

SUPPLEMENT No. 1 (1967) to
BRITISH STANDARD 350 : Part 2 : 1962
Conversion factors and tables
Part 2. Detailed conversion tables

ADDITIONAL TABLES FOR SI CONVERSIONS

PD 6203

Incorporating amendment issued
October 1969 (AMD 342)

THIS SUPPLEMENT, having been approved by the Units and Symbols Standards Committee was published under the authority of the General Council on 15 August, 1967.

The Institution desires to call attention to the fact that this British Standard does not purport to include all the necessary provisions of a contract.

In order to keep abreast of progress in the industries concerned, British Standards are subject to periodical review. Suggestions for improvements will be recorded and in due course brought to the notice of the committees charged with the revision of the standards to which they refer.

A complete list of British Standards, numbering over 5000, fully indexed and with a note of the contents of each, will be found in the British Standards Yearbook, price £1. The BS Yearbook may be consulted in many public libraries and similar institutions.

This standard makes reference to the following British Standards:

- BS 350. Conversion factors and tables.
Part 2, Detailed conversion tables.
- BS 3763. The international system (SI) units.

British Standards are revised, when necessary, by the issue either of amendment slips or of revised editions. It is important that users of British Standards should ascertain that they are in possession of the latest amendments or editions.

The following BSI references relate to the work on this standard:
Committee references USM/1, USM/1/6, USM/1/6/2

Amendment Slip No.2, published 24 September, 1973
to PD 6203

Supplement No.1 (1967) to B.S. 350 : Part 2 : 1962

Conversion factors and tables

Part 2. Detailed conversion tables

Additional tables for SI conversions

Additional text

Foreword. At the end of the foreword insert the following paragraph:

‘This supplement was published before the approval (by the General Conference of Weights and Measures in October 1971) of the special name pascal (symbol Pa) for the SI unit of pressure and stress, the newton per square metre (N/m^2). Thus, in connection with Tables 181 to 192, the newton per square metre may be called the pascal, and its symbol written as Pa. Similarly kN/m^2 may be shown as kPa, and MN/m^2 as MPa.’

Tables 181 to 192

Insert footnotes to these tables as indicated below:

Table No.	Pages requiring footnote	Footnote to be inserted
181	41 and 43	$1 \text{ MN/m}^2 = 1 \text{ N/mm}^2 = 1 \text{ MPa}$
182	45 and 47	$1 \text{ N/mm}^2 = 1 \text{ MN/m}^2 = 1 \text{ MPa}$
183	49 and 51	$1 \text{ kN/m}^2 = 0.01 \text{ bar} = 0.001 \text{ MN/m}^2 = 0.001 \text{ N/mm}^2 = 1 \text{ kPa}$
184	53 and 55	$1 \text{ bar} = 100 \text{ kN/m}^2 = 100 \text{ kPa}$ $1 \text{ N/mm}^2 = 1 \text{ MN/m}^2 = 1000 \text{ kN/m}^2 = 1 \text{ MPa}$
185	57 and 59	$1 \text{ N/m}^2 = 0.01 \text{ mbar} = 1 \text{ Pa}$
186	61 and 63	$1 \text{ mbar} = 100 \text{ N/m}^2 = 100 \text{ Pa}$
187	64	$1 \text{ kN/m}^2 = 10 \text{ mbar} = 1 \text{ kPa}$
188	65	$1 \text{ mbar} = 0.1 \text{ kN/m}^2 = 0.1 \text{ kPa}$
189	66	$1 \text{ kN/m}^2 = 10 \text{ mbar} = 1 \text{ kPa}$
190	67	$1 \text{ mbar} = 0.1 \text{ kN/m}^2 = 0.1 \text{ kPa}$
191	68	$1 \text{ kN/m}^2 = 10 \text{ mbar} = 1 \text{ kPa}$
192	69	$1 \text{ mbar} = 0.1 \text{ kN/m}^2 = 0.1 \text{ kPa}$

Correction

Table 182. Pressure stress. Meganewtons per square metre to UK tons-force per square inch:

Delete the entry ‘9.71253’ for 150.0 MN/m^2 and substitute ‘9.71235’.

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CONTENTS

	Page
Co-operating organizations	6
Foreword	7
Tables	8 to 87
Volume	
167. UK gallons to litres*	8
168. Litres* to UK gallons	9
169. UK fluid ounces to millilitres*	10
170. Millilitres* to UK fluid ounces	11
Mass/length	
171. Pounds per inch to kilogrammes per metre	12
172. Kilogrammes per metre to pounds per inch	13
Mass/area	
173. Ounces (avoirdupois) per square yard to kilogrammes per square metre	14
174. Kilogrammes per square metre to ounces (avoirdupois) per square yard	15
Force	
175. Kilogrammes force to newtons	16
176. Newtons to kilogrammes force	20
177. Pounds force to newtons	24
178. Newtons to pounds force	28
179. UK tons force to kilonewtons	32
180. Kilonewtons to UK tons force	36

* This litre, which equals one decimetre cubed, is as re-defined by the CGPM in 1964, and differs slightly from the litre in Tables 80–85 of BS 350 : Part 2 : 1962 which is legally recognized in the United Kingdom by the Weights and Measures Act, 1963.

	Page
Pressure, stress	
Table	
181. UK tons force per square inch to meganewtons per square metre	40
182. Meganewtons per square metre to UK tons force per square inch	44
183. Pounds force per square inch to kilonewtons per square metre	48
184. Kilonewtons per square metre to pounds force per square inch	52
185. Pounds force per square foot to newtons per square metre	56
186. Newtons per square metre to pounds force per square foot	60
187. Inches of mercury to kilonewtons per square metre	64
188. Kilonewtons per square metre to inches of mercury	65
189. Feet of water to kilonewtons per square metre	66
190. Kilonewtons per square metre to feet of water	67
191. Inches of water to kilonewtons per square metre	68
192. Kilonewtons per square metre to inches of water	69
Work or energy	
193. Kilowatt hours to megajoules	70
194. Megajoules to kilowatt hours	74
Specific energy (Calorific value, mass basis)	
195. British thermal units per pound to kilojoules per kilogramme	78
196. Kilojoules per kilogramme to British thermal units per pound	79

Calorific value, volume basis

- | | |
|--|----|
| 197. British thermal units per cubic foot to
kilojoules per cubic metre | 80 |
| 198. Kilojoules per cubic metre to British
thermal units per cubic foot | 82 |

Specific heat capacity (volume basis)

- | | |
|--|----|
| 199. British thermal units per cubic foot
degree Fahrenheit to kilojoules per
cubic metre degree Celsius | 84 |
| 200. Kilojoules per cubic metre degree
Celsius to British thermal units per
cubic foot degree Fahrenheit | 85 |

Thermal conductance

- | | |
|--|----|
| 201. British thermal units per square foot
hour degree Fahrenheit to watts per
square metre degree Celsius | 86 |
| 202. Kilowatts per square metre degree
Celsius to British thermal units per
square foot hour degree Fahrenheit | 87 |

CO-OPERATING ORGANIZATIONS

The Units and Symbols Standards Committee, under whose supervision this British Standard was prepared, consists of representatives from the following Government departments and scientific and industrial organizations:

- Association of Principals of Technical Institutions
- *British Iron and Steel Federation
- Electrical Research Association
- *Electricity Council, the Central Electricity Generating Board
and the Area Boards in England and Wales
- Engineering Equipment Users' Association
- *Gas Council
- Institute of Fuel
- Institute of Metals
- *Institute of Physics and The Physical Society
- *Institution of Civil Engineers
- Institution of Electrical Engineers
- *Institution of Gas Engineers
- Institution of Mechanical Engineers
- Institution of Production Engineers
- Institution of Structural Engineers
- Ministry of Defence, Army Department
- *Ministry of Technology
- *National Physical Laboratory (Ministry of Technology)
- *Royal Aeronautical Society
- *Royal Institute of British Architects
- *Royal Society
- Society of Chemical Industry
- Water-tube Boilermakers' Association
- *World Power Conference

The Government department and scientific and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committees entrusted with the preparation of this British Standard:

- Board of Trade
- Chemical Society
- Faraday Society
- Institute of Petroleum
- Institute of Weights and Measures Administration
- Institution of Chemical Engineers
- Ministry of Defence, Navy Department
- Post Office
- Royal Institute of Chemistry

ADDITIONAL TABLES FOR SI CONVERSIONS

FOREWORD

As part of the programme for the adoption of the metric system in the United Kingdom, special encouragement is being given to the use of SI units*, or suitable multiples or sub-multiples of these units.

BS 350 : Part 2 : 1962 was not prepared with this purpose in view. Although many of the tables in Part 2 are appropriate for the SI there are some instances, for example with force, pressure and energy units, where the appropriate tables for converting to and from the SI were not included. This supplement, with Tables 167 to 202, is provided to remedy this deficiency.

Users of this supplement are asked to bear the following points in mind:

- (1) The supplement is intended to augment BS 350 : Part 2 : 1962 and is not sufficient in itself to provide a comprehensive range of conversions to and from the SI.
- (2) Where multiples or sub-multiples of SI units have been used in the tables these have been chosen mainly for convenience in setting out the tables; they are not necessarily the most suitable multiples for practical use in any particular context.
- (3) In a supplement of a reasonable size it is not possible to provide conversion tables for every unit that is, or will be, in technical use; the selection has been guided by the tables existing in BS 350 : Part 2 : 1962. No need was seen to include tables for the velocity conversion feet per second to and from metres per second, since the Tables 55–56 in BS 350 : Part 2 : 1962 for the conversion of feet and metres give the necessary information. Similar considerations apply to the conversion of several other compound units which have components that are common or are related by decimal multiples.

* See BS 3763, 'International system (SI) units'.

TABLE 167

Volume: UK gallons to litres*

Basis: 1 UKgal = 4.546 09 litres*

UK gallons	0	1	2	3	4	5	6	7	8	9
	litres									
0	0.00000	4.54609	9.09218	13.6383	18.1844	22.7305	27.2765	31.8226	36.3687	40.9148
10	45.4609	50.0070	54.5531	59.0992	63.6453	68.1913	72.7374	77.2835	81.8296	86.3757
20	90.9218	95.4679	100.014	104.560	109.106	113.652	118.198	122.744	127.291	131.837
30	136.383	140.929	145.475	150.021	154.567	159.113	163.659	168.205	172.751	177.298
40	181.844	186.390	190.936	195.482	200.028	204.574	209.120	213.666	218.212	222.758
50	227.305	231.851	236.397	240.943	245.489	250.035	254.581	259.127	263.673	268.219
60	272.765	277.311	281.858	286.404	290.950	295.496	300.042	304.588	309.134	313.680
70	318.226	322.772	327.318	331.865	336.411	340.957	345.503	350.049	354.595	359.141
80	363.687	368.233	372.779	377.325	381.872	386.418	390.964	395.510	400.056	404.602
90	409.148	413.694	418.240	422.786	427.332	431.879	436.425	440.971	445.517	450.063
100	454.609	—	—	—	—	—	—	—	—	—

* This litre which equals one decimetre cubed is as redefined by the CGPM in 1964, and differs from the litre in Tables 80 to 85 of BS 350 : Part 2 : 1962 legally recognized in the United Kingdom by the Weights and Measures Act 1963.

TABLE 168

Volume: Litres* to UK gallons

Basis: 1 UKgal = 4.546 09 litres*

litres*	0	1	2	3	4	5	6	7	8	9
	UK gallons									
0	0.00000	0.21997	0.43994	0.65991	0.87988	1.09985	1.31982	1.53978	1.75975	1.97972
10	2.19969	2.41966	2.63963	2.85960	3.07957	3.29954	3.51951	3.73948	3.95945	4.17942
20	4.39938	4.61935	4.83932	5.05929	5.27926	5.49923	5.71920	5.93917	6.15914	6.37911
30	6.59908	6.81905	7.03902	7.25899	7.47895	7.69892	7.91889	8.13886	8.35883	8.57880
40	8.79877	9.01874	9.23871	9.45868	9.67865	9.89862	10.1186	10.3386	10.5585	10.7785
50	10.9985	11.2184	11.4384	11.6584	11.8783	12.0983	12.3183	12.5382	12.7582	12.9782
60	13.1982	13.4181	13.6381	13.8581	14.0780	14.2980	14.5180	14.7379	14.9579	15.1779
70	15.3978	15.6178	15.8378	16.0578	16.2777	16.4977	16.7177	16.9376	17.1576	17.3776
80	17.5975	17.8175	18.0375	18.2574	18.4774	18.6974	18.9174	19.1373	19.3573	19.5773
90	19.7972	20.0172	20.2372	20.4571	20.6771	20.8971	21.1170	21.3370	21.5570	21.7770
100	21.9969	—	—	—	—	—	—	—	—	—

* This litre which equals one decimetre cubed is as redefined by the CGPM in 1964, and differs from the litre in Tables 80 to 85 of BS 350 : Part 2 : 1962 legally recognized in the United Kingdom by the Weights and Measures Act 1963.

Volume:
Litres to UK gallons and vice versa

TABLE 169

*Volume: UK fluid ounces to millilitres**

Basis: 1 UKgal = 160 UK fl oz
= 4.546 09 litres*

UK fluid ounces	0	1	2	3	4	5	6	7	8	9
	millilitres									
0	0.00000	28.4131	56.8261	85.2392	113.652	142.065	170.478	198.891	227.305	255.718
10	284.131	312.544	340.957	369.370	397.783	426.196	454.609	483.022	511.435	539.848
20	568.261	596.674	625.087	653.500	681.913	710.327	738.740	767.153	795.566	823.979
30	852.392	880.805	909.218	937.631	966.044	994.457	1022.87	1051.28	1079.70	1108.11
40	1136.52	1164.94	1193.35	1221.76	1250.17	1278.59	1307.00	1335.41	1363.83	1392.24
50	1420.65	1449.07	1477.48	1505.89	1534.31	1562.72	1591.13	1619.54	1647.96	1676.37
60	1704.78	1733.20	1761.61	1790.02	1818.44	1846.85	1875.26	1903.68	1932.09	1960.50
70	1988.91	2017.33	2045.74	2074.15	2102.57	2130.98	2159.39	2187.81	2216.22	2244.63
80	2273.05	2301.46	2329.87	2358.28	2386.70	2415.11	2443.52	2471.94	2500.35	2528.76
90	2557.18	2585.59	2614.00	2642.41	2670.83	2699.24	2727.65	2756.07	2784.48	2812.89
100	2841.31	—	—	—	—	—	—	—	—	—

* This litre which equals one decimetre cubed is as redefined by the CGPM in 1964, and differs from the litre in Tables 80 to 85 of BS 350 : Part 2 : 1962 legally recognized in the United Kingdom by the Weights and Measures Act 1963.

TABLE 170

Volume: Millilitres* to UK fluid ounces

Basis: 1 UKgal = 160 UK fl oz
= 4.546 09 litres*

milli- litres*	0	1	2	3	4	5	6	7	8	9
	UK fluid ounces									
0	0.00000	0.03520	0.07039	0.10559	0.14078	0.17598	0.21117	0.24637	0.28156	0.31676
10	0.35195	0.38715	0.42234	0.45754	0.49273	0.52793	0.56312	0.59832	0.63351	0.66871
20	0.70390	0.73910	0.77429	0.80949	0.84468	0.87988	0.91507	0.95027	0.98546	1.02066
30	1.05585	1.09105	1.12624	1.16144	1.19663	1.23183	1.26702	1.30222	1.33741	1.37261
40	1.40780	1.44300	1.47819	1.51339	1.54858	1.58378	1.61897	1.65417	1.68936	1.72456
50	1.75975	1.79495	1.83014	1.86534	1.90053	1.93573	1.97092	2.00612	2.04131	2.07651
60	2.11170	2.14690	2.18209	2.21729	2.25249	2.28768	2.32288	2.35807	2.39327	2.42846
70	2.46366	2.49885	2.53405	2.56924	2.60444	2.63963	2.67483	2.71002	2.74522	2.78041
80	2.81561	2.85080	2.88600	2.92119	2.95639	2.99158	3.02678	3.06197	3.09717	3.13236
90	3.16756	3.20275	3.23795	3.27314	3.30834	3.34353	3.37873	3.41392	3.44912	3.48431
100	3.51951	—	—	—	—	—	—	—	—	—

* This litre which equals one decimetre cubed is as redefined by the CGPM in 1964, and differs from the litre in Tables 80 to 85 of BS 350 : Part 2 : 1962 legally recognized in the United Kingdom by the Weights and Measures Act 1963.

Volume:
Millilitres to UK fluid ounces and vice versa

TABLE 171

Mass/length: Pounds per inch to kilogrammes per metre

Basis: 1 inch = 0.0254 m

1 lb = 0.453 592 37 kg

pounds per inch	0	1	2	3	4	5	6	7	8	9
	kilogrammes per metre									
0	0.00000	17.8580	35.7159	53.5739	71.4319	89.2898	107.148	125.006	142.864	160.722
10	178.580	196.438	214.296	232.154	250.012	267.870	285.727	303.585	321.443	339.301
20	357.159	375.017	392.875	410.733	428.591	446.449	464.307	482.165	500.023	517.881
30	535.739	553.597	571.455	589.313	607.171	625.029	642.887	660.745	678.603	696.461
40	714.319	732.177	750.035	767.893	785.751	803.609	821.466	839.324	857.182	875.040
50	892.898	910.756	928.614	946.472	964.330	982.188	1000.05	1017.90	1035.76	1053.62
60	1071.48	1089.34	1107.19	1125.05	1142.91	1160.77	1178.63	1196.48	1214.34	1232.20
70	1250.06	1267.92	1285.77	1303.63	1321.49	1339.35	1357.21	1375.06	1392.92	1410.78
80	1428.64	1446.50	1464.35	1482.21	1500.07	1517.93	1535.79	1553.64	1571.50	1589.36
90	1607.22	1625.08	1642.93	1660.79	1678.65	1696.51	1714.36	1732.22	1750.08	1767.94
100	1785.80	—	—	—	—	—	—	—	—	—

TABLE 172

Mass/length: Kilogrammes per metre to pounds per inch

Basis: 1 inch = 0.0254 m
1 lb = 0.453 592 37 kg

kilo-grammes per metre	0	1	2	3	4	5	6	7	8	9
	pounds per inch									
0	0.00000	0.05600	0.11199	0.16799	0.22399	0.27999	0.33598	0.39198	0.44798	0.50398
10	0.55997	0.61597	0.67197	0.72797	0.78396	0.83996	0.89596	0.95196	1.00795	1.06395
20	1.11995	1.17595	1.23194	1.28794	1.34394	1.39994	1.45593	1.51193	1.56793	1.62393
30	1.67992	1.73592	1.79192	1.84791	1.90391	1.95991	2.01591	2.07190	2.12790	2.18390
40	2.23990	2.29589	2.35189	2.40789	2.46389	2.51988	2.57588	2.63188	2.68788	2.74387
50	2.79987	2.85587	2.91187	2.96786	3.02386	3.07986	3.13586	3.19185	3.24785	3.30385
60	3.35984	3.41584	3.47184	3.52784	3.58383	3.63983	3.69583	3.75183	3.80782	3.86382
70	3.91982	3.97582	4.03181	4.08781	4.14381	4.19981	4.25580	4.31180	4.36780	4.42380
80	4.47979	4.53579	4.59179	4.64779	4.70378	4.75978	4.81578	4.87178	4.92777	4.98377
90	5.03977	5.09576	5.15176	5.20776	5.26376	5.31975	5.37575	5.43175	5.48775	5.54374
100	5.59974	—	—	—	—	—	—	—	—	—

Mass/length:
Kilogrammes per metre to pounds per inch and vice versa

TABLE 173

Mass/area: Ounces (avoirdupois) per square yard to kilogrammes per square metre

Basis: 1 lb = 16 oz = 0.453 592 37 kg

1 yd = 0.9144 m

ounces per square yard	0	1	2	3	4	5	6	7	8	9
	kilogrammes per square metre									
0	0.00000	0.03391	0.06781	0.10172	0.13562	0.16953	0.20343	0.23734	0.27125	0.30515
10	0.33906	0.37296	0.40687	0.44077	0.47468	0.50859	0.54249	0.57640	0.61030	0.64421
20	0.67811	0.71202	0.74593	0.77983	0.81374	0.84764	0.88155	0.91546	0.94936	0.98327
30	1.01717	1.05108	1.08498	1.11889	1.15280	1.18670	1.22061	1.25451	1.28842	1.32232
40	1.35623	1.39014	1.42404	1.45795	1.49185	1.52576	1.55966	1.59357	1.62748	1.66138
50	1.69529	1.72919	1.76310	1.79700	1.83091	1.86482	1.89872	1.93263	1.96653	2.00044
60	2.03434	2.06825	2.10216	2.13606	2.16997	2.20387	2.23778	2.27169	2.30559	2.33950
70	2.37340	2.40731	2.44121	2.47512	2.50903	2.54293	2.57684	2.61074	2.64465	2.67855
80	2.71246	2.74637	2.78027	2.81418	2.84808	2.88199	2.91589	2.94980	2.98371	3.01761
90	3.05152	3.08542	3.11933	3.15323	3.18714	3.22105	3.25495	3.28886	3.32276	3.35667
100	3.39057	—	—	—	—	—	—	—	—	—

TABLE 174

Mass/area: Kilogrammes per square metre to ounces (avoirdupois) per square yard

Basis: 1 lb = 16 oz = 0.453 592 37 kg

1 yd = 0.9144 m

kilo- grammes per square metre	0	1	2	3	4	5	6	7	8	9
	ounces per square yard									
0	0.00000	29.4935	58.9870	88.4806	117.974	147.468	176.961	206.455	235.948	265.442
10	294.935	324.429	353.922	383.416	412.909	442.403	471.896	501.390	530.883	560.377
20	589.870	619.364	648.858	678.351	707.845	737.338	766.832	796.325	825.819	855.312
30	884.806	914.299	943.793	973.286	1002.78	1032.27	1061.77	1091.26	1120.75	1150.25
40	1179.74	1209.23	1238.73	1268.22	1297.72	1327.21	1356.70	1386.20	1415.69	1445.18
50	1474.68	1504.17	1533.66	1563.16	1592.65	1622.14	1651.64	1681.13	1710.62	1740.12
60	1769.61	1799.11	1828.60	1858.09	1887.59	1917.08	1946.57	1976.07	2005.56	2035.05
70	2064.55	2094.04	2123.53	2153.03	2182.52	2212.01	2241.51	2271.00	2300.49	2329.99
80	2359.48	2388.98	2418.47	2447.96	2477.46	2506.95	2536.44	2565.94	2595.43	2624.92
90	2654.42	2683.91	2713.40	2742.90	2772.39	2801.88	2831.38	2860.87	2890.37	2919.86
100	2949.35	—	—	—	—	—	—	—	—	—

TABLE 175

Force: Kilogrammes force to newtons

Basis: 1 kgf = 9.806 65 N

kilo- grammes force	0	1	2	3	4	5	6	7	8	9
	newtons									
0	0.00000	9.80665	19.6133	29.4200	39.2266	49.0333	58.8399	68.6466	78.4532	88.2599
10	98.0665	107.873	117.680	127.486	137.293	147.100	156.906	166.713	176.520	186.326
20	196.133	205.940	215.746	225.553	235.360	245.166	254.973	264.780	274.586	284.393
30	294.200	304.006	313.813	323.619	333.426	343.233	353.039	362.846	372.653	382.459
40	392.266	402.073	411.879	421.686	431.493	441.299	451.106	460.913	470.719	480.526
50	490.333	500.139	509.946	519.752	529.559	539.366	549.172	558.979	568.786	578.592
60	588.399	598.206	608.012	617.819	627.626	637.432	647.239	657.046	666.852	676.659
70	686.466	696.272	706.079	715.885	725.692	735.499	745.305	755.112	764.919	774.725
80	784.532	794.339	804.145	813.952	823.759	833.565	843.372	853.179	862.985	872.792
90	882.599	892.405	902.212	912.018	921.825	931.632	941.438	951.245	961.052	970.858
100	980.665	990.472	1000.28	1010.08	1019.89	1029.70	1039.50	1049.31	1059.12	1068.92
110	1078.73	1088.54	1098.34	1108.15	1117.96	1127.76	1137.57	1147.38	1157.18	1166.99
120	1176.80	1186.60	1196.41	1206.22	1216.02	1225.83	1235.64	1245.44	1255.25	1265.06
130	1274.86	1284.67	1294.48	1304.28	1314.09	1323.90	1333.70	1343.51	1353.32	1363.12
140	1372.93	1382.74	1392.54	1402.35	1412.16	1421.96	1431.77	1441.58	1451.38	1461.19
150	1471.00	1480.80	1490.61	1500.42	1510.22	1520.03	1529.84	1539.64	1549.45	1559.26
160	1569.06	1578.87	1588.68	1598.48	1608.29	1618.10	1627.90	1637.71	1647.52	1657.32
170	1667.13	1676.94	1686.74	1696.55	1706.36	1716.16	1725.97	1735.78	1745.58	1755.39
180	1765.20	1775.00	1784.81	1794.62	1804.42	1814.23	1824.04	1833.84	1843.65	1853.46
190	1863.26	1873.07	1882.88	1892.68	1902.49	1912.30	1922.10	1931.91	1941.72	1951.52
200	1961.33	1971.14	1980.94	1990.75	2000.56	2010.36	2020.17	2029.98	2039.78	2049.59
210	2059.40	2069.20	2079.01	2088.82	2098.62	2108.43	2118.24	2128.04	2137.85	2147.66
220	2157.46	2167.27	2177.08	2186.88	2196.69	2206.50	2216.30	2226.11	2235.92	2245.72
230	2255.53	2265.34	2275.14	2284.95	2294.76	2304.56	2314.37	2324.18	2333.98	2343.79
240	2353.60	2363.40	2373.21	2383.02	2392.82	2402.63	2412.44	2422.24	2432.05	2441.86

kilo-grammes force	0	1	2	3	4	5	6	7	8	9
	newtons									
250	2451.66	2461.47	2471.28	2481.08	2490.89	2500.70	2510.50	2520.31	2530.12	2539.92
260	2549.73	2559.54	2569.34	2579.15	2588.96	2598.76	2608.57	2618.38	2628.18	2637.99
270	2647.80	2657.60	2667.41	2677.22	2687.02	2696.83	2706.64	2716.44	2726.25	2736.06
280	2745.86	2755.67	2765.48	2775.28	2785.09	2794.90	2804.70	2814.51	2824.32	2834.12
290	2843.93	2853.74	2863.54	2873.35	2883.16	2892.96	2902.77	2912.58	2922.38	2932.19
300	2942.00	2951.80	2961.61	2971.41	2981.22	2991.03	3000.83	3010.64	3020.45	3030.25
310	3040.06	3049.87	3059.67	3069.48	3079.29	3089.09	3098.90	3108.71	3118.51	3128.32
320	3138.13	3147.93	3157.74	3167.55	3177.35	3187.16	3196.97	3206.77	3216.58	3226.39
330	3236.19	3246.00	3255.81	3265.61	3275.42	3285.23	3295.03	3304.84	3314.65	3324.45
340	3334.26	3344.07	3353.87	3363.68	3373.49	3383.29	3393.10	3402.91	3412.71	3422.52
350	3432.33	3442.13	3451.94	3461.75	3471.55	3481.36	3491.17	3500.97	3510.78	3520.59
360	3530.39	3540.20	3550.01	3559.81	3569.62	3579.43	3589.23	3599.04	3608.85	3618.65
370	3628.46	3638.27	3648.07	3657.88	3667.69	3677.49	3687.30	3697.11	3706.91	3716.72
380	3726.53	3736.33	3746.14	3755.95	3765.75	3775.56	3785.37	3795.17	3804.98	3814.79
390	3824.59	3834.40	3844.21	3854.01	3863.82	3873.63	3883.43	3893.24	3903.05	3912.85
400	3922.66	3932.47	3942.27	3952.08	3961.89	3971.69	3981.50	3991.31	4001.11	4010.92
410	4020.73	4030.53	4040.34	4050.15	4059.95	4069.76	4079.57	4089.37	4099.18	4108.99
420	4118.79	4128.60	4138.41	4148.21	4158.02	4167.83	4177.63	4187.44	4197.25	4207.05
430	4216.86	4226.67	4236.47	4246.28	4256.09	4265.89	4275.70	4285.51	4295.31	4305.12
440	4314.93	4324.73	4334.54	4344.35	4354.15	4363.96	4373.77	4383.57	4393.38	4403.19
450	4412.99	4422.80	4432.61	4442.41	4452.22	4462.03	4471.83	4481.64	4491.45	4501.25
460	4511.06	4520.87	4530.67	4540.48	4550.29	4560.09	4569.90	4579.71	4589.51	4599.32
470	4609.13	4618.93	4628.74	4638.55	4648.35	4658.16	4667.97	4677.77	4687.58	4697.39
480	4707.19	4717.00	4726.81	4736.61	4746.42	4756.23	4766.03	4775.84	4785.65	4795.45
490	4805.26	4815.07	4824.87	4834.68	4844.49	4854.29	4864.10	4873.91	4883.71	4893.52

TABLE 175 (continued)

Force: Kilogrammes force to newtons

Basis: 1 kgf = 9.806 65 N

kilo-grammes force	0	1	2	3	4	5	6	7	8	9
	newtons									
500	4903.33	4913.13	4922.94	4932.74	4942.55	4952.36	4962.16	4971.97	4981.78	4991.58
510	5001.39	5011.20	5021.00	5030.81	5040.62	5050.42	5060.23	5070.04	5079.84	5089.65
520	5099.46	5109.26	5119.07	5128.88	5138.68	5148.49	5158.30	5168.10	5177.91	5187.72
530	5197.52	5207.33	5217.14	5226.94	5236.75	5246.56	5256.36	5266.17	5275.98	5285.78
540	5295.59	5305.40	5315.20	5325.01	5334.82	5344.62	5354.43	5364.24	5374.04	5383.85
550	5393.66	5403.46	5413.27	5423.08	5432.88	5442.69	5452.50	5462.30	5472.11	5481.92
560	5491.72	5501.53	5511.34	5521.14	5530.95	5540.76	5550.56	5560.37	5570.18	5579.98
570	5589.79	5599.60	5609.40	5619.21	5629.02	5638.82	5648.63	5658.44	5668.24	5678.05
580	5687.86	5697.66	5707.47	5717.28	5727.08	5736.89	5746.70	5756.50	5766.31	5776.12
590	5785.92	5795.73	5805.54	5815.34	5825.15	5834.96	5844.76	5854.57	5864.38	5874.18
600	5883.99	5893.80	5903.60	5913.41	5923.22	5933.02	5942.83	5952.64	5962.44	5972.25
610	5982.06	5991.86	6001.67	6011.48	6021.28	6031.09	6040.90	6050.70	6060.51	6070.32
620	6080.12	6089.93	6099.74	6109.54	6119.35	6129.16	6138.96	6148.77	6158.58	6168.38
630	6178.19	6188.00	6197.80	6207.61	6217.42	6227.22	6237.03	6246.84	6256.64	6266.45
640	6276.26	6286.06	6295.87	6305.68	6315.48	6325.29	6335.10	6344.90	6354.71	6364.52
650	6374.32	6384.13	6393.94	6403.74	6413.55	6423.36	6433.16	6442.97	6452.78	6462.58
660	6472.39	6482.20	6492.00	6501.81	6511.62	6521.42	6531.23	6541.04	6550.84	6560.65
670	6570.46	6580.26	6590.07	6599.88	6609.68	6619.49	6629.30	6639.10	6648.91	6658.72
680	6668.52	6678.33	6688.14	6697.94	6707.75	6717.56	6727.36	6737.17	6746.98	6756.78
690	6766.59	6776.40	6786.20	6796.01	6805.82	6815.62	6825.43	6835.24	6845.04	6854.85
700	6864.66	6874.46	6884.27	6894.07	6903.88	6913.69	6923.49	6933.30	6943.11	6952.91
710	6962.72	6972.53	6982.33	6992.14	7001.95	7011.75	7021.56	7031.37	7041.17	7050.98
720	7060.79	7070.59	7080.40	7090.21	7100.01	7109.82	7119.63	7129.43	7139.24	7149.05
730	7158.85	7168.66	7178.47	7188.27	7198.08	7207.89	7217.69	7227.50	7237.31	7247.11
740	7256.92	7266.73	7276.53	7286.34	7296.15	7305.95	7315.76	7325.57	7335.37	7345.18

kilo-grammes force	0	1	2	3	4	5	6	7	8	9
	newtons									
750	7354.99	7364.79	7374.60	7384.41	7394.21	7404.02	7413.83	7423.63	7433.44	7443.25
760	7453.05	7462.86	7472.67	7482.47	7492.28	7502.09	7511.89	7521.70	7531.51	7541.31
770	7551.12	7560.93	7570.73	7580.54	7590.35	7600.15	7609.96	7619.77	7629.57	7639.38
780	7649.19	7658.99	7668.80	7678.61	7688.41	7698.22	7708.03	7717.83	7727.64	7737.45
790	7747.25	7757.06	7766.87	7776.67	7786.48	7796.29	7806.09	7815.90	7825.71	7835.51
800	7845.32	7855.13	7864.93	7874.74	7884.55	7894.35	7904.16	7913.97	7923.77	7933.58
810	7943.39	7953.19	7963.00	7972.81	7982.61	7992.42	8002.23	8012.03	8021.84	8031.65
820	8041.45	8051.26	8061.07	8070.87	8080.68	8090.49	8100.29	8110.10	8119.91	8129.71
830	8139.52	8149.33	8159.13	8168.94	8178.75	8188.55	8198.36	8208.17	8217.97	8227.78
840	8237.59	8247.39	8257.20	8267.01	8276.81	8286.62	8296.43	8306.23	8316.04	8325.85
850	8335.65	8345.46	8355.27	8365.07	8374.88	8384.69	8394.49	8404.30	8414.11	8423.91
860	8433.72	8443.53	8453.33	8463.14	8472.95	8482.75	8492.56	8502.37	8512.17	8521.98
870	8531.79	8541.59	8551.40	8561.21	8571.01	8580.82	8590.63	8600.43	8610.24	8620.05
880	8629.85	8639.66	8649.47	8659.27	8669.08	8678.89	8688.69	8698.50	8708.31	8718.11
890	8727.92	8737.73	8747.53	8757.34	8767.15	8776.95	8786.76	8796.57	8806.37	8816.18
900	8825.99	8835.79	8845.60	8855.40	8865.21	8875.02	8884.82	8894.63	8904.44	8914.24
910	8924.05	8933.86	8943.66	8953.47	8963.28	8973.08	8982.89	8992.70	9002.50	9012.31
920	9022.12	9031.92	9041.73	9051.54	9061.34	9071.15	9080.96	9090.76	9100.57	9110.38
930	9120.18	9129.99	9139.80	9149.60	9159.41	9169.22	9179.02	9188.83	9198.64	9208.44
940	9218.25	9228.06	9237.86	9247.67	9257.48	9267.28	9277.09	9286.90	9296.70	9306.51
950	9316.32	9326.12	9335.93	9345.74	9355.54	9365.35	9375.16	9384.96	9394.77	9404.58
960	9414.38	9424.19	9434.00	9443.80	9453.61	9463.42	9473.22	9483.03	9492.84	9502.64
970	9512.45	9522.26	9532.06	9541.87	9551.68	9561.48	9571.29	9581.10	9590.90	9600.71
980	9610.52	9620.32	9630.13	9639.94	9649.74	9659.55	9669.36	9679.16	9688.97	9698.78
990	9708.58	9718.39	9728.20	9738.00	9747.81	9757.62	9767.42	9777.23	9787.04	9796.84
1000	9806.65	—	—	—	—	—	—	—	—	—

TABLE 176

Force: Newtons to kilogrammes force

Basis: 1 kgf = 9.806 65 N

newtons	0	1	2	3	4	5	6	7	8	9
	kilogrammes force									
0	0.00000	0.10197	0.20394	0.30591	0.40789	0.50986	0.61183	0.71380	0.81577	0.91774
10	1.01972	1.12169	1.22366	1.32563	1.42760	1.52957	1.63155	1.73352	1.83549	1.93746
20	2.03943	2.14140	2.24338	2.34535	2.44732	2.54929	2.65126	2.75323	2.85521	2.95718
30	3.05915	3.16112	3.26309	3.36506	3.46704	3.56901	3.67098	3.77295	3.87492	3.97689
40	4.07886	4.18084	4.28281	4.38478	4.48675	4.58872	4.69069	4.79267	4.89464	4.99661
50	5.09858	5.20055	5.30252	5.40450	5.50647	5.60844	5.71041	5.81238	5.91435	6.01633
60	6.11830	6.22027	6.32224	6.42421	6.52618	6.62816	6.73013	6.83210	6.93407	7.03604
70	7.13801	7.23999	7.34196	7.44393	7.54590	7.64787	7.74984	7.85181	7.95379	8.05576
80	8.15773	8.25970	8.36167	8.46364	8.56562	8.66759	8.76956	8.87153	8.97350	9.07547
90	9.17745	9.27942	9.38139	9.48336	9.58533	9.68730	9.78928	9.89125	9.99322	10.0952
100	10.1972	10.2991	10.4011	10.5031	10.6050	10.7070	10.8090	10.9110	11.0129	11.1149
110	11.2169	11.3188	11.4208	11.5228	11.6248	11.7267	11.8287	11.9307	12.0327	12.1346
120	12.2366	12.3386	12.4405	12.5425	12.6445	12.7465	12.8484	12.9504	13.0524	13.1543
130	13.2563	13.3583	13.4603	13.5622	13.6642	13.7662	13.8681	13.9701	14.0721	14.1741
140	14.2760	14.3780	14.4800	14.5819	14.6839	14.7859	14.8879	14.9898	15.0918	15.1938
150	15.2957	15.3977	15.4997	15.6017	15.7036	15.8056	15.9076	16.0095	16.1115	16.2135
160	16.3155	16.4174	16.5194	16.6214	16.7233	16.8253	16.9273	17.0293	17.1312	17.2332
170	17.3352	17.4371	17.5391	17.6411	17.7431	17.8450	17.9470	18.0490	18.1509	18.2529
180	18.3549	18.4569	18.5588	18.6608	18.7628	18.8647	18.9667	19.0687	19.1707	19.2726
190	19.3746	19.4766	19.5786	19.6805	19.7825	19.8845	19.9864	20.0884	20.1904	20.2924
200	20.3943	20.4963	20.5983	20.7002	20.8022	20.9042	21.0062	21.1081	21.2101	21.3121
210	21.4140	21.5160	21.6180	21.7200	21.8219	21.9239	22.0259	22.1278	22.2298	22.3318
220	22.4338	22.5357	22.6377	22.7397	22.8416	22.9436	23.0456	23.1476	23.2495	23.3515
230	23.4535	23.5554	23.6574	23.7594	23.8614	23.9633	24.0653	24.1673	24.2692	24.3712
240	24.4732	24.5752	24.6771	24.7791	24.8811	24.9830	25.0850	25.1870	25.2890	25.3909

newtons	0	1	2	3	4	5	6	7	8	9
	kilogrammes force									
250	25.4929	25.5949	25.6968	25.7988	25.9008	26.0028	26.1047	26.2067	26.3087	26.4106
260	26.5126	26.6146	26.7166	26.8185	26.9205	27.0225	27.1245	27.2264	27.3284	27.4304
270	27.5323	27.6343	27.7363	27.8383	27.9402	28.0422	28.1442	28.2461	28.3481	28.4501
280	28.5521	28.6540	28.7560	28.8580	28.9599	29.0619	29.1639	29.2659	29.3678	29.4698
290	29.5718	29.6737	29.7757	29.8777	29.9797	30.0816	30.1836	30.2856	30.3875	30.4895
300	30.5915	30.6935	30.7954	30.8974	30.9994	31.1013	31.2033	31.3053	31.4073	31.5092
310	31.6112	31.7132	31.8151	31.9171	32.0191	32.1211	32.2230	32.3250	32.4270	32.5289
320	32.6309	32.7329	32.8349	32.9368	33.0388	33.1408	33.2427	33.3447	33.4467	33.5487
330	33.6506	33.7526	33.8546	33.9565	34.0585	34.1605	34.2625	34.3644	34.4664	34.5684
340	34.6704	34.7723	34.8743	34.9763	35.0782	35.1802	35.2822	35.3842	35.4861	35.5881
350	35.6901	35.7920	35.8940	35.9960	36.0980	36.1999	36.3019	36.4039	36.5058	36.6078
360	36.7098	36.8118	36.9137	37.0157	37.1177	37.2196	37.3216	37.4236	37.5256	37.6275
370	37.7295	37.8315	37.9334	38.0354	38.1374	38.2394	38.3413	38.4433	38.5453	38.6472
380	38.7492	38.8512	38.9532	39.0551	39.1571	39.2591	39.3610	39.4630	39.5650	39.6670
390	39.7689	39.8709	39.9729	40.0748	40.1768	40.2788	40.3808	40.4827	40.5847	40.6867
400	40.7886	40.8906	40.9926	41.0946	41.1965	41.2985	41.4005	41.5024	41.6044	41.7064
410	41.8084	41.9103	42.0123	42.1143	42.2163	42.3182	42.4202	42.5222	42.6241	42.7261
420	42.8281	42.9301	43.0320	43.1340	43.2360	43.3379	43.4399	43.5419	43.6439	43.7458
430	43.8478	43.9498	44.0517	44.1537	44.2557	44.3577	44.4596	44.5616	44.6636	44.7655
440	44.8675	44.9695	45.0715	45.1734	45.2754	45.3774	45.4793	45.5813	45.6833	45.7853
450	45.8872	45.9892	46.0912	46.1931	46.2951	46.3971	46.4991	46.6010	46.7030	46.8050
460	46.9069	47.0089	47.1109	47.2129	47.3148	47.4168	47.5188	47.6207	47.7227	47.8247
470	47.9267	48.0286	48.1306	48.2326	48.3345	48.4365	48.5385	48.6405	48.7424	48.8444
480	48.9464	49.0483	49.1503	49.2523	49.3543	49.4562	49.5582	49.6602	49.7622	49.8641
490	49.9661	50.0681	50.1700	50.2720	50.3740	50.4760	50.5779	50.6799	50.7819	50.8838

TABLE 176 (continued)

Force: Newtons to kilogrammes force

Basis: 1 kgf = 9.806 65 N

newtons	0	1	2	3	4	5	6	7	8	9
	kilogrammes force									
500	50.9858	51.0878	51.1898	51.2917	51.3937	51.4957	51.5976	51.6996	51.8016	51.9036
510	52.0055	52.1075	52.2095	52.3114	52.4134	52.5154	52.6174	52.7193	52.8213	52.9233
520	53.0252	53.1272	53.2292	53.3312	53.4331	53.5351	53.6371	53.7390	53.8410	53.9430
530	54.0450	54.1469	54.2489	54.3509	54.4528	54.5548	54.6568	54.7588	54.8607	54.9627
540	55.0647	55.1666	55.2686	55.3706	55.4726	55.5745	55.6765	55.7785	55.8804	55.9824
550	56.0844	56.1864	56.2883	56.3903	56.4923	56.5942	56.6962	56.7982	56.9002	57.0021
560	57.1041	57.2061	57.3081	57.4100	57.5120	57.6140	57.7159	57.8179	57.9199	58.0219
570	58.1238	58.2258	58.3278	58.4297	58.5317	58.6337	58.7357	58.8376	58.9396	59.0416
580	59.1435	59.2455	59.3475	59.4495	59.5514	59.6534	59.7554	59.8573	59.9593	60.0613
590	60.1633	60.2652	60.3672	60.4692	60.5711	60.6731	60.7751	60.8771	60.9790	61.0810
600	61.1830	61.2849	61.3869	61.4889	61.5909	61.6928	61.7948	61.8968	61.9987	62.1007
610	62.2027	62.3047	62.4066	62.5086	62.6106	62.7125	62.8145	62.9165	63.0185	63.1204
620	63.2224	63.3244	63.4263	63.5283	63.6303	63.7323	63.8342	63.9362	64.0382	64.1401
630	64.2421	64.3441	64.4461	64.5480	64.6500	64.7520	64.8540	64.9559	65.0579	65.1599
640	65.2618	65.3638	65.4658	65.5678	65.6697	65.7717	65.8737	65.9756	66.0776	66.1796
650	66.2816	66.3835	66.4855	66.5875	66.6894	66.7914	66.8934	66.9954	67.0973	67.1993
660	67.3013	67.4032	67.5052	67.6072	67.7092	67.8111	67.9131	68.0151	68.1170	68.2190
670	68.3210	68.4230	68.5249	68.6269	68.7289	68.8308	68.9328	69.0348	69.1368	69.2387
680	69.3407	69.4427	69.5446	69.6466	69.7486	69.8506	69.9525	70.0545	70.1565	70.2584
690	70.3604	70.4624	70.5644	70.6663	70.7683	70.8703	70.9722	71.0742	71.1762	71.2782
700	71.3801	71.4821	71.5841	71.6860	71.7880	71.8900	71.9920	72.0939	72.1959	72.2979
710	72.3999	72.5018	72.6038	72.7058	72.8077	72.9097	73.0117	73.1137	73.2156	73.3176
720	73.4196	73.5215	73.6235	73.7255	73.8275	73.9294	74.0314	74.1334	74.2353	74.3373
730	74.4393	74.5413	74.6432	74.7452	74.8472	74.9491	75.0511	75.1531	75.2551	75.3570
740	75.4590	75.5610	75.6629	75.7649	75.8669	75.9689	76.0708	76.1728	76.2748	76.3767

newtons	0	1	2	3	4	5	6	7	8	9
	kilogrammes force									
750	76·4787	76·5807	76·6827	76·7846	76·8866	76·9886	77·0905	77·1925	77·2945	77·3965
760	77·4984	77·6004	77·7024	77·8043	77·9063	78·0083	78·1103	78·2122	78·3142	78·4162
770	78·5181	78·6201	78·7221	78·8241	78·9260	79·0280	79·1300	79·2319	79·3339	79·4359
780	79·5379	79·6398	79·7418	79·8438	79·9458	80·0477	80·1497	80·2517	80·3536	80·4556
790	80·5576	80·6596	80·7615	80·8635	80·9655	81·0674	81·1694	81·2714	81·3734	81·4753
800	81·5773	81·6793	81·7812	81·8832	81·9852	82·0872	82·1891	82·2911	82·3931	82·4950
810	82·5970	82·6990	82·8010	82·9029	83·0049	83·1069	83·2088	83·3108	83·4128	83·5148
820	83·6167	83·7187	83·8207	83·9226	84·0246	84·1266	84·2286	84·3305	84·4325	84·5345
830	84·6364	84·7384	84·8404	84·9424	85·0443	85·1463	85·2483	85·3502	85·4522	85·5542
840	85·6562	85·7581	85·8601	85·9621	86·0640	86·1660	86·2680	86·3700	86·4719	86·5739
850	86·6759	86·7778	86·8798	86·9818	87·0838	87·1857	87·2877	87·3897	87·4917	87·5936
860	87·6956	87·7976	87·8995	88·0015	88·1035	88·2055	88·3074	88·4094	88·5114	88·6133
870	88·7153	88·8173	88·9193	89·0212	89·1232	89·2252	89·3271	89·4291	89·5311	89·6331
880	89·7350	89·8370	89·9390	90·0409	90·1429	90·2449	90·3469	90·4488	90·5508	90·6528
890	90·7547	90·8567	90·9587	91·0607	91·1626	91·2646	91·3666	91·4685	91·5705	91·6725
900	91·7745	91·8764	91·9784	92·0804	92·1823	92·2843	92·3863	92·4883	92·5902	92·6922
910	92·7942	92·8961	92·9981	93·1001	93·2021	93·3040	93·4060	93·5080	93·6099	93·7119
920	93·8139	93·9159	94·0178	94·1198	94·2218	94·3237	94·4257	94·5277	94·6297	94·7316
930	94·8336	94·9356	95·0376	95·1395	95·2415	95·3435	95·4454	95·5474	95·6494	95·7514
940	95·8533	95·9553	96·0573	96·1592	96·2612	96·3632	96·4652	96·5671	96·6691	96·7711
950	96·8730	96·9750	97·0770	97·1790	97·2809	97·3829	97·4849	97·5868	97·6888	97·7908
960	97·8928	97·9947	98·0967	98·1987	98·3006	98·4026	98·5046	98·6066	98·7085	98·8105
970	98·9125	99·0144	99·1164	99·2184	99·3204	99·4223	99·5243	99·6263	99·7282	99·8302
980	99·9322	100·034	100·136	100·238	100·340	100·442	100·544	100·646	100·748	100·850
990	100·952	101·054	101·156	101·258	101·360	101·462	101·564	101·666	101·768	101·870
1000	101·972	—	—	—	—	—	—	—	—	—

TABLE 177

Force: Pounds force to newtons

Basis: 1 lbf = 0.453 592 37 kgf

1 kgf = 9.806 65 N

pounds force	0	1	2	3	4	5	6	7	8	9
	newtons									
0	0.00000	4.44822	8.89644	13.3447	17.7929	22.2411	26.6893	31.1376	35.5858	40.0340
10	44.4822	48.9304	53.3787	57.8269	62.2751	66.7233	71.1715	75.6198	80.0680	84.5162
20	88.9644	93.4127	97.8609	102.309	106.757	111.206	115.654	120.102	124.550	128.998
30	133.447	137.895	142.343	146.791	151.240	155.688	160.136	164.584	169.032	173.481
40	177.929	182.377	186.825	191.274	195.722	200.170	204.618	209.066	213.515	217.963
50	222.411	226.859	231.308	235.756	240.204	244.652	249.100	253.549	257.997	262.445
60	266.893	271.342	275.790	280.238	284.686	289.134	293.583	298.031	302.479	306.927
70	311.376	315.824	320.272	324.720	329.168	333.617	338.065	342.513	346.961	351.410
80	355.858	360.306	364.754	369.202	373.651	378.099	382.547	386.995	391.444	395.892
90	400.340	404.788	409.236	413.685	418.133	422.581	427.029	431.477	435.926	440.374
100	444.822	449.270	453.719	458.167	462.615	467.063	471.511	475.960	480.408	484.856
110	489.304	493.753	498.201	502.649	507.097	511.545	515.994	520.442	524.890	529.338
120	533.787	538.235	542.683	547.131	551.579	556.028	560.476	564.924	569.372	573.821
130	578.269	582.717	587.165	591.613	596.062	600.510	604.958	609.406	613.855	618.303
140	622.751	627.199	631.647	636.096	640.544	644.992	649.440	653.889	658.337	662.785
150	667.233	671.681	676.130	680.578	685.026	689.474	693.923	698.371	702.819	707.267
160	711.715	716.164	720.612	725.060	729.508	733.957	738.405	742.853	747.301	751.749
170	756.198	760.646	765.094	769.542	773.991	778.439	782.887	787.335	791.783	796.232
180	800.680	805.128	809.576	814.025	818.473	822.921	827.369	831.817	836.266	840.714
190	845.162	849.610	854.059	858.507	862.955	867.403	871.851	876.300	880.748	885.196
200	889.644	894.093	898.541	902.989	907.437	911.885	916.334	920.782	925.230	929.678
210	934.127	938.575	943.023	947.471	951.919	956.368	960.816	965.264	969.712	974.161
220	978.609	983.057	987.505	991.953	996.402	1000.85	1005.30	1009.75	1014.19	1018.64
230	1023.09	1027.54	1031.99	1036.44	1040.88	1045.33	1049.78	1054.23	1058.68	1063.12
240	1067.57	1072.02	1076.47	1080.92	1085.37	1089.81	1094.26	1098.71	1103.16	1107.61