

Section 15. Technical Appendix

Table 15.1 SI Units US or UK Conversion

Quantity	SI Units		US or UK Units		Conversion			
	Name	Symbol	Name	Symbol	SI to US or UK		US or UK to SI	
Pressure strength	megapascal or newton per square millimetre	MPa or N/mm ²	pound force per square inch	lbf/in ² or psi	MPa or 1 N/mm ²	= 145 lbf/in ² or psi	1 lbf/in ² or 1 psi	= 0,0069 MPa or N/mm ²
	bar or decanewton per square centimetre	b or daN/cm ²	pound force per square inch	lbf/in ² or psi	1 b or 1 da N/cm ²	= 14,5 lbf/in ² or psi	1 lbf/in ² or 1 psi	= 0,069 b or daN/cm ²
	decanewton per square millimetre	daN/mm ²	pound force per square inch	lbf/in ² or psi	1 daN/mm ² = 1450 psi		1 lbf/in ² or 1 psi	= 0,00069 daN/mm ²
	megapascal	MPa	short ton per square inch	sh ton/in ²	1 MPa = 0,0725 sh tn/in ²		1 sh tn/in ² = 13,79 MPa	
	megapascal	MPa	long ton per square inch	UK ton/in ²	1 MPa = 0,0647 sh ton/in ²		1 UK ton/in ² = 15,44 MPa	
Moment of a couple	newton metre	N.m	pound force - foot	lbf ft	1 N.m = 0,073756 lbf ft		1 lbf ft = 1,3558 N.m	
	decanewton metre	da N.m	pound force - foot	lbf ft	1 da N.m = 7,3756 lbf ft		1 lbf ft = 0,1356 da N.m	

Section 15. Technical Appendix

Table 15.2 SI Units US or UK Conversion

Quantity	SI Units		US or UK Units		Conversion	
	Name	Symbol	Name	Symbol	SI to US or UK	US or UK to SI
Length	millimetre	mm	inch	in	1 mm = 0,03937 in	1 in = 25,4 mm
	metre	m	foot	ft	1 m = 3,281 ft	1 ft = 0,3048 m
	metre	m	yard	yd	1 m = 1,0936 yd	1 yd = 0,9144 m
	kilometre	km	mile	mi	1 km = 0,6214 mi	1 mi = 1,609 km
Area	square millimetre	mm ²	square inch	in ²	1 mm ² = 0,00155in ²	1 in ² = 645,2 mm ²
	square metre	m ²	square foot	ft ²	1 m ² = 10,7643 ft ²	1 ft ² = 0,0929 m ²
	square metre	m ²	square yard	yd ²	1 m ² = 1,1959 yd ²	1 yd ² = 0,8361 m ²
	square kilometre	km ²	square mile	mi ²	1 km ² = 0,3861 mi ²	1 mi ² = 2,59 km ²
Volume	cubic centimetre	cm ³	cubic inch	in ³	1 cm ³ = 0,061 in ³	1 in ³ = 16,39 cm ³
	cubic decim. - litre	dm ³ -l	cubic foot	ft ³	1 dm ³ = 1l = 0,0353 ft ³	1 ft ³ = 28,32 l ou/or dm ³
	cubic metre	m ³	cubic yard	yd ³	1 m ³ = 1,307 yd ³	1 yd ³ = 0,765 m ³
	litre	l	US gallon	US gal	1l = 0,2642 US gal	1 US gal = 3,785 l
	litre	l	UK gallon	UK gal	1l = 0,2200 UK gal	1 UK gal = 4,546 l
Mass	gram	g	ounce	oz	1 g = 0,0353 oz	1 oz = 28,35 g
	kilogram	kg	pound	lb	1 kg = 2,204 lb	1 lb = 0,4536 kg
	tonne	t	short ton	sh tn	1 t = 1,1023 sh tn	1 sh tn = 0,9072 t
	tonne	t	long ton	UK ton	1 t = 0,9842 UK ton	1 UK ton = 1,0160 t

Section 15. Technical Appendix

Table 15.3 Pressure Conversion

lbf/in ² psi	bar	lbf/in ² psi	bar	lbf/in ² psi	bar	lbf/in ² psi	bar	lbf/in ² psi	bar	lbf/in ² psi	bar
1	0.0689	26	1.7926	51	3.5163	76	5.2400	101	6.9637	126	8.69
2	0.1379	27	1.8616	52	3.5853	77	5.3090	102	7.0327	127	8.76
3	0.2068	28	1.9305	53	3.6542	78	5.3779	103	7.1016	128	8.83
4	0.2758	29	1.9995	54	3.6542	79	5.4469	104	7.1706	129	8.89
5	0.3447	30	2.0684	55	3.7921	80	5.5158	105	7.2395	130	8.96
6	0.4137	31	2.1374	56	3.8611	81	5.5848	106	7.31	131	9.03
7	0.4826	32	2.2063	57	3.9300	82	5.6537	107	7.38	132	9.10
8	0.5516	33	2.2753	58	3.9990	83	5.7227	108	7.45	133	9.17
9	0.6205	34	2.3442	59	4.0679	84	5.7916	109	7.52	134	9.24
10	0.6895	35	2.4132	60	4.1369	85	5.8605	110	7.58	135	9.31
11	0.7584	36	2.4821	61	4.2058	86	5.9295	111	7.65	136	9.38
12	0.8274	37	2.5511	62	4.2748	87	5.9984	112	7.72	137	9.45
13	0.8963	38	2.6200	63	4.3437	88	6.0674	113	7.79	138	9.51
14	0.9653	39	2.6890	64	4.4126	89	6.1363	114	7.86	139	9.58
15	1.0342	40	2.7579	65	4.4816	90	6.2053	115	7.93	140	9.65
16	1.1032	41	2.8269	66	4.5505	91	6.2742	116	8.00	141	9.72
17	1.1721	42	2.8959	67	4.6195	92	6.3422	117	8.07	142	9.79
18	1.2411	43	2.9647	68	4.6884	93	6.4121	118	8.14	143	9.86
19	1.3100	44	3.0337	69	4.7574	94	6.4811	119	8.20	144	9.93
20	1.3790	45	3.1026	70	4.8263	95	6.5500	120	8.27	145	10.00
21	1.4479	46	3.1716	71	4.8953	96	6.6190	121	8.34	146	10.07
22	1.5168	47	3.2405	72	4.9642	97	6.6879	122	8.41	147	10.14
23	1.5858	48	3.3095	73	5.0332	98	6.7569	123	8.48	148	10.20
24	1.6547	49	3.3784	74	5.1021	99	6.8258	124	8.55	149	10.27
25	1.7237	50	3.4474	75	5.1711	100	6.8948	125	8.62	150	10.34

Section 15. Technical Appendix

Table 15.3 Pressure Conversion

lbf/in ² psi	bar	lbf/in ² psi	bar	lbf/in ² psi	bar	lbf/in ² psi	bar	lbf/in ² psi	bar	lbf/in ² psi	bar
155	10.69	280	19.31	510	35.16	760	52.40	1010	69.64	1260	86.90
160	11.03	285	19.65	520	35.85	770	53.09	1020	70.33	1270	87.59
165	11.38	290	19.99	530	36.54	780	53.78	1030	71.02	1280	88.28
170	11.72	295	20.34	540	37.23	790	54.47	1040	71.71	1290	88.97
175	12.07	300	20.68	550	37.92	800	55.16	1050	72.40	1300	89.66
180	12.41	310	21.37	560	38.61	810	55.85	1060	73.11	1310	90.35
185	12.76	320	22.06	570	39.30	820	56.54	1070	73.80	1320	91.04
190	13.10	330	22.75	580	39.99	830	57.23	1080	74.49	1330	91.73
195	13.44	340	23.44	590	40.68	840	57.92	1090	75.18	1340	92.42
200	13.79	350	24.13	600	41.37	850	58.60	1100	75.87	1350	93.11
205	14.13	360	24.82	610	42.06	860	59.30	1110	76.56	1360	93.80
210	14.48	370	25.51	620	42.75	870	59.98	1120	77.25	1370	94.49
215	14.82	380	26.20	630	43.44	880	60.67	1130	77.94	1380	95.19
220	15.17	390	26.89	640	44.13	890	61.36	1140	78.62	1390	95.87
225	15.52	400	27.58	650	44.82	900	62.05	1150	79.31	1400	96.56
230	15.86	410	28.27	660	45.50	910	62.74	1160	80.00	1410	97.24
235	16.20	420	28.96	670	46.20	920	63.43	1170	80.70	1420	97.94
240	16.55	430	29.65	680	46.88	930	64.12	1180	81.38	1430	98.63
245	16.89	440	30.34	690	47.57	940	64.81	1190	82.07	1440	99.32
250	17.24	450	31.03	700	48.26	950	65.50	1200	82.76	1450	100.0
255	17.58	460	31.72	710	48.95	960	66.19	1210	83.45	1460	100.7
260	17.93	470	32.41	720	49.64	970	66.88	1220	84.14	1470	101.4
265	18.27	480	33.09	730	50.33	980	67.57	1230	84.83	1480	102.1
270	18.62	490	33.78	740	51.02	990	68.28	1240	85.52	1490	102.8
275	18.96	500	34.47	750	51.71	1000	68.95	1250	86.21	1500	103.4

Table 15.3 Pressure Conversion

lbf/in ² psi	bar	lbf/in ² psi	bar	lbf/in ² psi	bar	lbf/in ² psi	bar	lbf/in ² psi	bar	lbf/in ² psi	bar
1600	110.4										
1700	117.2										
1800	124.1										
1900	131.0										
2000	137.9										
2500	172.4										
3000	206.9										
5000	344.8										
10000	690.0										
15000	1035.0										
20000	1397.0										

Section 15. Technical Appendix

Table 15.4 Hardness Comparison Table

BRINELL 10mm Ball 3000 kg Load	VICKERS 120 kg	ROCKWELL		BRINELL 10mm Ball 3000 kg Load	VICKERS 120 kg	ROCKWELL	
		C Scale 120° Cone kg Load	150 B Scale $\frac{1}{16}$ " Ball 100 kg Load			C Scale 120° Cone kg Load	150 B Scale $\frac{1}{16}$ " Ball 100 kg Load
-	-	-	-	285	285	31	105
130	130	-	72	293	291	32	106
135	135	-	75	301	305	33	107
140	141	-	77	311	312	34	108
141	142	-	78	323	320	35	109
143	144	-	79	331	335	36	109
145	146	-	79	341	344	37	110
147	147	-	80	346	352	37	110
150	149	-	81	351	361	38	111
152	150	-	82	362	380	39	111
154	152	-	82	370	385	40	112
156	154	1	83	375	390	41	113
160	159	2	84	388	401	42	114
163	162	3	85	401	423	43	114
165	165	4	86	415	435	44	115
167	168	5	87	427	460	45	115
170	171	6	87	444	474	46	116
175	174	7	88	451	489	47	117
180	177	9	89	461	502	48	117
183	183	10	90	477	534	49	118
185	184	11	91	495	551	51	119
187	186	12	91	502	565	52	119
191	190	13	92	514	587	53	120
196	197	14	92	529	606	54	-
200	199	15	93	545	639	55	-
203	201	16	94	552	649	56	-
206	209	17	94	576	694	57	-

Table 15.4 Hardness Comparison Table

BRINELL 10mm Ball 3000 kg Load	VICKERS 120 kg	ROCKWELL		BRINELL 10mm Ball 3000 kg Load	VICKERS 120 kg	ROCKWELL	
		C Scale 120° Cone kg Load	150 B Scale 1/16" Ball 100 kg Load			C Scale 120° Cone kg Load	150 B Scale 1/16" Ball 100 kg Load
211	213	18	95	590	727	59	-
217	217	19	96	601	746	60	-
224	238	20	97	614	775	61	-
229	243	21	98	626	803	62	-
237	235	22	99	652	867	63	-
240	240	23	99	668	905	64	-
245	246	24	100	682	940	65	-
249	250	25	101	712	1021	66	-
255	255	26	102	725	1060	67	-
258	258	27	102	745	1114	68	-
261	261	28	103	760	1170	70	-
269	272	29	104	780	1220	71	-
276	278	30	105	800	-	72	-

GENERAL NOTE: There is no recognised body to provide comparisons between hardness, consequently the values shown in the table are provided for guidance only.

Section 15. Technical Appendix

Temperature conversion F° to $C^{\circ} = 5/9 (F^{\circ}-32)$ C° to $F^{\circ} = (C^{\circ} \times 9/5)+32$

Table 15.5 Temperature Conversion

$^{\circ}C \leftarrow ^{\circ}F$			$^{\circ}C \leftarrow ^{\circ}F$			$^{\circ}C \leftarrow ^{\circ}F$			$^{\circ}C \leftarrow ^{\circ}F$			$^{\circ}C \leftarrow ^{\circ}F$		
	$^{\circ}C \rightarrow$	$^{\circ}F$		$^{\circ}C \rightarrow$	$^{\circ}F$		$^{\circ}C \rightarrow$	$^{\circ}F$		$^{\circ}C \rightarrow$	$^{\circ}F$		$^{\circ}C \rightarrow$	$^{\circ}F$
-73.3	-100	-148.0	0.0	32	89.6	30.6	87	188.6	60.5	141	285.8	190.6	375	707.0
-67.8	-90	-130.0	0.6	33	91.4	31.1	88	190.4	61.1	142	287.6	193.4	380	716.0
-62.2	-80	-112.0	1.1	34	93.2	31.7	89	192.2	61.6	143	289.4	196.1	385	725.0
-56.7	-70	-94.0	1.7	35	95.0	32.2	90	194.0	62.2	144	291.2	198.9	390	734.0
-51.1	-60	-76.0	2.3	36	96.8	32.8	91	195.8	62.7	145	293.0	201.7	395	743.0
-45.6	-50	-58.0	2.8	37	98.6	33.3	92	197.6	63.3	146	294.8	204.4	400	752.0
-42.8	-45	-49.0	3.4	38	100.4	33.9	93	199.4	63.8	147	296.6	207.2	405	761.0
-40.0	-40	-40.0	3.9	39	102.2	34.4	94	201.2	64.4	148	298.4	210.0	410	770.0
-37.2	-35	-31.0	4.5	40	104.0	35.0	95	203.0	65.0	149	300.2	212.8	415	779.0
-34.5	-30	-22.0	5.0	41	105.8	35.6	96	204.8	65.5	150	302.0	215.6	420	788.0
-31.7	-25	-13.0	5.6	42	107.6	36.1	97	206.6	68.3	155	311.0	218.4	425	797.0
-28.9	-20	-4.0	6.1	43	109.4	36.7	98	208.4	71.0	160	320.0	221.1	430	806.0
-26.1	-15	5.0	6.7	44	111.2	37.2	99	210.2	73.8	165	329.0	223.9	435	815.0
-23.2	-10	14.0	7.2	45	113.0	37.8	100	212.0	76.6	170	338.0	226.7	440	824.0
-22.7	-9	15.8	7.8	46	114.8	38.3	101	213.8	79.3	175	347.0	229.4	445	833.0
-22.2	-8	17.6	8.3	47	116.6	38.9	102	215.6	82.1	180	356.0	232.2	450	842.0
-21.6	-7	19.4	8.9	48	118.4	39.4	103	217.4	85.0	185	365.0	235.0	455	851.0
-21.1	-6	21.2	9.5	49	120.2	40.0	104	219.2	87.8	190	374.0	237.8	460	860.0
-20.5	-5	23.0	10.0	50	122.0	40.6	105	221.0	90.5	195	383.0	240.6	465	869.0
-20.0	-4	24.8	10.6	51	123.8	41.1	106	222.8	93.3	200	392.0	243.4	470	878.0
-19.4	-3	26.6	11.1	52	125.6	41.7	107	224.6	96.1	205	401.0	246.1	475	887.0
-18.9	-2	28.4	11.7	53	127.4	42.2	108	226.4	98.8	210	410.0	248.9	480	896.0
-18.3	-1	30.2	12.2	54	128.2	42.8	109	228.2	101.6	215	419.0	251.7	485	905.0
-17.8	0	32.0	12.8	55	131.0	43.3	110	230.0	104.4	220	428.0	254.4	490	914.0
-17.2	1	33.8	13.3	56	132.8	43.9	111	231.8	107.2	225	437.0	257.2	495	923.0
-16.7	2	35.6	13.9	57	134.6	44.4	112	233.6	110.0	230	446.0	260.0	500	932.0

Temperature conversion F° to $C^{\circ} = 5/9 (F^{\circ}-32)$ C° to $F^{\circ} = (C^{\circ} \times 9/5)+32$

Table 15.5 Temperature Conversion

$^{\circ}C \leftarrow ^{\circ}F$			$^{\circ}C \leftarrow ^{\circ}F$			$^{\circ}C \leftarrow ^{\circ}F$			$^{\circ}C \leftarrow ^{\circ}F$			$^{\circ}C \leftarrow ^{\circ}F$		
$^{\circ}C$	$^{\circ}F$	$^{\circ}F$	$^{\circ}C$	$^{\circ}F$	$^{\circ}F$	$^{\circ}C$	$^{\circ}F$	$^{\circ}F$	$^{\circ}C$	$^{\circ}F$	$^{\circ}F$	$^{\circ}C$	$^{\circ}F$	$^{\circ}F$
-16.1	3	37.4	14.4	58	136.4	45.0	113	235.4	112.7	235	455.0	265.5	510	950.0
-15.6	4	39.2	15.0	59	138.2	45.6	114	237.2	115.5	240	464.0	271.1	520	968.0
-15.0	5	41.0	15.6	60	140.0	46.1	115	239.0	118.2	245	473.0	276.6	530	986.0
-14.4	6	42.8	16.1	61	141.8	46.7	116	240.8	121.0	250	482.0	282.1	540	1004.0
-13.9	7	44.6	16.7	62	143.6	47.2	117	242.6	123.8	255	491.0	287.7	550	1022.0
-13.3	8	46.4	17.2	63	145.4	47.8	118	244.4	126.6	260	500.0	293.3	560	1040.0
-12.8	9	48.2	17.8	64	147.2	48.3	119	246.2	129.4	265	509.0	298.8	570	1058.0
-12.2	10	50.0	18.3	65	149.0	48.9	120	248.0	123.2	270	518.0	304.4	580	1076.0
-11.7	11	51.8	18.9	66	150.8	49.4	121	249.8	135.0	275	527.0	310.0	590	1094.0
-11.1	12	53.6	19.4	67	152.6	50.0	122	251.6	137.7	280	536.0	315.5	600	1112.0
-10.6	13	55.4	20.0	68	154.4	50.6	123	253.4	140.5	285	545.0	321.1	610	1130.0
-10.0	14	57.2	20.6	69	156.2	51.1	124	255.2	143.3	290	554.0	326.6	620	1148.0
-9.5	15	59.0	21.1	70	158.0	51.7	125	257.0	146.1	295	563.0	332.2	630	1166.0
-8.9	16	60.8	21.6	71	159.8	52.2	126	258.8	148.9	300	572.0	337.7	640	1184.0
-8.3	17	62.6	22.2	72	161.6	52.8	127	260.6	151.7	305	581.0	343.3	650	1202.0
-7.8	18	64.4	22.7	73	163.4	53.3	128	262.4	154.5	310	590.0	348.8	660	1220.0
-7.2	19	66.2	23.3	74	165.2	53.9	129	264.2	157.2	315	599.0	354.4	670	1238.0
-6.7	20	68.0	23.9	75	167.0	54.4	130	266.0	160.0	320	608.0	360.0	680	1256.0
-6.1	21	69.8	24.4	76	168.8	55.0	131	267.8	162.8	325	617.0	365.5	690	1274.0
-5.6	22	71.6	25.0	77	170.6	55.5	132	269.6	165.6	330	626.0	371.1	700	1292.0
-5.0	23	73.4	25.6	78	172.4	56.1	133	271.4	168.4	335	635.0	376.6	710	1310.0
-4.5	25	75.2	26.1	79	174.2	56.6	134	273.2	171.1	340	644.0	382.2	720	1328.0
-3.9	25	77.0	26.7	80	176.0	57.2	135	275.0	173.9	345	653.0	387.7	730	1346.0
-3.4	26	78.8	27.2	81	177.8	57.7	136	276.8	176.7	350	662.0	393.3	740	1364.0
-2.8	27	80.6	27.8	82	179.6	58.3	137	278.6	179.5	355	671.0	398.8	750	1382.0
-2.3	28	82.4	28.3	83	181.4	58.8	138	280.4	182.2	360	680.0	404.4	760	1400.0
-1.7	29	84.2	28.9	84	183.2	59.4	139	282.2	185.0	365	689.0	410.0	770	1418.0
-1.1	30	86.0	29.4	85	185.0	60.0	140	284.0	187.8	370	698.0	415.5	780	1436.0
-0.6	31	87.8	30.0	86	186.8									

Section 15. Technical Appendix

Table 15.6 British Wire Gauge Conversion

Imperial Standard Wire Gauge		Birmingham Wire Gauge		Birmingham Gauge 1884	
No.	Equivalent in mm	No.	Equivalent in mm	No.	Equivalent in mm
000	9.448	000	10.794	000	12.700
00	8.839	00	9.651	00	12.308
0	8.229	0	8.633	0	10.068
1	7.620	1	7.620	1	8.871
2	7.010	2	7.213	2	7.993
3	6.400	3	6.579	3	7.122
4	5.893	4	6.045	4	6.350
5	5.385	5	5.558	5	5.631
6	4.877	6	5.156	6	5.032
7	4.470	7	4.571	7	4.480
8	4.064	8	4.191	8	3.988
9	3.658	9	3.759	9	3.551
10	3.251	10	3.403	10	3.175
11	2.946	11	3.047	11	2.827
12	2.642	12	2.768	12	2.517
13	2.337	13	2.412	13	2.240
14	2.032	14	2.108	14	1.994
15	1.829	15	1.828	15	1.775
16	1.626	16	1.650	16	1.587
17	1.442	17	1.472	17	1.412
18	1.219	18	1.244	18	1.257
19	1.016	19	1.066	19	1.118
20	0.914	20	0.888	20	0.996
21	0.813	21	0.812	21	0.886
22	0.711	22	0.761	22	0.792
23	0.610	23	0.634	23	0.707

Table 15.6 British Wire Gauge Conversion

Imperial Standard Wire Gauge		Birmingham Wire Gauge		Birmingham Gauge 1884	
No.	Equivalent in mm	No.	Equivalent in mm	No.	Equivalent in mm
24	0.559	24	0.558	24	0.629
25	0.508	25	0.507	25	0.560
26	0.457	26	0.457	26	0.498
27	0.406	27	0.406	27	0.443
28	0.355	28	0.355	28	0.396
29	0.330	29	0.330	29	0.353
30	0.304	30	0.304	30	0.312