cu	Other
EN 10208-2	L 360 NB	0.20 max	0.45 max	1.60 max	0.025	0.020	–	–	–	–	V 0.10 max Ti 0.04 max
EN 10217-1	P 195 TR1	0.13 max	0.35 max	0.70 max	0.030	0.025	0.30 max	0.30 max	0.08 max	0.30 max	Al 0.020 min pre TR2
	P 235 TR1	0.16 max	0.35 max	1.20 max	0.030	0.025	0.30 max	0.30 max	0.08 max	0.30 max	
	P 265 TR1	0.20 max	0.40 max	1.40 max	0.030	0.025	0.30 max	0.30 max	0.08 max	0.30 max	
EN 10217-3	P 275 NL1	0.16 max	0.40 max	0.50–1.50	0.030	0.020	0.30 max	0.50 max	0.08 max	0.30 max	Al 0.020 min
	P 275 NL2	0.16 max	0.40 max	0.50–1.50	0.025	0.015	0.30 max	0.50 max	0.08 max	0.30 max	Al 0.020 min
	P 355 N	0.20 max	0.50 max	0.90–1.70	0.030	0.025	0.30 max	0.50 max	0.08 max	0.30 max	Al 0.020 min
	P 355 NH	0.20 max	0.50 max	0.90–1.70	0.030	0.025	0.30 max	0.50 max	0.08 max	0.30 max	Al 0.020 min
	P 355 NL1	0.18 max	0.50 max	0.90–1.70	0.030	0.020	0.30 max	0.50 max	0.08 max	0.30 max	Al 0.020 min
	P 355 NL2	0.18 max	0.50 max	0.90–1.70	0.025	0.015	0.30 max	0.50 max	0.08 max	0.30 max	Al 0.020 min
	P 460 N	0.20 max	0.60 max	1.00–1.70	0.030	0.025	0.30 max	0.80 max	0.10 max	0.70 max	Al 0.020 min
	P 460 NH	0.20 max	0.60 max	1.00–1.70	0.030	0.025	0.30 max	0.80 max	0.10 max	0.70 max	Al 0.020 min
	P 460 NL1	0.20 max	0.60 max	1.00–1.70	0.030	0.020	0.30 max	0.80 max	0.10 max	0.70 max	Al 0.020 min
	P 460 NL2	0.20 max	0.60 max	1.00–1.70	0.025	0.015	0.30 max	0.80 max	0.10 max	0.70 max	Al 0.020 min
EN 10217-5	P 235 GH	0.16 max	0.35 max	1.20 max	0.030	0.025	0.30 max	0.30 max	0.08 max	0.30 max	Al 0.020 min
	P 265 GH	0.20 max	0.35 max	1.40 max	0.030	0.025	0.30 max	0.30 max	0.08 max	0.30 max	Al 0.020 min
	16Mo3	0.12–0.20	0.35 max	0.40–0.90	0.030	0.025	0.30 max	0.30 max	0.25–0.35	0.30 max	Al 0.040 max
EN 10217-6	P 215 NL	0.15 max	0.35 max	0.40–1.20	0.030	0.020	0.30 max	0.30 max	0.08 max	0.30 max	Al 0.020 min
	P 265 NL	0.20 max	0.40 max	0.60–1.40	0.030	0.020	0.30 max	0.30 max	0.08 max	0.30 max	Al 0.020 min
EN 10219-1	S 235 JRH	0.17 max	–	1.40 max	0.045	0.045	–	–	–	–	–
	S 275 JOH	0.20 max	–	1.50 max	0.040	0.040	–	–	–	–	–
	S 275 J2H	0.20 max	–	1.50 max	0.035	0.035	–	–	–	–	–
	S 355 JOH	0.22 max	0.55 max	1.60 max	0.040	0.040	–	–	–	–	–
	S 355 J2H	0.22 max	0.55 max	1.60 max	0.035	0.035	–	–	–	–	–
	S 275 NH	0.20 max	0.40 max	0.50–1.40	0.035	0.030	0.30 max	0.30 max	0.10 max	0.35 max	Al 0.020 min
	S 275 NLH	0.20 max	0.40 max	0.50–1.40	0.030	0.025	0.30 max	0.30 max	0.10 max	0.35 max	Al 0.020 min
	S 355 NH	0.20 max	0.50 max	0.90–1.65	0.035	0.030	0.30 max	0.50 max	0.10 max	0.35 max	Al 0.020 min
	S 355 NLH	0.18 max	0.50 max	0.90–1.65	0.030	0.025	0.30 max	0.50 max	0.10 max	0.35 max	Al 0.020 min
	S 460 NH	0.20 max	0.60 max	1.00–1.70	0.035	0.030	0.30 max	0.80 max	0.10 max	0.35 max	Al 0.020 min
	S 460 NLH	0.20 max	0.60 max	1.00–1.70	0.030	0.025	0.30 max	0.80 max	0.10 max	0.35 max	Al 0.020 min
	S 275 MH	0.13 max	0.50 max	1.50 max	0.035	0.030	–	0.30 max	0.20 max	–	Al 0.020 min
	S 275 MLH	0.13 max	0.50 max	1.50 max	0.030	0.025	–	0.30 max	0.20 max	–	Al 0.020 min
	S 355 MH	0.14 max	0.50 max	1.50 max	0.035	0.030	–	0.30 max	0.20 max	–	Al 0.020 min
	S 355 MLH	0.14 max	0.50 max	1.50 max	0.030	0.025	–	0.30 max	0.20 max	–	Al 0.020 min
	S 420 MH	0.16 max	0.50 max	1.70 max	0.035	0.030	–	0.30 max	0.20 max	–	Al 0.020 min
	S 420 MLH	0.16 max	0.50 max	1.70 max	0.030	0.025	–	0.30 max	0.20 max	–	Al 0.020 min
	S 460 MH	0.16 max	0.50 max	1.70 max	0.035	0.030	–	0.30 max	0.20 max	–	Al 0.020 min
	S 460 MLH	0.16 max	0.50 max	1.70 max	0.030	0.025	–	0.30 max	0.20 max	–	Al 0.020 min

Standards	Steel Grade	C	Si	Mn	Pmax	Smax	Cr	Ni	Mo	Cu	Other
EN 10224	L 235	0.17 max	0.35 max	0.80 max	0.045	0.045	–	–	–	–	–
	L 275	0.21 max	0.35 max	1.20 max	0.045	0.045	–	–	–	–	–
	L 355	0.22 max	1.60 max	0.35 max	0.045	0.045	–	–	–	–	–
EN 10296-1	E 155	0.10 max	0.35 max	0.60 max	0.045	0.045	–	–	–	–	–
	E 185	0.15 max	0.35 max	0.70 max	0.045	0.045	–	–	–	–	–
	E 235	0.20 max	0.35 max	1.40 max	0.045	0.045	–	–	–	–	–
	E 275	0.25 max	0.35 max	1.20 max	0.045	0.045	–	–	–	–	–
	E 355	0.25 max	0.35 max	1.40 max	0.045	0.045	–	–	–	–	–

Pressure Piping Tubes Mechanical Properties

Standards	Steel Grade	Re		Rm			A5 min %
		min MPa	min ksi	min MPa	max MPa	min ksi	
STN, ČSN	11 369	226	–	353	441	–	–
	11 373	235	–	360	470	–	24
	11 375	225	–	360	470	–	24
	11 416	245	–	400	490	–	22
	11 425	255	–	412	510	–	22
	11 503	355	–	490	630	–	22
	11 523	353	–	510	628	–	23
	15 020	270	–	450	600	–	22
	15 121	295	–	440	590	–	22
	15 128	365	–	490	690	–	18
API 5L	Grade A	207	30	331	–	48	–
	Grade B	241	35	413	–	60	–
	Grade X42	289	42	413	–	60	–
	Grade X46	317	46	434	–	63	–
	Grade X52	358	52	455	–	66	–
BS 3601	Grade 430	275	–	430	570	–	22
BS 3602–2	Grade 430	250	–	430	550	–	23
	Grade 490	325	–	490	610	–	21
BS 6323–7	SAW 4	235	–	410	–	–	22
	SAW 5	340	–	490	–	–	20
GOST 20295	10	205	–	330	–	–	24
	20	245	–	410	–	–	21
	35	315	–	530	–	–	20
	45	355	–	600	–	–	16

Standards	Steel Grade	Re		Rm			A5 min %
		min MPa	min ksi	min MPa	max MPa	min ksi	
DIN 1615	St 33	175	–	290	540	–	17
DIN 1626	St 37.0	235	–	350	480	–	25
	St 44.0	275	–	420	550	–	21
	St 52.0	355	–	500	650	–	21
DIN 1628	St 37.4	235	–	350	480	–	25
	St 44.4	275	–	420	550	–	21
	St 52.4	355	–	500	650	–	21
DIN 17120	USt 37.2	235	–	340	470	–	26
	RSt 37-2	235	–	340	470	–	26
	St 37-3	235	–	340	470	–	26
	St 44-2	275	–	410	540	–	22
	St 44-3	275	–	410	540	–	22
	St 52-3	355	–	490	630	–	22
DIN 17 123	StE 255	255	–	360	480	–	25
DIN 17 178	TStE 255	255	–	360	480	–	25
	EStE 255	255	–	360	480	–	25
	StE 285	285	–	390	510	–	24
	TStE 285	285	–	390	510	–	24
	EStE 285	285	–	390	510	–	24
	StE 355	355	–	490	630	–	22
	TStE 355	355	–	490	630	–	22
	EStE 355	355	–	490	630	–	22
	StE 420	420	–	530	680	–	21
	TStE 420	420	–	530	680	–	21
	EStE 420	420	–	530	680	–	21
	StE 460	460	–	560	730	–	19
	TStE 460	460	–	560	730	–	19
	EStE 460	460	–	560	730	–	19
DIN 17172	StE 210.7	210	–	320	440	–	26
	StE 240.7	240	–	370	490	–	24
	StE 290.7	290	–	420	540	–	23
	StE 320.7	320	–	460	580	–	21
	StE 360.7	360	–	510	630	–	20

Standards	Steel Grade	Re		Rm			A5 min %
		min MPa	min ksi	min MPa	max MPa	min ksi	
DIN 17174	TT St 35N	225	–	340	460	–	25
EN 10025	S 355 J2G3	355	–	490	630	–	–
EN 10208-1	L 210 GA	210	–	335	475	–	25
	L 235 GA	235	–	370	510	–	23
	L 245 GA	245	–	415	555	–	22
	L 290 GA	290	–	415	555	–	21
	L 360 GA	360	–	460	620	–	20
EN 10208-2	L 245 NB	245-440	–	415	–	–	22
	L 290 NB	292-440	–	415	–	–	21
	L 360 NB	360-510	–	460	–	–	20
EN 10217-1	P 195 TR1	195	–	320	440	–	27
	P 235 TR1	235	–	360	500	–	25
	P 265 TR1	265	–	410	570	–	22
EN 10217-3	P 275 NL1	275	–	390	530	–	24
	P 275 NL2	275	–	390	530	–	24
	P 355 N	355	–	490	650	–	22
	P 355 NH	355	–	490	650	–	22
	P 355 NL1	355	–	490	650	–	22
	P 355 NL2	355	–	490	650	–	22
	P 460 N	460	–	560	730	–	19
	P 460 NH	460	–	560	730	–	19
	P 460 NL1	460	–	560	730	–	19
	P 460 NL2	460	–	560	730	–	19
EN 10217-5	P 235 GH	235	–	360	500	–	25
	P 265 GH	265	–	410	570	–	23
	16Mo3	280	–	450	600	–	22
EN 10217-6	P 215 NL	215	–	360	480	–	25
	P 265 NL	265	–	410	570	–	24
EN 10219-1	S 235 JRH	235	–	340	470	–	26
	S 275 JOH	275	–	410	560	–	22
	S 275 J2H	275	–	410	560	–	22
	S 355 JOH	355	–	490	630	–	20
	S 355 J2H	355	–	490	630	–	20
	S 275 NH	275	–	370	540	–	24
	S 275 NLH	275	–	370	540	–	24
	S 355 NH	355	–	470	630	–	22

Standards	Steel Grade	Re		Rm			A5 min %
		min MPa	min ksi	min MPa	max MPa	min ksi	
EN 10219-1	S 355 NLH	355	–	470	630	–	22
	S 460 NH	460	–	550	720	–	17
	S 460 NLH	460	–	550	720	–	17
	S 275 MH	275	–	360	510	–	24
	S 275 MLH	275	–	360	510	–	24
	S 355 MH	355	–	450	610	–	22
	S 355 MLH	355	–	450	610	–	22
	S 420 MH	420	–	500	660	–	19
	S 420 MLH	420	–	500	660	–	19
	S 460 MH	460	–	530	720	–	17
	S 460 MLH	460	–	530	720	–	17
EN 10224	L 235	235	–	360	500	–	25
	L 275	275	–	430	570	–	21
	L 355	355	–	500	650	–	21
EN 10296-1	E 155	155	–	260	–	–	–
	E 185	185	–	320	–	–	–
	E 235	235	–	360	–	–	–
	E 275	275	–	410	–	–	–
	E 355	355	–	490	–	–	–

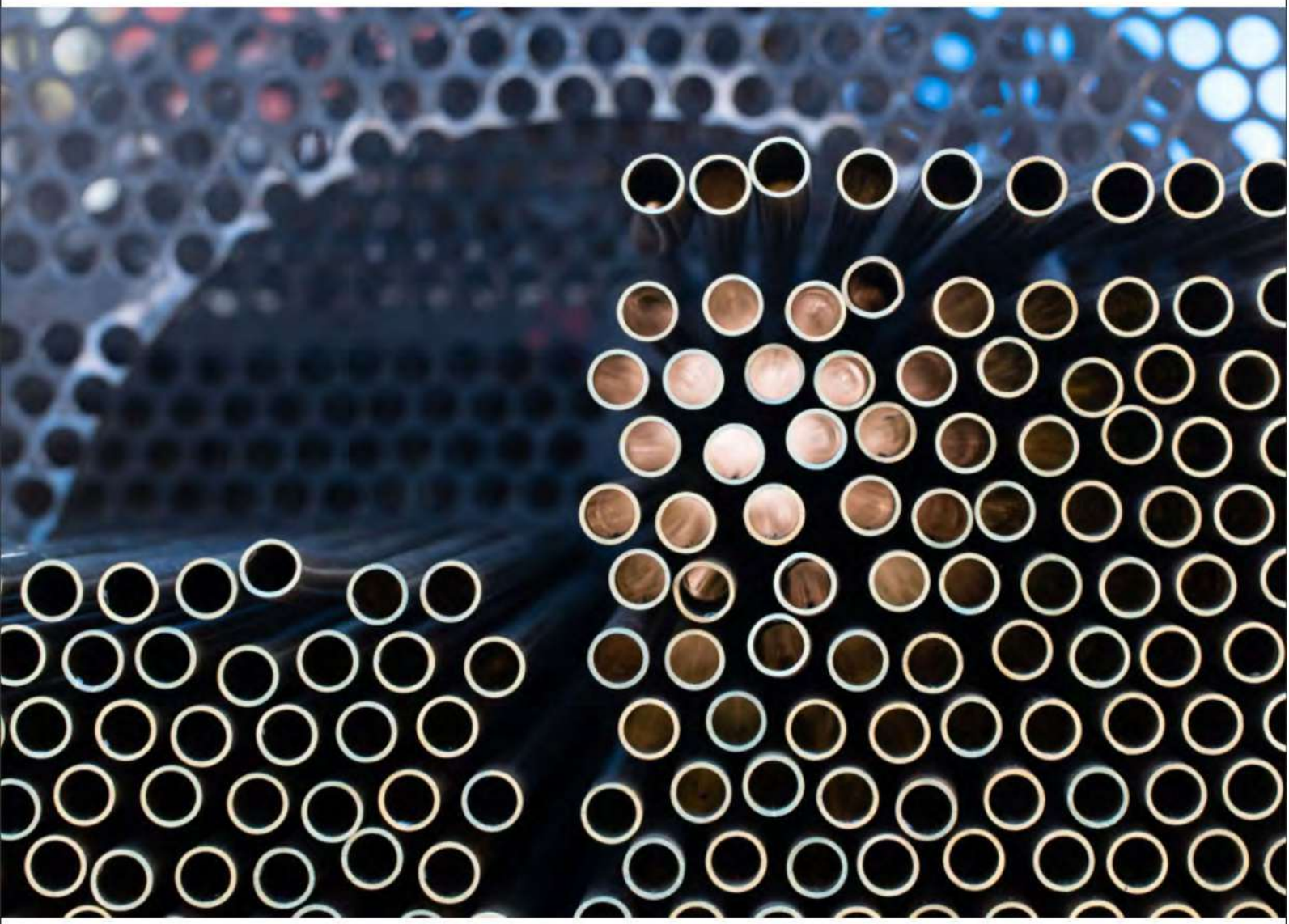
STAINLESS STEEL TUBES

CARBON STEEL TUBES

SPECIAL STEEL TUBES

ALLOY STEEL TUBES

DUPLEX STEEL TUBES



SHREE ARBUDA STEEL

"QUALITY MAKERS"

Office : Shop No. 9, Ground Floor, 91/95, Mukund Bhuvan, 3rd Kumbharwada, Dr. M.G. Mahimtura Marg, Mumbai - 400004.

Godown : Ground Floor, Shop No. 9, A-Wing, Parshuram Pupala Marg, Anjuman High School, Mumbai Central, Mumbai - 400008.

Factory : Industrial Gala No. 17, Aakash Industrial Estate, Gate No. 123, Plot No. 20, Village Padghe, Taluka Palghar, Dist. Palghar.