

DUGAR GROUP

Chemical Composition												Mechanical Properties				
Specification	Type	C%	Mn%	P%	S%	Si%	Cr%	Cu%	Mo%	Ni%	Va%	Tensile Strength	Yield Test	Elongation In	Hardness	Impact Test
				MAX	MAX							Mpa	Mpa	% MIN	HRB MAX	50°f

STANDARD SPECIFICATION OF CARBON STEEL SEAMLESS TUBES / PIPES FOR HEAT EXCHANGER AND CONDENSER

ASTM A179	CS	0.06-0.18	0.27-0.63	0.035	0.035	-	-	-	-	-	-	325 MIN	180 MIN	35	72	-
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STANDARD SPECIFICATION OF CARBON STEEL SEAMLESS BOILER TUBES / PIPES FOR HIGH PRESSURE SERVICES

ASTM A192	CS	0.06-0.18	0.27-0.63	0.035	0.035	0.25 MAX	-	-	-	-	-	325 MIN	180 MIN	35	77	-
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STANDARD SPECIFICATION OF CARBON STEEL SEAMLESS TUBES / PIPES FOR HIGH TEMPERATURE SERVICES

ASTM A 53/A	CS	0.25 MAX	0.95 MAX	0.050	0.060	-	-	-	-	-	-	330 MIN	205 MIN	36	-	-
ASTM A 53/B	CS	0.30MAX	1.20 MAX	0.050	0.060	-	-	-	-	-	-	415 MIN	240 MIN	29.5	-	-
ASTM A 106/A	CS	0.25 MAX	0.27-0.93	0.035	0.035	0.10 MIN	0.40 MAX	0.40 MAX	0.15 MAX	0.4 MAX	0.08 MAX	330 MIN	205 MIN	35	-	-
ASTM A 106/B	CS	0.30 MAX	0.29-1.06	0.035	0.035	0.10 MIN	0.40 MAX	0.40 MAX	0.15 MAX	0.4 MAX	0.08 MAX	415 MIN	240 MIN	30	-	-
ASTM A 106/C	CS	0.35 MAX	0.29-1.06	0.035	0.035	0.10 MIN	0.40 MAX	0.40 MAX	0.15 MAX	0.4 MAX	0.08 MAX	485 MIN	275 MIN	30	-	-

STANDARD SPECIFICATION OF CARBON STEEL BOILER AND SUPER HEATER TUBES

ASTM A210/A1	CS	0.27 MAX	0.93 MAX	0.035	0.035 MAX	0.10 MIN	-	-	-	-	-	415 MIN	255 MIN	30	79	-
ASTM A210/C	CS	0.35 MAX	0.29-1.06	0.035	0.035	0.10 MIN	-	-	-	-	-	485 MIN	275 MIN	30	89	-

STANDARD SPECIFICATION OF CARBON STEEL PIPES FOR LOW TEMP. SERVICES

ASTM A333/1	CS	0.30 MAX	0.40-1.06	0.025	0.025	-	-	-	-	-	-	380 MIN	205 MIN	35	85	50°f
ASTM A333/6	CS	0.30 MAX	0.29-1.06	0.025	0.025	0.10 MIN	-	-	-	-	-	415 MIN	240 MIN	30	90	50°f
ASTM A334/1	CS	0.30 MAX	0.40-1.06	0.025	0.025	-	-	-	-	-	-	380 MIN	205 MIN	35	85	50°f
ASTM A334/6	CS	0.30 MAX	0.29-1.06	0.025	0.025	0.10 MIN	-	-	-	-	-	415 MIN	240 MIN	30	90	50°f

STANDARD SPECIFICATION FOR SEAMLESS CARBON-MOLYBDENUM ALLOY-STEEL BOILER AND SUPER HEATER TUBES

ASTM A209/T1	AS	0.10-0.20	0.30-0.80	0.025	0.025	0.10-0.50	-	-	0.44-0.65	-	-	380 MIN	205 MIN	30	80	-
ASTM A209/T1a	AS	0.15-0.25	0.30-0.80	0.025	0.025	0.10-0.50	-	-	0.44-0.65	-	-	365 MIN	195 MIN	30	81	-
ASTM A213/T2	AS	0.10-0.20	0.30-0.61	0.025	0.025	0.10-0.30	0.50-0.81	-	0.44-0.65	-	-	415 MIN	205 MIN	30	83	-
ASTM A213/T5	AS	0.15 MAX	0.30-0.60	0.025	0.025	0.50 MAX	4.00-6.00	-	0.45-0.65	-	-	415 MIN	205 MIN	30	85	-
ASTM A213/T11	AS	0.05-0.15	0.30-0.60	0.025	0.025	0.50-1.0	1.00-1.50	-	0.44-0.65	-	-	415 MIN	205 MIN	30	85	-
ASTM A213/T12	AS	0.05-0.15	0.30-0.61	0.025	0.025	0.50 MAX	0.80-1.25	-	0.44-0.65	-	-	415 MIN	220 MIN	30	85	-
ASTM A213/T22	AS	0.05-0.15	0.30-0.60	0.025	0.025	0.50 MAX	1.90-2.60	-	0.87-1.13	-	-	415 MIN	205 MIN	30	85	-

STANDARD SPECIFICATION OF CARBON STEEL BOILER AND SUPER HEATER TUBES

ASTM A335/P1	AS	0.10-0.20	0.30-0.80	0.025	0.025	0.10-0.50	-	-	0.44-0.65	-	-	380 MIN	205 MIN	30	-	-
ASTM A335/P2	AS	0.10-0.20	0.30-0.61	0.025	0.025	0.10-0.30	0.50-0.81	-	0.44-0.65	-	-	415 MIN	205 MIN	30	-	-
ASTM A335/P5	AS	0.15 MAX	0.30-0.60	0.025	0.025	0.50 MAX	4.00-6.00	-	0.45-0.65	-	-	415 MIN	205 MIN	30	-	-
ASTM A335/P11	AS	0.05-0.15	0.30-0.60	0.025	0.025	0.50-1.0	1.00-1.50	-	0.44-0.65	-	-	415 MIN	205 MIN	30	-	-
ASTM A335/P12	AS	0.05-0.15	0.30-0.61	0.025	0.025	0.50 MAX	0.80-1.25	-	0.44-0.65	-	-	415 MIN	220 MIN	30	-	-
ASTM A335/P22	AS	0.05-0.15	0.30-0.60	0.025	0.025	0.50 MAX	1.90-2.60	-	0.87-1.13	-	-	415 MIN	205 MIN	30	-	-

STANDARD SPECIFICATION FOR CARBON STEEL BOILER AND SUPER HEATER

BS 3059/1/320	CS	0.16 MAX	0.30-0.70	0.050	0.050	-	-	-	-	-	-	320-480	195 MIN	25	-	-
BS 3059/2/360	CS	0.17 MAX	0.40-0.80	0.045	0.045	0.35MAX	-	-	-	-	-	360-500	215 MIN	24	-	-
BS 3059/2/440	CS	0.12-0.18	0.90-1.20	0.040	0.035	0.10-0.35	-	-	-	-	-	440-560	245 MIN	21	-	-
BS 3059/2/620	AS	0.12-0.15	0.40-0.70	0.040	0.040	0.10-0.35	0.70-1.10	-	0.45-0.65	-	-	460-610	180 MIN	22	-	-
BS 3059/2/622	AS	0.08-0.15	0.40-0.70	0.040	0.040	0.10-0.35	2.00-2.50	-	0.90-1.20	-	-	490-640	275 MIN	20	-	-

STANDARD SPECIFICATION FOR SEAMLESS ALLOY STEEL TUBES FOR BOILER , PIPELINES, PRESSURE VESSEL FOR TEMPERATURE UP To 600° C

DIN17175/ST35.8	CS	0.17 MAX	0.40-0.80	0.040	0.040	0.10-0.35	-	-	-	-	-	340-441	235 MIN	25	-	-
DIN17175/ST45.8	CS	0.21 MAX	0.40-1.20	0.040	0.040	0.10-0.35	-	-	-	-	-	441-540	235 MIN	25	-	-
DIN17175/15 Mo3	AS	0.12-0.20	0.40-0.80	0.035	0.035	0.10-0.35	-	-	0.25-0.35	-	-	441-540	285 MIN	21	-	-
DIN17175/13CrMo44	AS	0.10-0.18	0.40-0.70	0.035	0.035	0.10-0.35	0.7-1.10	-	0.45-0.65	-	-	441-570	294 MIN	22	-	-
DIN17175/10CrMo910	AS	0.15 MAX	0.40-0.80	0.035	0.035	0.10-0.35	2.0-2.50	-	0.90-1.10	-	-	441-590	265 MIN	20	-	-

STANDARD SPECIFICATION FOR SEAMLESS CARBON STEEL TUBES

JIS 3445 STKM 11A	CS	0.12 MAX	0.60 MAX	0.040	0.040	0.35 MAX	-	-	-	-	-	294 MIN	-	35	-	-
JIS 3445 STKM 12A	CS	0.20 MAX	0.60 MAX	0.040	0.040	0.35 MAX	-	-	-	-	-	344 MIN	177 MIN	35	-	-
JIS 3445 STKM 12B	CS	0.20 MAX	0.60 MAX	0.040	0.040	0.35 MAX	-	-	-	-	-	393 MIN	274 MIN	25	-	-
JIS 3445 STKM 12C	CS	0.20 MAX	0.60 MAX	0.040	0.040	0.35 MAX	-	-	-	-	-	470 MIN	351 MIN	20	-	-
JIS 3445 STKM 13B	CS	0.25 MAX	0.30-0.90	0.040	0.040	0.35 MAX	-	-	-	-	-	442 MIN	304 MIN	20	-	-
JIS 3445 STKM 13C	CS	0.25 MAX	0.30 MAX	0.040	0.040	0.35 MAX	-	-	-	-	-	373 MIN	216 MIN	30	-	-