

## MATERAIL CERTIFICATIONS

### CERTIFICATIONS & MTC

Material inspection and certification is done as per the requirements of relevant standards, specifications and project requirements. Certificate of EN 10204 / 3.1 is being provided for our products. Special instructions regarding inspection & certifications such as laboratory testing and 3<sup>rd</sup> party inspections are being performed for our products depending upon projects requirements.

#### 9; - MECHANICAL PROPERTIES OF MATERIAL

			MECHANICAL PROPERTIES						
DESCRIPTION	MATERIAL STANDARDS	GRADE	CLASS / TYPE	T.S ( N/mm <sup>2</sup> )	Y.S N/mm <sup>2</sup>	ELONGATION (%)	AREA REDUCE (%)	PROOF LOAD	HARDNESS
ASTM A193 GR. B7	ASTM A193	B7	-	861 min	723 min	16	50	X	26-35 HRC
ASTM A194 GR. 8M	ASTM A194	GR. 8M	-	X	X	X	X	X	60-105 HRB
ASTM A194 GR. 8	ASTM A194	GR. 8	-	X	X	X	X	X	60-105 HRB
AISI 304 / 304L	AISI 304/304L	GR. 8	-	X	X	X	X	X	60-105 HRB
ASTM A193 GR. B8 CL. 1	ASTM A193	B8	CL. 1	515	205	30	50	X	20 HRC (max)
ASTM A193 GR. B8 CL. 2	ASTM A193	B8	CL. 2	860	690	12	35	X	35 HRC (max)
ASTM A193 GR. B8LN	ASTM A193	B8LN	CL. 1	515	205	30	50	X	20 HRC (max)
AISI 316/316L	AISI 316 /316L	316/316L	-	515	205	30	50	X	20 HRC (max)
ASTM A193 GR. B8M CL. 1	ASTM A193	B8M	CL. 1	515	205	30	50	X	18.0 HRC (max)
ASTM A193 GR. B8M CL. 2	ASTM A193	B8M	CL. 2	760	665	15	45	X	35 HRC (max)
ASTM A193 GR. B5	ASTM A193	B5	-	690	550	16	50	X	-
ASTM A320 Gr. L7	ASTM A320	L7	-	860 min	725 min	16	50	x	35 HRC (max)
ASTM A194 GR. 7	ASTM A194	GR. 7	-	x	x	x	x	***	24-38 HRC
ASTM A194 GR. 7M	ASTM A194	GR. 7M	-	x	x	x	x		24 HRC (max)
ASTM A194 GR. 4	ASTM A194	GR. 4	-	x	x	x	x	***	24-38 HRC
ASTM A193 GR. B16	ASTM A193	B16	-	860	725	18	50	X	35 HRC (max)
SAE 4340	SAE 4340	SAE 4340	-	1061	963	18	53.8	X	337 HB (36 HRC)
BS 970 EN 8	BS 970	EN 8	080M40	550 min	280 min	16	-	X	152-207 HB
BS 970 EN 24	BS 970	EN 024	817M40	1061	963	18	53.8	X	337 HB (36 HRC)

EN 024 (34CrNiMo6)	EN 10083-1	EN 024	-	1061	963	13.5	53.8	X	337 HB (36 HRC)
AISI 4140	AISI 4140	4140	-	861	723	16	50	X	26-35 HRC
ASTM F568 GR. 12.9	ASTM F568	GR. 12.9	-	1220	1100	8	35	X	38-44 HRC
ASTM F568 GR. 10.9	ASTM F568	GR. 10.9	-	1040	940	9	35	X	33-39 HRC
ASTM A193 GR. B8T CL. 2	ASTM A193	B8T	CL. 2	860	690	12	35	X	35 HRC (max)
ASTM A193 GR. B8C CL. 2	ASTM A193	B8C	CL. 2	860	690	12	35	X	35 HRC (max)
ASTM A194 GR. 8C	ASTM A194	8C	-	-	-	-	-	X	32 HRC (max)
EN 10083 - 1 (C35)	EN 10083 - 1	C35	-	520	270	19	-	X	-
<b>MECHANICAL PROPERTIES</b>									
DESCRIPTION	MATERIAL STANDARDS	GRADE	CLASS / TYPE	T.S ( N/mm <sup>2</sup> )	Y.S N/mm <sup>2</sup>	ELONGATION (%)	AREA REDUCE (%)	PROOF LOAD	HARDNESS
ASTM A36	ASTM A36	A36	-	400-550	250 min	23 (min)	-	X	-
AISI 1045	AISI 1045	1045	-	647 (min)	415 (min)	17.5 (min)	43.5 (min)	-	-
ASTM F568 GR. 8.8	ASTM F568	GR. 8.8	-	830 min	660 min	12	35	X	23-34 HRC
BS 3692 GR. 5.8	BS 3692	GR. 5.8	-	520 min	420 min	10	35	X	82 HRB (min)
BS 3692 GR. 8.8	BS 3692	GR. 8.8	-	830 min	660 min	12	52	X	23-34 HRC
BS 3692 GR. 4.6	BS 3692	GR. 4.6	-	400	240	22	35	X	65-95 HRB
EN19 (42CRMO4)	EN 10083-1	EN 019	-	860	720	16	50	X	321 HB MAX
ASTM A307 Gr.C	ASTM A307	GR. C	-	400-550	250 min	23	-	-	-
ASTM A194 Gr.2H	ASTM A194	GR. 2H	-	-	-	-	-	984.5 KN	24-38 HRC
ASTM A563 CL.10S	ASTM A563	CL. 10S	HVY HEX	-	-	-	-	180 KSI	26-36 HRC
ASTM A563 CL.10	ASTM A563	CL. 10	-	-	-	-	-	1060 N/mm <sup>2</sup>	26-36 HRC
ASTM A307 GR. B	ASTM A307	GR. B	-	415-690	-	18	-	X	69-95 HRB
ASTM A307 GR. A	ASTM A307	GR. A	-	415 (min)	-	18	-	X	69-100 HRB
ASTM A325 Type 1	ASTM A325	-	TYPE 1	830	660	17	50	X	24-35 HRC
ASTM A325 Type 3	ASTM A325	CL. A	TYPE 3	830	660	17	50	X	24-35 HRC
BS 4395 GR. 8.8	BS 4395	GR. 8.8	-	830	660	12	35	X	23-34 HRC
EN 10025 S275J2G3	EN 10025	S275J0	-	-	265	20	-	X	-
AISI 1040	AISI 1040	1040	-	600 (min)	362 (min)	30 (min)	49 (min)	X	90 HRB (15 HRC)
AISI 1035	AISI 1035	1035	-	-	-	-	-	X	-
AISI 1060	AISI 1060	1060	-	814 (min)	483 (min)	17	-	X	179 - 241 HB
AISI 1095	AISI 1095	1095	-	965 (min)	572 (min)	9	-	X	192 - 293 HB
ASTM A194 Gr.2HM	ASTM A194	GR. 2HM	-	-	-	-	-	-	22 HRC (max)
ASTM F1554	ASTM F1554	GR. 55	-	517-655	380 min	18 (min)	30 (min)	-	-
ASTM F1554	ASTM F1554	GR. 36	-	400-558	248 min	20 (min)	-	-	-
ASTM A320 GR. L7M	ASTM A320	GR. L7M	-	690	550	-	-	-	99 HRB (max)
ASTM A320 GR. L43	ASTM A320	GR. L43	-	860	725	16	50	-	23-34 HRC

ASTM A473 Type 316 ***	ASTM A473	316	-	515	205	30	50	X	18.0 HRC (max)
ASTM A563 GR. A	ASTM A563	A	HVY HEX	-	-	-	-	100 KSI	32 HRC (max)
<b>MECHANICAL PROPERTIES</b>									
DESCRIPTION	MATERIAL STANDARDS	GRADE	CLASS / TYPE	T.S ( N/mm <sup>2</sup> )	Y.S N/mm <sup>2</sup>	ELONGATION (%)	AREA REDUCE (%)	PROOF LOAD	HARDNESS
ASTM A563 GR. C	ASTM A563	C	HVY HEX	-	-	-	-	100 KSI	32 HRC (max)
ASTM A563 GR. A	ASTM A563	A	HEX	-	-	-	-	90 KSI	32 HRC (max)
ASTM A563 GR. DH	ASTM A563	DH	HVY HEX	-	-	-	-	175 KSI	38 HRC (max)
ASTM A563 GR. DH	ASTM A563	DH	HEX	-	-	-	-	150 KSI	38 HRC (max)
ASTM A563 GR. D	ASTM A563	D	HVY HEX	-	-	-	-	150 KSI	38 HRC (max)
ASTM A563 GR. D	ASTM A563	D	HEX	-	-	-	-	135 KSI	38 HRC (max)
ASTM A540 B23	ASTM A540	B23	CL.3	999	827	12	45	-	285-363 HB
BS 4360 GR. 50A	BS 4360	GR. 50A	-	490-630					
ASTM A572 GR. 50	ASTM A572	GR.50	-	450 (min)	345 (min)	18	-	-	-
ASTM A572 GR. 55	ASTM A572	GR.55	-	485 (min)	380 (min)	17	-	-	-
ASTM A572 GR. 60	ASTM A572	GR.60	-	520 (min)	415 (min)	16	-	-	-
ASTM A572 GR. 65	ASTM A572	GR.65	-	550 (min)	450 (min)	15	-	-	-
ASTM F1554 GR. 105	ASTM F1554	GR. 105	-	802- 1034	724	12	45	X	-
ASTM B139 CDA 52100	ASTM B139	CDA 521	-	80 KSI	65 KSI	33	-	X	85 HRB
ASTM A276 GR. 440A / 440C	ASTM A276	440A	-	758	448	14	-	X	269 HB (max)
ASTM A276 GR. 440C / 440A	ASTM A276	440C	-	1960	1830	4	-	X	57 HRC
UNS S31803	ASTM A276	S31803	-	620	448	25	-	X	290 HB (max)
UNS S44002	UNS S44002	-	-	758	448	14	-	X	269 HB (max)
UNS S44003	UNS S44003	-	-	758	448	14	-	X	269 HB (max)
UNS S44004	UNS S44003	-	-	758	448	14	-	X	269 HB (max)
UNS S44002	UNS S44002	440C	-	1960	1830	4	-	X	57 HRC
BS 4360 GR. 40A	BS 4360	GR. 40A	-	400-480	-	22	-	X	-
BS 4360 GR. 43A	BS 4360	GR. 43A	-	430-510	245	20	-	X	-
BS 4360 GR. 50C	BS 4360	GR. 50C	-	490-620	355	18	-	X	-
BS 4360 GR. 55C	BS 4360	GR. 55C	-	550-700	450	17	-	X	-
EN 10025 S275JR	EN 10025	S275JR	-	410-560	265 (min)	23 (min)	-	X	-
EN 10025 S275JO	EN 10025	S275JO	-	410-560	265	23 (min)	-	X	-
ST37-2	ST37-2	ST37-2	-	429	290	32	-	X	115 HB