Table 1. Permitted variations of product analysis from specified range

Element	Range In which maximum of specified element falls	variation on specified range	
		Over max.	Under min.
	%	%	%
(a). *Carbon, carbon manganese, boron and micro-alloyed steels*			
Carbon*	S0.25 > 0.25 0.50* > 0.50 1.05*	0.02 0.03 0.04	0.02 0.03 0.04
Silicon	0.40	0.03	0.03
Manganese	1.0 1.0 1.5 > 1.5	0.04 0.08 0.10	0.04 0.08 0.10
Phosphorus	0.025 > 0.025 0.040 > 0.040 0.060	0.005 0.006 0.008	
Sulphur	0.025 > 0.025 0.040 > 0.040 0.060 > 0.060 0.10 When range is specified: 0.015 - 0.040 0.025 - 0.050 0.050 - 0.10	0.005 0.006 0.008 0.010 0.006 0.008 0.010	 0.003 0.005 0.008
(b) Alloy steels			
Carbon	0.25 > 0.25 0.50 > 0.50	0.01 0.02 0.03	0.01 0.02 0.03
Silicon	0.45	0.03	0.03
Manganese	0.70 > 0.70 1.0 > 1.0 2.0	0.03 0.04 0.05	0.03 0.04 0.05
Phosphorus	0.030 > 0.030 0.040	0.003 0.004	
Sulphur +	0.030 > 0.030 0.040 > 0.040 0.050 When range is specified: 0-015 - 0.040 0.025 - 0.050	0.003 0.004 0.005 0.004 0.005	 0.003 0.003
Chromium	0.60 > 0.60 1.25 > 1.25 2.50 > 2.50 4.0	0.03 0.04 0.05 0.10	0.03 0.04 0.05 0.10

Element	Range In which maximum of specified element falls	variation on specified range	
		Over max.	Under min.
	%	%	%
Molybdenum	0.50 > 0.50	0.02 0.03	0.02 0.03
Nickel	I.0 > 1.0 3.0 > 3.0 5.0	0.03 0.05 0.07	0.03 0.05 0.07
Aluminium	> 0.80 1.50	0.10	0.10
Vanadium	0.30	0.03	0.03
(c) Stainless and heat resisting steels			
Carbon	03 > 0.03 0.25 > 0.25 0.50	0.005 0.01 0-02	 0.01 0.02
Silicon	1.0 > 1.0 2.0	0.05 0.07	0.05 0.07
Manganese	1.0 > 1.0 2.0	0.03 0.04	0.03 0.04
Phosphorus	0.030 > 0.030 0.045 > 0.045	0.003 0.004 0.005	
Sulphur	0.030 > 0.030 0.080 Specified range 0.15 - 0.35	0.003 0.005 0.02	 0.02
Chromium	10.0 > 10.0 15.0 > 15.0 20.0 > 20.0	0.10 0.15 0.20 0.25	0.10 0.15 0.20 0.25
Molybdenum	1.0 > 1.0 2.0 > 2.0 3.0	0.03 0.05 0.08	0.03 0.05 0.08
Nickel	.0 > 1.0 3.0 > 3.0 5-0 > 5.0 10.0 > 10.0 20.0 > 20.0	0.03 0.05 0.07 0.10 0.15 0.20	0.03 0.05 0.07 0.10 0.15 0.20
Niobium	All ranges	0.05	0.05
Selenium	All ranges	0.03	0.03
Titanium	All ranges	0.05	0.05

* When required by the purchaser and subject to agreement with the supplier, smaller variations for the carbon ovar 0.25% up to and, Including-0-50% may.be.agreed.
† For 606M36, deviations from the sulphur analysis are not specified.

APPROXIMATE RELATION BETWEEN BRINELL, ROCKWELL, SHORE, VICKERS HARDNESSES AND TENSILE STRENGTH

BRINELL HARDNESS STEEL BALL OF 10 mm Dia 3000 kgs LOAD		TENSILE STRENGTH (MEAN VALUE CALCULATED FROM BRINELL HARDNESS)		ROCKWELL HARDNESS		VICKERS HARDNESS 30 kgs LOAD	SHORE SCLERO-SCOPE HARDNESS NO.
DIAMETER OF IMPRESSION In mm	BRINELL HARDNESS NO	Kg per sq-mm	tons per sq.in.	C 120 DIAMOND CORE 150Kgs	B 1/16 in. BALL 100Kgs LOAD		
6.00	95	35	22	-	55	100	-
5.95	97	35	22.5	-	55	100	-
5.90	99	36	22.75	-	57	104	-
5.85	101	36	23	-	59	106	-
5.80	103	37	23.5	-	61	108	-
5.75	105	38	24	-	62	110	-
5.70	107	39	24.5	-	63	112	-
5.65	109	39	25	-	64	114	-
5.60	111	40	25.5	-	66	116	-
5.55	114	41	26	-	67	120	-
5.50	116	42	26.5	-	68	122	-
5.45	118	43	27	-	69	124	-
5.40	121	44	28	-	70	127	-
5.35	123	45	28.5	-	71	128	-
5.30	126	46	29	-	72	133	-
5.25	128	46	29.5	-	73	135	-
5.20	131	47	30	-	74	138	-
5.15	134	49	31	-	75	141	-
5.10	137	50	31.5	-	76	144	-
5.05	140	50	32	-	77	147	-
5.00	143	52	33	-	78	150	-
4.95	146	53	33.5	-	79	153	-
4.90	149	54	34	-	80	156	-
4.85	153	55	35	-	81	161	-
4.80	156	57	36	-	82	164	-
4.75	159	57	36.5	-	83	167	-
4.70	163	59	37.5	-	85	171	-
4.65	167	60	38	-	86	176	-
4.60	170	61	38.5	-	87	179	-
4.55	174	61	39	-	88	183	-
4.50	179	62	39.5	-	89	188	-
4.45	183	63	40	-	90	192	30
4.40	187	65	41	-	90	197	31
4.35	192	66	42	-	91	202	-
4.30	197	68	43	-	92	207	32
4.25	201	69	44	14	93	211	33
4.20	207	71	45	15	94	217	-
4.15	212	72	46	16	95	222	34
4.10	217	74	47	17	96	227	35
4.05	223	77	49	18	98	233	36
4.00	229	79	50	19	99	239	37
3.95	235	80	51	20	100	245	38

Continued.

APPROXIMATE RELATION BETWEEN BRINELL, ROCKWELL, SHORE, VICKERS HARDNESSES AND TENSILE STRENGTH (CONTD.)

BRINELL HARDNESS STEEL BALL OF 10 mm Dia 3000 kgs LOAD		TENSILE STRENGTH (MEAN VALUE CALCULATED FROM BRINELL HARDNESS)		ROCKWELL HARDNESS		VICKERS HARDNESS 30 kgs LOAD	SHORE SCLERO-SCOPE HARDNESS NO.
DIAMETER OF IMPRESSION In mm	BRINELL HARDNESS NO	Kg per sq-mm	tons per sq.in.	C 120 DIAMOND CORE 150Kgs	B 1/16 in. BALL 100Kgs LOAD		
3.90	241	82	52	21	100	251	39
3.85	248	85	54	22	101	258	40
3.80	255	87	55	23	101	265	41
3.75	262	90	57	24	102	273	42
3.70	269	93	59	25	103	280	43
3.65	277	94	60	26	104	289	44
3.60	286	98	62	28	104	299	45
3.55	293	101	64	29	105	306	46
3.50	302	104	66	31	106	315	47
3.45	311	107	68	33	106	326	48
3.40	321	110	70	34	107	337	49
3.35	331	113	72	35	108	348	50
3.30	341	117	74	37	109	360	52
3.25	352	120	76	38	109	371	53
3.20	363	124	79	40	110	382	54
3.15	375	129	82	41	-	394	55
3.10	388	134	85	42	-	407	57
3.05	401	137	87	43	-	418	58
3.00	415	142	90	44	-	433	60
2.95	429	146	93	45	-	445	62
2.90	444	153	97	47	-	460	63
2.85	461	157	100	48	-	474	65
2.80	477	164	104	50	-	490	67