

MATERIAL COMPARISON TABLE

ASTM STANDARD	UNS NO.	KOREAN/JAPANESE			GERMAN			
		KS/JIS Symbol	KS/JIS Number	Remark	DIN Type	DIN Number	Material Number	Remark
A36 Structural Steel	K02600	SMS400A/SM400A	D3515/G3106	(23)	St44-2 St44-2	17100 17100	1.0044 1.0044	<1.1/2in Thick. (25)
A48 Gray Cast Iron Casings Class No. 25	F11701	GC200/FC200	D4301/G5501	-	GG20	1691	0.6020	-
A53 Welded and Seamless Steel Pipe Grade A	K02504	SPPS38/STPG370	D3562/G3454	(16)	St37.2 St35	1626 1629	1.0036 1.0308	(18)Welded (18)Seamless
Grade B	K03005	SPPS42/STPG410	D3562/G3454	(16)	St45 St42-2	1629 1626	1.0408 1.0040	(18)Seamless (18)Welded
A105 Carbon Steel forgings for Piping Components	K03504	SFVC2A/SFVC2A	D4122/G3202	(22)	19Mn5	17155	1.0482	(3b)(15)
A106 Seamless C-Steel Pipe for High Temp. Service								
Grade A	K02501	SPHT38/STPT370	D3570/G3456	(16)(30)	St35.8	17175	1.0305	-
Grade B	K03006	SPHT42/STPT410	D3570/G3456	(16)(30)	St45.8	17175	1.0405	-
A126 Gray Iron Casings for Valves, Flanges and Pipe Fittings								
Grade A	F11501	GC200/FC200	D4301/G5501	-	GG15	1691	0.6015	-
Grade B	F12102	GC250/FC250	D4301/G5501	-	GG25	1691	0.6025	-
A131 Structural Steel for Ships								
Grade A	K02300	SWS400A/SM400A	D3515/G3106	-	St44-2	17100	1.0044	-
Grade B	K02102	SWS400B/SM400B	D3515/G3106	-	R St44-2	17100	1.0044	(1)
Grade D & E	K02101	SWS400C/SM400C	D3515/G3106	(1)	St44-3	17100	1.0044	(1)
A134 Electric-Fusion(Arc)- Welded Steel Pipe		SPW400/STPY400	K3583/G3457	(19)	-	-	-	(3)
A139 Electric-Fusion(Arc)- Welded Steel Pipe								
Grade B	K03003	-	-	(3)	-	-	-	(3)
Grade C	K03004	-	-	(3)	-	-	-	(3)
A167 Stainless and Heat-Resisting Cr-Ni Steel Plate Sheet and Strip								
Grade 304	S30400	STS304/SUS304	D3705/G4304	-	X5CrNi18 9	17440	1.4301	(3b)
Grade 304L	S30403	STS304L/SUS304L	D3705/G4304	-	X2CrNi18 9	17440	1.4306	(3b)
Grade 316	S31600	STS316/SUS316	D3705/G4304	-	X5CrNiMo18 10	17440	1.4401	(3b)
Grade 316L	S31603	STS316L/SUS316L	D3705/G4304	-	X2CrNiMo18 10	17440	1.4404	(3b)
Grade 321	S32100	STS321/SUS321	D3705/G4304	-	X10CrNiTi18 9	17440	1.4541	(3b)(17)
Grade 347	S34700	STS347/SUS347	D3705/G4304	-	X10CrNiNb18 9	17440	1.4550	(3b)(17)
A176 Stainless and Heat-Resisting Cr Steel Plate Sheet and Strip								
Type 405	S40500	STS405/SUS405	D3705/G4304	-	X7CrAl 13	17440	1.4002	(3b)
Type 410	S41000	STS410/SUS410	D3705/G4304	-	X10Cr 13	17440	1.4006	(3b)
Type 410S	S41008	STS410S/SUS410S	D3705/G4304	-	X7Cr 13	17440	1.4000	(3a)
A178 C-Steel Electric-Resistance Welded Boiler Tube								
Grade A	K01200	STBH340/STB35	D3563/G3461	-	St 37.8	17177	1.0315	(7)
Grade C	K03503	STBH410/STB42	D3563/G3461	-	St 42.8	17177	1.0498	(7)

ASTM STANDARD	UNS NO.	KOREAN/JAPANESE			GERMAN			
		KS/JIS Symbol	KS/JIS Number	Remark	DIN Type	DIN Number	Material Number	Remark
A179 Seamless Cold Drawn Low-C Steel H/EX and Condenser Tubes	K01200	STBH340/STB35	D3563/G3461		St 35.4 St 35.8	1629 17175	1.0309 1.0305	Plus DIN2391 (18)
A181 C-Steel forgings for General Purpose Piping Class 60 Class 70	K03502	SFVC1/SFVC1	D4122/G3202	-	St 44-2	17100	1.0044	Per Ad-merk. W-13(18)
		SFVC2A/SFVC2A	D4122/G3202	-	C22 19 Mn 5 20 Mn 5	17200 - -	1.0402 1.0482 1.1133	WBL620(3b) WBL610(3b) WBL550(3b)
A182 Forged or Rolled Alloy Steel Pipe Flange, Fitting and Valves for High Temp. Service								
Grade F1	K12822	SFVA F1/SFVA F1	D4123/G3203	(10)	16Mo 5	-	1.5423	(3a)
Grade F5	K42544	SFVA F5B/SFVA F5B	D4123/G3203	(10)	12CrMo 19 5	-	1.7362	WBL-400&590(3b)
Grade F6a	-	-	-	(3)	X10Cr 13	17440	1.4006	(3a)
Grade F11	K11572	SFVA F11/SFVA F11	D4123/G3203	(10)	13CrMo 44	17175	1.7335	WBL-620(3b)(8)
Grade F12	K11564	SFVA F12/SFVA F12	D4123/G3203	(10)	13CrMo 44	17176	1.7335	WBL-620(3b)
Grade F22	K21590	SFVA F22B/SFVA F22B	D4123/G3203	(10)	10CrMo 9 10	17177	1.7380	WBL-610(3b)
Grade F304	S30400	STSF304/SUSF304	D4115/G3214	-	X5CrNi 18 9	17440	1.4301	(3b)
Grade F304H	S30409	STSF304H/SUSF304H	D4115/G3214	-	-	-	-	(3)
Grade F304L	S30403	STSF304L/SUSF304L	D4115/G3214	-	X2CrNi 18 9	17440	1.4306	(3b)
Grade F310	S31000	STSF310S/SUSF310S	D4115/G3214	-	-	-	-	(3)
Grade F316	S31600	STSF316/SUSF316	D4115/G3214	-	X5CrNiMo 18 10	17440	1.4401	(3b)
Grade F316H	S31609	STSF316H/SUSF316H	D4115/G3214	-	-	17440	-	(3)
Grade F316L	S31603	STSF316L/SUSF316L	D4115/G3214	-	X2CrNiMo 18 10	17440	1.4404	(3b)
Grade F321	S32100	STSF321/SUSF321	D4115/G3214	-	X10CrNiTi 18 9	17440	1.4541	(3b)
Grade F347	S34700	STSF347/SUSF347	D4115/G3214	-	X10CrNiNb 18 9	17440	1.4550	(3b)
A192 Seamless C-Steel Boiler Tubes for High Pressure Service	K01201	STBH340/STB340	D3563/G3461	(30)	St 35.8	17175	1.0305	-
A193 Alloy Steel Bolting Material for High Temp. Service								
Grade B6	S41000	STS410/SUS410	D3706/G4303	(3a)	X7Cr 13	17440	1.4000	(3a)
Grade B7	G41400	SNB7/SNB7	D3755/G4107	(3a)	42CrMo 4	17200	1.7225	(3c)
					24CrMo 5	17200	1.7258	Limit to 500°C
Grade B7M	G41400	SNB7/SNB7	D3755/G4107	(3a)(20)	42CrMo 4	17200	1.7225	(3c)(20)
Grade B8	S30400	STS304/SUS304	D3706/G4303	(3a)	X5CrNi 18 9	17440	1.4301	(3c)
Grade B8C	S34700	STS347/SUS347	D3706/G4303	(3a)	X10CrNiNb 18 9	17440	1.4550	(3c)
Grade B8M	S31600	STS316/SUS316	D3706/G4303	(3a)	X5CrNiMo 18 10	17440	1.4401	(3c)
Grade B8T	S32100	STS321/SUS321	D3706/G4303	(3a)	X10CrNiTi 18 9	17440	1.4541	(3c)
Grade B16	K14072	SNB16/SNB16	D3755/G4107	(3a)	40CrMoV 5 5	17240	1.7711	(3c)
A194 C-and Alloy Steel Nuts for Bolts for High Temp. Service								
Grade 2H	K04002	SM45C/S45C	D3752/G4051	(3a)	C 35	17240	1.4181	(3c)
Grade 4	K14510	-	-	(3)	24CrMo 5	17240	1.7258	(3c)
Grade 6	S41000	STS410/SUS410	D3706/G4303	(3c)	X7Cr 13	17440	1.4000	(3a)
Grade 6F (With sulfur)		-	-	(3)	-	-	-	(3)
Grade 8	S30400	STS304/SUS304	D3706/G4303	(3a)	X5CrNi 18 9	17440	1.4301	(3c)
Grade 8M	S31600	STS316/SUS316	D3706/G4303	(3a)	X5CrNiMo 18 10	17440	1.4401	(3c)
A199 Seamless Cold Drawn Intermediate Alloy Steel H/EX and Condenser Tubes								
T 5	K41545	STHA24/STBA25	D3572/G3462	(35)	12CrMo 19 5	-	1.7362	(3a)
T 11	K11597	STHA22/STBA23	D3572/G3462	(35)	13CrMo 44	17175	1.7335	(8)
T 22	K21590	STHA23/STBA24	D3572/G3462	(35)	10CrMo 9 10	17175	1.7380	-

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		KS/JIS Symbol	KS/JIS Number	Remark	DIN Type	DIN Number	Material Number	Remark
A200 Seamless Intermediate Alloy Steel Still Tubes for Refinery Service								
T 5	K41545	STHA24/STBA25	D3572/G3462	(32)	12CrMo 19 5	-	1.7362	(3a)
T 11	K11597	STHA22/STBA23	D3572/G3462	(32)	13CrMo 44	17175	1.7335	(8)
T 22	K21590	STHA23/STBA24	D3572/G3462	(32)	10CrMo 9 10	17175	1.7380	-
A203 Nickel Steel Boiler Plate								
Grade D	K31718	SL3N 225/SL3N 225	D3586/G3127	-	10Ni 14	-	1.5637	WBL-680(3a)
Grade E	K32018	SL3N 275/SL3N 275	D3586/G3127	-	-	-	-	(3)
A204 Mo-Steel Plates for Boiler and Other Pressure Vessels								
Grade A	K11820	SB450M/SB450M	D3560/G3103	-	16Mo 5	-	1.5423	Order with DIN 50049-3.1C(3a)
Grade B	K12020	SB480M/SB480M	D3560/G3103	-	16Mo 5	-	1.5423	Order with DIN 50049-3.1C(3a)
A209 Seamless C-Mo Steel Boiler and Superheater Tubes								
Grade T1	K11522	STHA12/STBA12	D3572/G3462	(30)(24)	16Mo 5	-	1.5423	(3a)
Grade T1a	K12023	STHA13/STBA13	D3572/G3462	(30)(24)	16Mo 5	-	1.5423	(3a)
A210 Seamless Medium-Carbon Steel Boiler and Superheater Tubes								
Grade A-1	K02707	STBH410/STB410	D3563/G3461	(30)(24)	St 45.8	17175	1.0405	-
A213 Seamless Alloy Steel Boiler and Heat Exchanger Tubes								
Grade T5	K41545	STHA24/STBA25	D3572/G3462	(30)(24)	12CrMo 19 5	-	1.7362	(3a)
Grade T11	K11597	STHA22/STBA23	D3572/G3462	(30)(24)	13CrMo 44	17175	1.7335	(8)(32)
Grade T12	K11562	STHA21/STBA22	D3572/G3462	(30)(24)	13CrMo 44	17175	1.7335	(32)
Grade T22	K21590	STHA23/STBA24	D3572/G3462	(30)(24)	10CrMo 9 10	17175	1.7380	(32)
TP304	S30400	STS304TB/SUS304TB	D3577/G3463	(30)(24)	X5CrNi 18 9	17440	1.4301	(3b)
TP304L	S31403	STS304LTB/SUS304LTB	D3577/G3463	(30)(24)	X2CrNi 18 9	17440	1.4306	(3b)
TP310	S31000	STS310STB/SUS310STB	D3577/G3463	(30)(24)	X12CrNi 25 28	-	1.4845	WBL-470(3b)
TP316	S31600	STS316TB/SUS316TB	D3577/G3463	(30)(24)	X5CrNiMo 18 10	17440	1.4401	(3b)
TP316L	S31603	STS316LTB/SUS316LTB	D3577/G3463	(30)(24)	X2CrNiMo 18 10	17440	1.4404	(3b)
TP321	S32100	STS321TB/SUS321TB	D3577/G3463	(30)(24)	X10CrNiTi 18 9	17440	1.4541	(3b)
TP347	S34700	STS347TB/SUS347TB	D3577/G3463	(30)(24)	X10CrNiNb 18 9	17440	1.4550	(3b)
A214 Electric Resistance Welded Heat Exchanger and Condenser Tubes	K01807	STBH340/STB35 STBH410/STB42 STBH510/STB52	D3563/G3461 D3563/G3461 D3563/G3461	(24) (24) (24)	St 37-2	1626	1.0036	(3b) ERW Only
A216 C-Steel Casting Suitable for Fusion Welding for High Temp. Service								
WCA	J02502	SCPH1/SCPH1	D4107/G5151	-	GS-C 25	17245	1.0619	-
WCB	J03002	SCPH2/SCPH2	D4107/G5151	-	-	-	-	(3)
A217 Alloy Steel Casting for Pressure Containing Parts Suitable for High Temp. Service								
WC 1	J12524	SCPH11/SCPH11	D4107/G5151	-	GS-22Mo 4	17245	1.5419	-
WC 6	J12072	SCPH21/SCPH21	D4107/G5151	-	GS-17CrMo 5 5	17245	1.7357	-
WC 9	J21890	-	-	(3)	-	-	-	-
C 5	J42045	SCPH61/SCPH61	D4107/G5151	-	GS-12CrMo 19 5	-	1.7363	WBL-595(3b)
C 12	J82090	-	-	(3)	G-X-12CrMo 10 1	-	1.7389	WBL-595(3b)
CA 15	J91150	-	-	(3)	-	-	-	(3)

ASTM STANDARD	UNS NO.	KOREAN/JAPANESE			GERMAN			
		KS/JIS Symbol	KS/JIS Number	Remark	DIN Type	DIN Number	Material Number	Remark
A234 Wrought C-and Alloy Piping Fitting for Moderate and Elevated Temp.								
Grade WPB	K03006	SPHT42/STPT42	D3750/G3456	(3b)	St 45.8	17175	1.0405	-
Grade WPC	K03501	SPHT49/STPT49	D3750/G3456	(3b)	-	-	-	(3)
Grade WP1	K12821	SPA10/STPA12	D3753/G3458	(3b)	16Mo 5	-	1.5423	(3a)
Grade WP5	K41545	SPA24/STPA25	D3753/G3458	(3b)	12CrMo 19 5	-	1.7362	(3a)
Grade WP11		SPA22/STPA23	D3753/G3458	(3b)	13CrMo 44	17175	1.7335	(8)
Grade WP12	K12062	SPA21/STPA22	D3753/G3458	(3b)	13CrMo 44	17175	1.7335	-
Grade WP22	K21590	SPA23/STPA24	D3753/G3458	(3b)	10CrMo 9 10	17175	1.7380	-
A240 Heat Resisting Cr and Cr-Ni Steel Plate and Sheet for Pressure Vessels								
Type 304	S30400	STS304/SUS304	D3693/G3601	-	X5CrNi 18 9	17440	1.4301	(3b)
Type 304L	S30403	STS304L/SUS304L	D3693/G3601	-	X2CrNi 18 10	17440	1.4306	(3b)
Type 316	S31600	STS316/SUS316	D3693/G3601	-	X5CrNiMo 18 10	17440	1.4401	(3b)
Type 316L	S31603	STS316L/SUS316L	D3693/G3601	-	X2CrNiMo 18 10	17440	1.4404	(3b)
Type 317	S31700	STS317/SUS317	D3693/G3601	-	-	-	-	(3)
Type 317L	S31703	STS317L/SUS317L	D3693/G3601	-	-	-	-	(3)
Type 321	S32100	STS321/SUS321	D3693/G3601	-	X10CrNiTi 18 9	17440	1.4541	(3b)
Type 347	S34700	STS347/SUS347	D3693/G3601	-	X10CrNiNb 18 9	17440	1.4550	(3b)
Type 405	S40500	STS405/SUS405	D3693/G3601	-	X7CrAl 13	17440	1.4002	(3b)
Type 410	S41000	STS410/SUS410	D3693/G3601	-	X10Cr 13	17440	1.4006	(3b)
Type 410S	S41008	STS410S/SUS410S	D3693/G3601	-	X7Cr 13	17440	1.4000	(3b)
Type 430	S43000	STS430/SUS430	D3693/G3601	-	X8Cr 17	17440	1.4016	(3b)
A252 Welded and Seamless Pipe Piles	-	-	-	(3)	-	-	-	(3)
A263 Corrosion Resisting Cr-Ni Steel Clad Plate, Sheet and Strip								
Type 405	S40500	STS405/SUS405	D3693/G3601	-	X7CrAl 13	17440	1.4002	(3a)
Type 410S	S41008	STS410S/SUS410S	D3693/G3601	-	X7Cr 13	17440	1.4000	(3a)
A264 Corrosion Resisting Cr Steel Clad Plate, Sheet and Strip								
Type 304	S30400	STS304/SUS304	D3693/G3601	-	X5CrNi 18 9	17440	1.4301	(3b)
Type 304L	S30403	STS304L/SUS304L	D3693/G3601	-	X2CrNi 18 10	17440	1.4306	(3b)
Type 316	S31600	STS316/SUS316	D3693/G3601	-	X5CrNiMo 18 10	17440	1.4401	(3b)
Type 316L	S31603	STS316L/SUS316L	D3693/G3601	-	X2CrNiMo 18 10	17440	1.4404	(3b)
Type 317	S31700	STS317/SUS317	D3693/G3601	-	-	-	-	(3)
Type 317L	S31703	STS317L/SUS317L	D3693/G3601	-	-	-	-	(3)
Type 321	S32100	STS321/SUS321	D3693/G3601	-	X10CrNiTi 18 9	17440	1.4541	(3b)
Type 347	S34700	STS347/SUS347	D3693/G3601	-	X10CrNiNb 18 10	17440	1.4550	(3b)
A265 Ni and Ni Base Alloy Clad Steel Plate 70/30 Ni-Cu	-	-	-	(3)	NiCu 30 Fe	17743	2.4360	Nicorous; Silver in(3b)
A266 C-Steel forgings for Pressure Vessels								
Class 1	K03506	SFVC/SFVC1	D4122/G3202	-	Ck22	17200	1.1151	(3b)
Class 4	K03017	SFVC28/SFVC2B	D4122/G3202	-	Ck22	17200	1.1151	(3b)
A268 Seamless and Welded Ferritic and Martensitic Stainless Steel Tubing for General Service								
Type 405	S40500	-	D3577/G3463	(3)	X7CrAl	17440	1.4002	(3b)
Type 410	S41000	STS405TB/SUS405TB	-	-	X10Cr 13	17440	1.4006	(3b)

ASTM STANDARD	UNS NO.	KOREAN/JAPANESE			GERMAN			
		KS/JIS Symbol	KS/JIS Number	Remark	DIN Type	DIN Number	Material Number	Remark
A269 Seamless and Welded Austenitic Stainless Steel Tubing for General Service								
Type 304	S30400	STS304TB/SUS304TB	D3577/G3463	-	X5CrNi 18 9	17440	1.4301	(3b)
Type 304L	S30403	STS304LTB/SUS304LTB	D3577/G3463	-	X2CrNi 18 10	17440	1.4306	(3b)
Type 316	S31600	STS316TB/SUS316TB	D3577/G3463	-	X5CrNiMo 18 10	17440	1.4401	(3b)
Type 316L	S31603	STS316LTB/SUS316LTB	D3577/G3463	-	X2CrNiMo 18 10	17440	1.4404	(3b)
Type 317	S31700	STS317TB/SUS317TB	D3577/G3463	-	-	-	-	(3)
Type 321	S32100	STS321TB/SUS321TB	D3577/G3463	-	X10CrNiTi 18 9	17440	1.4541	(3b)
Type 347	S34700	STS347TB/SUS347TB	D3577/G3463	-	X10CrNiNb 18 9	17440	1.4550	(3b)
A271 Seamless Austenitic Cr-Ni Steel Still Tubes for Refinery Service								
TP 304	S30400	STS304TF/SUS304TF	D3587/G3467	-	X5CrNi 18 9	17440	1.4301	(3b)
TP 304H	S30409	STS304HTF/SUS304HTF	D3587/G3467	-	X6CrNi 18 11	-	1.4948	WBL-640(3b)
TP 316	S31600	STS316TF/SUS316TF	D3587/G3467	-	X5CrNiMo 18 10	17440	1.4401	(3b)
TP 321	S32100	STS321TF/SUS321TF	D3587/G3467	-	X10CrNiTi 18 9	17440	1.4541	(3b)
TP 347	S34700	STS347TF/SUS347TF	D3587/G3467	-	X10CrNiNb 18 10	17440	1.4550	(3b)
TP 347H	S34709	STS347HTF/SUS347HTF	D3587/G3467	-	X8CrNiNb 16 13	-	1.4961	WBL-670(3b)
A276 Stainless Steel Heat Resisting Steel Bars and Shapes								
Type 304	S30400	STS304/SUS304	D3706/G4303	-	X5CrNi 18 9	17440	1.4301	(3b)
Type 304L	S30403	STS306M/SUS304L	D3706/G4303	-	X2CrNi 18 10	17440	1.4306	(3b)
Type 310	S31000	-	-	(3)	X12CrNi 25 21	-	1.4845	(3a)
Type 316	S31600	STS316/SUS316	D3706/G4303	-	X5CrNiMo 18 10	17440	1.4401	(3b)
Type 316L	S31603	STS316L/SUS316L	D3706/G4303	-	X2CrNiMo 18 10	17440	1.4404	(3b)
Type 317L	-	STS317/SUS317	D3706/G4303	-	-	-	-	(3)
Type 321	S32100	STS321/SUS321	D3706/G4303	-	X10CrNiTi 18 9	17440	1.4541	(3b)
Type 347	S34700	STS347/SUS347	D3706/G4303	-	X10CrNiNb 18 9	17440	1.4550	(3b)
A283 Low and Intermediate Tensile Strength C-Steel Plates of Structural Quality								
Grade C		SS400/SS400	D3503/G3101	-	Ust 37-2	17100	1.0036	-
Grade D		SS400/SS400	D3503/G3101	-	St 44-3	17100	1.0044	-
A285 Low and Intermediate Tensile Strength C-Steel Plates for Pressure Vessels								
Grade A & B	K01700	-	-	(3)	H1	17155	1.0345	-
Grade C	K02801	SB410/SB410	D3560/G3103	-	HH	17155	1.0425	-
A297 Heat Resistant Fe-Cr and Fe-Cr-Ni Alloy Casting for General Application								
Grade HF	J92603	HRSC12/SCH12	D4105/G5122	-	G-X40CrNiSi 22 9	17465	1.4826	(3a)
Grade HH	J93503	HRSC13/SCH13	D4105/G5122	-	G-X35CrNiSi 25 12	17465	1.4837	(3a)
Grade HK	J94224	HRSC22/SCH22	D4105/G5122	-	G-X40CrNiSi 25 20	17465	1.4848	(3a)
Grade HP	N08705	HRSC24/SCH24	D4105/G5122	-	G-X40CrNiSi 35 25	17465	1.4857	(3a)
A299 C-Mn-Si Steel Plates for Pressure Vessels	K02803	SPPV355/SPV355	D3521/G3115	(15)	WSt 355	17102	1.0565	-
A302 Mn-Mo and Mn-Mo-Ni Steel Plates for Pressure Vessels								
Grade A	K12021	SBV1A/SBV1A	D3638/G3119	-	-	-	-	(3)
Grade B	K12022	SBV1B/SBV1B	D3638/G3119	-	-	-	-	(3)
A307 Low C-steel Threaded Standard								
Grade B		SS400/SS400	D3503/G3101	(3b)	5D(St 50.11)	267	-	-

ASTM STANDARD	UNS NO.	KOREAN/JAPANESE			GERMAN			
		KS/JIS Symbol	KS/JIS Number	Remark	DIN Type	DIN Number	Material Number	Remark
A312								
Seamless and Welded Austenitic Stainless Steel Pipe								
TP 304	S30400	STS304TP/SUS304TP	D3576/G3459	(16)	X5CrNi 18 9	17440	1.4301	(3b)
TP 304H	S30409	STS304HTP/SUS304HTP	D3576/G3459	(16)	-	-	-	(3)
TP 304L	S30403	STS304LTP/SUS304LTP	D3576/G3459	(16)	X2CrNi 18 9	17440	1.4306	(3b)
TP 310	S31000	STS310STP/SUS310STP	D3576/G3459	(16)	-	-	-	(3)
TP 316	S31600	STS316TP/SUS316TP	D3576/G3459	(16)	X5CrNiMo 18 10	17440	1.4401	(3b)
TP 316H	S31609	STS316HTP/SUS316HTP	D3576/G3459	(16)	-	-	-	(3)
TP 316L	S31603	STS316LTP/SUS321LTP	D3576/G3459	(16)	X2CrNiMo 18 10	17440	1.4404	(3b)
TP 321	S32100	STS321TP/SUS321TP	D3576/G3459	(16)	X10CrNiTi 18 9	17440	1.4541	(3b)
TP 347	S34700	STS347TP/SUS347TP	D3576/G3459	(16)	X5CrNiNb 18 9	-	1.4543	(3b)
TP 347H	S34709	STS347HTP/SUS347HTP	D3576/G3459	(16)	-	-	-	(3)
A320								
Alloy Steel Bolting Material for Low Temp. Service								
L 7		SCM440/SCM440	D3711/G4105	(3a)	42CrMo 4	17200	1.7225	(3a)
L 43		SMCM439/SNCM439	D3709/G4301	(3a)	-	-	-	(3)
B 8	S30400	STS304/SUS304	D3706/G4303	(3b)	X5CrNi 18 9	17440	1.4301	(3a)
A325								
High Strength Steel Bolts for Structural Steel Joints								
Type 1	K02706	SM33C/S33C	D3752/G4051	(3a)	Cq35	1654	1.1172	(3c)
Type 2	D11900	-	-	-	22B2	1654	1.5508	(3c)
A333								
Seamless and Welded Pipe for Low Temp. Service								
Grade 1	K03008	SPLT39/STPL380	D3569/G3460	(16)	TT St 41 N	-	1.0437	WBL-680(3b)
Grade 3	K31918	SPLT46/STPL450	D3569/G3460	(16)	10Ni 14	-	1.5637	WBL-680(3b)
Grade 6	K03006	-	-	(3)	TT St 45 N	-	1.0456	WBL-680(3b)
Grade 8	K81340	SPLT70/STPL690	D3569/G3460	(16)	X8Ni 9	-	1.5662	WBL-680(3b)
A334								
Seamless and Welded C-and Alloy Steel Tubes for Low Temp. Service								
Grade 1	K03008	SPLT39/STBL380	D3571/G3464	-	TT St 41 N	-	1.0437	WBL-680(3b)
Grade 3	K31918	SPLT46/STBL450	D3571/G3464	-	10Ni 14	-	1.5637	WBL-680(3b)
Grade 6	K03006	-	-	(3)	TT St 45 N	-	1.0456	WBL-680(3b)
Grade 8	K81340	SPLT70/STBL690	D3571/G3464	-	X8Ni 9	-	1.5662	WBL-680(3b)
A335								
Seamless Ferritic Alloy Steel Pipe for High Temp. Service								
P 1	K11522	SPA12/STPA12	D3573/G3458	(16)	16Mo 5	-	1.5423	(3a)
P 5	K41545	SPA25/STPA25	D3573/G3458	(16)	12CrMo 19 5	-	1.7362	WBL-590(3b)
P 9	S50400	SPA26/STPA26	D3573/G3458	(16)	-	-	-	(3)
P 11	K11597	SPA23/STPA23	D3573/G3458	(16)	13CrMo 44	17175	1.7335	(8)
P 12	K11562	SPA22/STPA22	D3573/G3458	(16)	13CrMo 44	17175	1.7335	-
P 22	K21590	SPA24/STPA24	D3573/G3458	(16)	10CrMo 9 10	17175	1.7380	-
A350								
Forged or Rolled C-and Alloy Steel Flanges, Forged Fittings, and Valves for Low Temp. Service								
Grade LF1	K03009	SFL1/SFL1	D4125/G3205	-	TT 41	-	1.0437	WBL-680(3c)
Grade LF2	K03011	SFL2/SFL2	D4125/G3205	-	TT StE 315	17102	1.0508	(3c)
Grade LF3	K32025	SFL3/SFL3	D4125/G3205	-	10Ni 14	-	1.5637	WBL-680(3c)
A351								
Austenitic Steel Casting for High Temperature Service								
CF 8	J92600	SSC13/SCS13A	D4103/G5121	-	G-X CrNi 18 9	17445	1.4308	(3a)
CF 8M	J92900	SSC14/SCS14A	D4103/G5121	-	G-X6 CrNiMo 18 10	17445	1.4408	(3a)
CK 20	J94202	SSC18/SCS18	D4103/G5121	(3b)	G-X15 CrNiSi 25 20	-	1.4849	WBL-595(3b)
HK 40	J94204	HRSC22/SCH22	D4105/G5122	-	G-X40 CrNiMo 25 20	17445	1.4848	(3a)

ASTM STANDARD	UNS NO.	KOREAN/JAPANESE			GERMAN			
		KS/JIS Symbol	KS/JIS Number	Remark	DIN Type	DIN Number	Material Number	Remark
A352								
Ferritic Steel Castings for Low Temp. Service								
Grade LCB	J03003	SCPL1/SCPL1	D4111/G5152	-	GS-CK24	1.1156	-	WBL-685(3b)
Grade LC2	J22500	SCPL21/SCPL21	D4111/G5152	-	-	-	-	(3)
Grade LC3	J31550	SCPL31/SCPL31	D4111/G5152	-	GS-10 Ni 14	1.5638	-	WBL-685(3b)
A353								
9% Nickel Steel Plate, Double Normalized and Tempered for Pressure Vessels	K81340	-	-	(3)	X8Ni 9	-	1.5662	WBL-680(3c)
A358								
Electric Fusion Welded Austenitic Cr-Ni Alloy Steel Pipe for High Temp. Service								
Grade 304	S30400	STS304TPY/SUS304TPY	D3588/G3468	-	X5CrNi 18 9	17440	1.4301	(3b)
Grade 310	S31000	STS310TPY/SUS310TPY	D3588/G3468	-	X12CrNi 25 21	-	1.4845	WBL-470(3b)
Grade 316	S31600	STS316TPY/SUS316TPY	D3588/G3468	-	X5CrNiMo 18 10	17440	1.4401	(3b)
Grade 321	S32100	STS321TPY/SUS321TPY	D3588/G3468	-	X10CrNiTi 18 9	17440	1.4541	(3b)(17)
Grade 347	S34700	STS347TPY/SUS347TPY	D3588/G3468	-	X10CrNiNb 18 9	17440	1.4550	(3b)(17)
A387								
Cr-Mo Steel Plate for Boilers and Other Pressure Vessels								
Grade 5 Class 1	K41545	SCMV6/SCMV6	D3543/G4109	-	12CrMo 19 5	-	1.7362	WBL-590(3a)
Class 2	-	-	-	-	12CrMo 19 5	-	1.7362	(3a)
Grade 11 Class 1	K11789	SCMV3/SCMV3	D3543/G4109	-	-	-	-	(3)
Class 2	-	-	(3)	-	-	-	-	(3)
Grade 12 Class 1	K11757	SCMV2/SCMV2	D3543/G4109	-	13CrMo 44	17155	1.7335	-
Class 2	-	-	(3)	13CrMo 44	17155	1.7335	-	(3a)
Grade 21 Class 1	K31545	SCMV5/SCMV5	D3543/G4109	-	-	-	-	(3)
Class 2	-	-	(3)	-	-	-	-	(3)
Grade 22 Class 1	K21590	SCMV4/SCMV4	D3543/G4109	-	10CrMo 9 10	-	1.7380	(3b)
Class 2	-	-	(3)	10CrMo 9 10	-	-	1.7380	(3a)
A395								
Ferritic Ductile Iron Pressure Castings for Elevated Temperatures	F32800	-	-	(3)	-	-	-	(3)
A403								
Wrought Austenitic Stainless Steel Piping, Fitting	S30400	-	-	(3)	-	-	-	(3)
A414								
Carbon Steel Sheet for Pressure Vessels								
Grade B	K02201	SB410/SB410	D3560/G3103	-	H1	17155	1.0345	-
Grade D	K02505	SB410/SB410	D3560/G3103	-	HH	17155	1.0425	-
Grade C	K02503	-	(3)	H1H	17155	1.0435	-	
A426								
Centrifugally Cast Ferritic Alloy Steel Pipe for High Temp. Service								
CP 1	J12501	SCPH-11CF/SCPH-11CF	D4112/G5202	-	-	-	-	(3)
CP 12	J11562	SCPH-21CF/SCPH-21CF	D4112/G5202	-	GS-17CrMo 55	17245	1.7357	(3b)
CP 22	J21890	SCPH-32CF/SCPH-32CF	D4112/G5202	-	GS-18CrMo 9 10	-	1.7379	(3a)
A442								
C-Steel Plates with Improved Transition Properties								
Grade 55	K02202	-	(3)	TT St 41N	-	1.0437	WBL-680(3c)	
Grade 60	K02402	SPPV235/SPV235	-	-	-	-	-	(3)
D3521/G3115								
A447								
Cr-Ni-Fe Alloy Casting for High Temperature Service								
Type 11	J93303	-	-	(3)	G-X35 CrNi 25 12	-	1.4831	WBL-595(3a)

ASTM STANDARD	UNS NO.	KOREAN/JAPANESE			GERMAN			
		KS/JIS Symbol	KS/JIS Number	Remark	DIN Type	DIN Number	Material Number	Remark
A451								
Centrifugally Cast Austenitic Steel Pipe for High Temp. Service								
Grade CPF 8	J92600	-	-	(3)	G-X6CrNi 18 9	17445	1.4308	(3b)
Grade CPF 8C	J92710	-	-	(3)	G-X7CrNiNb 18 9	17445	1.4552	(3b)
Grade CPF 8M	J92900	-	-	(3)	G-X6CrNiMo 18 9	17445	1.4408	(3b)
Grade CPK 20	J94202	-	-	(3)	G-X15CrNi 25 20	-	1.4840	WBL-595(3b)
A508								
Quenched and Tempered Vacuum Treated Carbon and Alloy								
Forgings for Pressure Vessel								
Class 1	K13502	-	-	(3)	-	-	-	(3)
Class 2	K12766	-	-	(3)	22NiMoCr 37	-	1.6571	WBL-640(3b)
Class 3	K12042	-	-	(3)	20MnMoNi 55	-	1.6310	WBL-640(3b)
A515								
Carbon Steel Plates for Pressure Vessels for Intermediate and Higher Temp. Service								
Grade 55	K02001	-	-	(3)	HH	17155	1.0425	-
Grade 60	K02401	SB410/SB410	D3560/G3103	-	HIH	17155	1.0435	-
Grade 65	K02800	SB450/SB450	D3560/G3103	-	HIV	17155	1.0445	-
Grade 70	K03101	SB480/SB480	D3560/G3103	-	19Mn 5	17155	1.0485	-
A516								
Carbon Steel Plates for Pressure Vessels for Moderate and Lower Temp. Service								
Grade 55	K01800	-	-	(3)	A St 41	17135	1.0426	-
Grade 60	K02100	SGV410/SGV410	D3540/G3118	-	A St 45	17135	1.0436	-
Grade 65	K02403	SGV450/SGV450	D3540/G3118	-	A St 45	17135	1.0436	-
Grade 70	K02700	SGV480/SGV480	D3540/G3118	-	A St 52	17135	1.0843	-
A536								
Ductile Iron Castings								
Grade 60-40-18	F32800	-	-	(3)	-	-	-	(3)
A537								
C-Mn-Si Steel Plates, Heat Treated for Pressure Vessel								
Class 1	K02400	SPPV355/SPV355N	D3521/G3115	-	19Mn 5	17155	1.0485	(6)
Class 2	K12437	SPPV450/SPV450Q	D3521/G3115	-	-	-	-	(3)
A542								
Chromium-Molybdenum Steel Plates, Quenched and Tempered for Pressure Vessel								
Class 4	K21590	-	-	(3)	-	-	-	(3)
A553								
9% Nickel Steel Plates, Quenched and Tempered for Pressure Vessel								
Type 1	K81340	SL9N 590/SL9N 590	D3586/G3127	-	-	-	-	(3)
A560								
Chromium-Nickel Alloy Castings								
Grade 50 Cr-50Ni	R20500	-	-	(3)	-	-	-	(3)
Grade 60 Cr-40Ni	R20600	-	-	(3)	-	-	-	(3)
Grade 50 Cr-50Ni-Cb	-	-	-	(3)	-	-	-	(3)
A569								
Hot Rolled C-Steel Sheets Commercial Quality		SHP 1/SPHC	D3501/G3131	-	USt 37-2	1623-2	1.0112.5-	
A570								
Hot Rolled C-Steel Sheets and Strip, Structural Quality								
Grade 30	K02502	SS330/SS330	D3503/G3101	(6)	USt 37-2	17100	1.0036	-
Grade 36	K02502	SS400/SS400	D3503/G3101	-	USt 37-2	17100	1.0036	-
Grade 40	K02502	SS400/SS400	D3503/G3101	(6)	USt 44-2	17100	1.0044	-

ASTM STANDARD	UNS NO.	KOREAN/JAPANESE			GERMAN			
		KS/JIS Symbol	KS/JIS Number	Remark	DIN Type	DIN Number	Material Number	Remark
A573 Structural Carbon Steel Plates of Improved Toughness Grade 65 Grade 70	K02404 K02701	SGV450/SGV450 SGV480/SGV480	D3540/G3118 D3540/G3118	- -	USt 44-3 USt 52-3	17100 17100	1.0144 1.0570	- -
A608 Centrifugally Cast High Alloy Tubing for Pressure Application at High Temperature Grade HK40	J94204	-	-	(3)	-	-	-	(3)
A611 Cold Rolled Carbon Structural Steel Sheet Grade B Grade C Grade D		SCP1-8D/SPCC8D SCP1-4/SPCC-4 SCP1-1/SPCC-1	D3512/G3141 D3512/G3141 D3512/G3141	(3a) (3a) (3a)	- St 12 -	- 1623-1 -	- 1.0330 -	(3) (3b) (3)
A615 Deformed Billet-Steel Bars for Concrete Reinforcement Grade 40 Grade 60		SD30/SD295 SD40/SD390	D3504/G3112 D3504/G3112	- (6)	- B St 42/50 RU	- 488	- 1.0433	- (5)
A633 Normalized High Strength Low Alloy Structural Steel Grade A Grade C Grade E	K01802 K12000 K12202	SLA1 325/SLA325 SLA1 360/SLA360 -	D3541/G3126 D3541/G3126 -	- - (3)	TStE 315 TStE 355 TStE 420	17102 17102 17102	1.0508 1.0566 1.8912	- - -
A645 5% Nickel Specially Heat Treated	K41583	-	-	-	-	-	-	(3)
A671 Electric-Fusion Welded Pipe for Atmospheric and Lower Temperature		-	-	(3)	-	-	-	(3)
A672 Electric-Fusion Welded Pipe for High Pressure Service at Moderate Temperature		-	-	(3)	-	-	-	(3)
A675 C-Steel Bars Hot Rolled Special Quality		-	-	(3)	-	-	-	(3)
A691 Electric-Fusion Welded C- and Alloy Steel Pipe for High Temperature		-	-	(3)	-	-	-	(3)
A743 Corrosion Resistant Fe-Cr, Fe-Cr-Ni and Ni Base Alloy Castings for General Application Grade CF-8 Grade CF-8M Grade CK-20 Grade CA-15 Grade CA-6NM	J92600 J92900 J94202 J91150 J91650	SSC 13/SCS 13A SSC 14/SCS 14A SSC 18/SCS 18 SSC 1/SCS 1 -	D4103/G5121 D4103/G5121 D4103/G5121 D4103/G5121 -	- - - - (3)	G-X6CrNi 18 9 G-X6CrNiMo 18 10 G-X15CrNi 25 20 G-X12Cr 14 -	17445 17445 - 17445 -	1.4308 1.4408 1.4840 1.4008 -	(3a) (3a) WBL-595(3b) (3a) (3)

EXPLANATORY NOTES(Ferrous)

- (1) Specify impact tests per ASTM Standard.
- (2) Siemens-Martin(open hearth), basic oxygen or electric furnace only.
- (3) Normally available to or will be furnished to ASTM Standard.
- (3a) Specify mechanical properties, tests and inspection in accordance with ASTM Standard.
- (3b) Test and inspect the product to ASTM Standard except for chemical analysis and mechanical properties of the steel.
- (3c) Specify heat treatment test requirements and inspection in accordance with ASTM Standard.
- (4) Specify tempering heat treatment per ASTM Standard.
- (5) Specify type and strength required.
- (6) Recognize lower minimum tensile or yield strength of substitute steel in design or specify minimum tensile and yield strengths per ASTM Standard.

- (7) Order with DIN 50049 Inspection Certificate C and Quality Grade III.
- (8) Specify chromium content of 1% minimum.
- (9) Available in sizes up to 8 in.(200mm) diameter.
- (10) Specify hardness not to exceed ASTM limits.
- (11) Specify carbon content of 0.15% maximum.
- (12) Specify heat treatment per ASTM Standard.
- (13) Specify maximum hardness of 79HRB or 143 HB.
- (14) Specify silicon content of 0.15 to 0.4%.
- (15) Specify silicon content of 0.35% maximum.
- (16) Pipe dimensions are different from those of usa standard.
- (17) Specify carbon content of 0.08% maximum.
- (18) The temperature limitation of 300 °C(572 °F) established for this material by German regulation does not necessarily apply for applications outside Germany.
- (19) Specify ASTM A285 or equivalent JIS Steel plate except where steel plate standards A36, A570, A611 and A283 or JIS equivalents are acceptable. For all grades specify qualification of welding procedure and hydrostatic test per ASTM Standard.
- (20) Specify maximum hardness of 99 HRB or 235 HB.
- (21) Specify silicon content of 0.15 ~ 0.5%.
- (22) Specify maximum hardness of 187 HB.
- (23) Consider differences in dimensions and tolerances.