

原子质量单位与千克的相互换算表

GB 5113—85

Atomic mass unit and kilogram conversion tables

1 引言

1.1 为了使所有的国家标准逐步采用国际单位制,针对我国现有的实际情况和各行各业的需要,参照有关量和单位的 15 个国家标准(GB 3100—82,GB 3101—82,GB 3102.1~3102.13—82)遵照 GB 1.1—81《标准化工作导则 编写标准的一般规定》,特编制 GB 5113—85《原子质量单位与千克的相互换算表》。

1.2 本标准适用于所有原子质量单位(u)换算成千克(kg)和千克换算成原子质量单位的场合。本标准的换算表仅限于一般需要的换算,换算表中换算后的数字修约至五位有效数字,1 以下的数字修约至小数点后四位。必要时按 1.3 给出的换算系数进行计算和修约。修约规则按 GB 1.1—81 附录 C 的规定。

1.3 换算系数:

$$1 \text{ u} = (1.660\,565\,5 \pm 0.000\,008\,6) \times 10^{-27} \text{ kg}$$

$$1 \text{ kg} = 1 / (1.660\,565\,5 \pm 0.000\,008\,6) \times 10^{27} \text{ u}$$

此数据取自 GB 3102.9—82《原子物理学和核物理学的量和单位》。

2 换算表

表 1 原子质量单位至千克的换算表
 $1 \text{ u} = 1.660\,565\,5 \times 10^{-27} \text{ kg}$

$\frac{\text{kg}}{\text{u}} \times 10^{-27}$	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0	0.0000	0.1661	0.3321	0.4982	0.6642	0.8303	0.9963	1.1624	1.3285	1.4945
1	1.6606	1.8266	1.9927	2.1587	2.3248	2.4908	2.6569	2.8230	2.9890	3.1551
2	3.3211	3.4872	3.6532	3.8193	3.9854	4.1514	4.3175	4.4835	4.6496	4.8156
3	4.9817	5.1478	5.3138	5.4799	5.6459	5.8120	5.9780	6.1441	6.3101	6.4762
4	6.6423	6.8083	6.9744	7.1404	7.3065	7.4725	7.6386	7.8047	7.9707	8.1368
5	8.3028	8.4689	8.6349	8.8010	8.9671	9.1331	9.2992	9.4652	9.6313	9.7973
6	9.9634	10.129	10.296	10.462	10.628	10.794	10.960	11.126	11.292	11.458
7	11.624	11.790	11.956	12.122	12.288	12.454	12.620	12.786	12.952	13.118
8	13.285	13.451	13.617	13.783	13.949	14.115	14.281	14.447	14.613	14.779
9	14.945	15.111	15.277	15.443	15.609	15.775	15.941	16.107	16.274	16.440

续表 1

$\frac{\text{kg}}{(\times 10^{-27})}$ u	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
10	16.606	16.772	16.938	17.104	17.270	17.436	17.602	17.768	17.934	18.100
11	18.266	18.432	18.598	18.764	18.930	19.097	19.263	19.429	19.595	19.761
12	19.927	20.093	20.259	20.425	20.591	20.757	20.923	21.089	21.255	21.421
13	21.587	21.753	21.919	22.086	22.252	22.418	22.584	22.750	22.916	23.082
14	23.248	23.414	23.580	23.746	23.912	24.078	24.244	24.410	24.576	24.742
15	24.908	25.075	25.241	25.407	25.573	25.739	25.905	26.071	26.237	26.403
16	26.569	26.735	26.901	27.067	27.233	27.399	27.565	27.731	27.898	28.064
17	28.230	28.396	28.562	28.728	28.894	29.060	29.226	29.392	29.558	29.724
18	29.890	30.056	30.222	30.388	30.554	30.720	30.887	31.053	31.219	31.385
19	31.551	31.717	31.883	32.049	32.215	32.381	32.547	32.713	32.879	33.045
20	33.211	33.377	33.543	33.709	33.876	34.042	34.208	34.374	34.540	34.706
21	34.872	35.038	35.204	35.370	35.536	35.702	35.868	36.034	36.200	36.366
22	36.532	36.698	36.865	37.031	37.197	37.363	37.529	37.695	37.861	38.027
23	38.193	38.359	38.525	38.691	38.857	39.023	39.189	39.355	39.521	39.688
24	39.854	40.020	40.186	40.352	40.518	40.684	40.850	41.016	41.182	41.348
25	41.514	41.680	41.846	42.012	42.178	42.344	42.510	42.677	42.843	43.009
26	43.175	43.341	43.507	43.673	43.839	44.005	44.171	44.337	44.503	44.669
27	44.835	45.001	45.167	45.333	45.499	45.666	45.832	45.998	46.164	46.330
28	46.496	46.662	46.828	46.994	47.160	47.326	47.492	47.658	47.824	47.990
29	48.156	48.322	48.489	48.655	48.821	48.987	49.153	49.319	49.485	49.651
30	49.817	49.983	50.149	50.315	50.481	50.647	50.813	50.979	51.145	51.311
31	51.478	51.644	51.810	51.976	52.142	52.308	52.474	52.640	52.806	52.972
32	53.138	53.304	53.470	53.636	53.802	53.968	54.134	54.300	54.467	54.633
33	54.799	54.965	55.131	55.297	55.463	55.629	55.795	55.961	56.127	56.293
34	56.459	56.625	56.791	56.957	57.123	57.290	57.456	57.622	57.788	57.954
35	58.120	58.286	58.452	58.618	58.784	58.950	59.116	59.282	59.448	59.614
36	59.780	59.946	60.112	60.279	60.445	60.611	60.777	60.943	61.109	61.275
37	61.441	61.607	61.773	61.939	62.105	62.271	62.437	62.603	62.769	62.935
38	63.101	63.268	63.434	63.600	63.766	63.932	64.098	64.264	64.430	64.596
39	64.762	64.928	65.094	65.260	65.426	65.592	65.758	65.924	66.091	66.257
40	66.423	66.589	66.755	66.921	67.087	67.253	67.419	67.585	67.751	67.917
41	68.083	68.249	68.415	68.581	68.747	68.913	69.080	69.246	69.412	69.578
42	69.744	69.910	70.076	70.242	70.408	70.574	70.740	70.906	71.072	71.238
43	71.404	71.570	71.736	71.902	72.069	72.235	72.401	72.567	72.733	72.899
44	73.065	73.231	73.397	73.563	73.729	73.895	74.061	74.227	74.393	74.559
45	74.725	74.892	75.058	75.224	75.390	75.556	75.722	75.888	76.054	76.220
46	76.386	76.552	76.718	76.884	77.050	77.216	77.382	77.548	77.714	77.881
47	78.047	78.213	78.379	78.545	78.711	78.877	79.043	79.209	79.375	79.541
48	79.707	79.873	80.039	80.205	80.371	80.537	80.703	80.870	81.036	81.202
49	81.368	81.534	81.700	81.866	82.032	82.198	82.364	82.530	82.696	82.862

续表 1

$\frac{\text{kg}}{(\times 10^{-27})}$ u	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
50	83.028	83.194	83.360	83.526	83.693	83.859	84.025	84.191	84.357	84.523
51	84.689	84.855	85.021	85.187	85.353	85.519	85.685	85.851	86.017	86.183
52	86.349	86.515	86.682	86.848	87.014	87.180	87.346	87.512	87.678	87.844
53	88.010	88.176	88.342	88.508	88.674	88.840	89.006	89.172	89.338	89.504
54	89.671	89.837	90.003	90.169	90.335	90.501	90.667	90.833	90.999	91.165
55	91.331	91.497	91.663	91.829	91.995	92.161	92.327	92.493	92.660	92.826
56	92.992	93.158	93.324	93.490	93.656	93.822	93.988	94.154	94.320	94.486
57	94.652	94.818	94.984	95.150	95.316	95.483	95.649	95.815	95.981	96.147
58	96.313	96.479	96.645	96.811	96.977	97.143	97.309	97.475	97.641	97.807
59	97.973	98.139	98.305	98.472	98.638	98.804	98.970	99.136	99.302	99.468
60	99.634	99.800	99.966	100.13	100.30	100.46	100.63	100.80	100.96	101.13
61	101.29	101.46	101.63	101.79	101.96	102.12	102.29	102.46	102.62	102.79
62	102.96	103.12	103.29	103.45	103.62	103.79	103.95	104.12	104.28	104.45
63	104.62	104.78	104.95	105.11	105.28	105.45	105.61	105.78	105.94	106.11
64	106.28	106.44	106.61	106.77	106.94	107.11	107.27	107.44	107.60	107.77
65	107.94	108.10	108.27	108.43	108.60	108.77	108.93	109.10	109.27	109.43
66	109.60	109.76	109.93	110.10	110.26	110.43	110.59	110.76	110.93	111.09
67	111.26	111.42	111.59	111.76	111.92	112.09	112.25	112.42	112.59	112.75
68	112.92	113.08	113.25	113.42	113.58	113.75	113.91	114.08	114.25	114.41
69	114.58	114.75	114.91	115.08	115.24	115.41	115.58	115.74	115.91	116.07
70	116.24	116.41	116.57	116.74	116.90	117.07	117.24	117.40	117.57	117.73
71	117.90	118.07	118.23	118.40	118.56	118.73	118.90	119.06	119.23	119.39
72	119.56	119.73	119.89	120.06	120.22	120.39	120.56	120.72	120.89	121.06
73	121.22	121.39	121.55	121.72	121.89	122.05	122.22	122.38	122.55	122.72
74	122.88	123.05	123.21	123.38	123.55	123.71	123.88	124.04	124.21	124.38
75	124.54	124.71	124.87	125.04	125.21	125.37	125.54	125.70	125.87	126.04
76	126.20	126.37	126.54	126.70	126.87	127.03	127.20	127.37	127.53	127.70
77	127.86	128.03	128.20	128.36	128.53	128.69	128.86	129.03	129.19	129.36
78	129.52	129.69	129.86	130.02	130.19	130.35	130.52	130.69	130.85	131.02
79	131.18	131.35	131.52	131.68	131.85	132.01	132.18	132.35	132.51	132.68
80	132.85	133.01	133.18	133.34	133.51	133.68	133.84	134.01	134.17	134.34
81	134.51	134.67	134.84	135.00	135.17	135.34	135.50	135.67	135.83	136.00
82	136.17	136.33	136.50	136.66	136.83	137.00	137.16	137.33	137.49	137.66
83	137.83	137.99	138.16	138.33	138.49	138.66	138.82	138.99	139.16	139.32
84	139.49	139.65	139.82	139.99	140.15	140.32	140.48	140.65	140.82	140.98
85	141.15	141.31	141.48	141.65	141.81	141.98	142.14	142.31	142.48	142.64
86	142.81	142.97	143.14	143.31	143.47	143.64	143.80	143.97	144.14	144.30
87	144.47	144.64	144.80	144.97	145.13	145.30	145.47	145.63	145.80	145.96
88	146.13	146.30	146.46	146.63	146.79	146.96	147.13	147.29	147.46	147.62
89	147.79	147.96	148.12	148.29	148.45	148.62	148.79	148.95	149.12	149.28

续表 1

$\frac{\text{kg}}{(\times 10^{-27})} \backslash \text{u}$	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
u										
90	149.45	149.62	149.78	149.95	150.12	150.28	150.45	150.61	150.78	150.95
91	151.11	151.28	151.44	151.61	151.78	151.94	152.11	152.27	152.44	152.61
92	152.77	152.94	153.10	153.27	153.44	153.60	153.77	153.93	154.10	154.27
93	154.43	154.60	154.76	154.93	155.10	155.26	155.43	155.59	155.76	155.93
94	156.09	156.26	156.43	156.59	156.76	156.92	157.09	157.26	157.42	157.59
95	157.75	157.92	158.09	158.25	158.42	158.58	158.75	158.92	159.08	159.25
96	159.41	159.58	159.75	159.91	160.08	160.24	160.41	160.58	160.74	160.91
97	161.07	161.24	161.41	161.57	161.74	161.91	162.07	162.24	162.40	162.57
98	162.74	162.90	163.07	163.23	163.40	163.57	163.73	163.90	164.06	164.23
99	164.40	164.56	164.73	164.89	165.06	165.23	165.39	165.56	165.72	165.89
100	166.06	166.22	166.39	166.55	166.72	166.89	167.05	167.22	167.39	167.55

表 2 千克至原子质量单位的换算表

$$1 \text{ kg} = 1/1.660\,565\,5 \times 10^{27} \text{ u}$$

$\frac{\text{u}}{(\times 10^{27})} \backslash \text{kg}$	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
kg										
0	0.0000	0.0602	0.1204	0.1807	0.2409	0.3011	0.3613	0.4215	0.4818	0.5420
1	0.6022	0.6624	0.7226	0.7829	0.8431	0.9033	0.9635	1.0237	1.0840	1.1442
2	1.2044	1.2646	1.3248	1.3851	1.4453	1.5055	1.5657	1.6260	1.6862	1.7464
3	1.8066	1.8668	1.9271	1.9873	2.0475	2.1077	2.1679	2.2282	2.2884	2.3486
4	2.4088	2.4690	2.5293	2.5895	2.6497	2.7099	2.7701	2.8304	2.8906	2.9508
5	3.0110	3.0712	3.1315	3.1917	3.2519	3.3121	3.3723	3.4326	3.4928	3.5530
6	3.6132	3.6734	3.7337	3.7939	3.8541	3.9143	3.9745	4.0348	4.0950	4.1552
7	4.2154	4.2757	4.3359	4.3961	4.4563	4.5165	4.5768	4.6370	4.6972	4.7574
8	4.8176	4.8779	4.9381	4.9983	5.0585	5.1187	5.1790	5.2392	5.2994	5.3596
9	5.4198	5.4801	5.5403	5.6005	5.6607	5.7209	5.7812	5.8414	5.9016	5.9618
10	6.0220	6.0823	6.1425	6.2027	6.2629	6.3231	6.3834	6.4436	6.5038	6.5640
11	6.6242	6.6845	6.7447	6.8049	6.8651	6.9254	6.9856	7.0458	7.1060	7.1662
12	7.2265	7.2867	7.3469	7.4071	7.4673	7.5276	7.5878	7.6480	7.7082	7.7684
13	7.8287	7.8889	7.9491	8.0093	8.0695	8.1298	8.1900	8.2502	8.3104	8.3706
14	8.4309	8.4911	8.5513	8.6115	8.6717	8.7320	8.7922	8.8524	8.9126	8.9728
15	9.0331	9.0933	9.1535	9.2137	9.2739	9.3342	9.3944	9.4546	9.5148	9.5751
16	9.6353	9.6955	9.7557	9.8159	9.8762	9.9364	9.9966	10.057	10.117	10.177
17	10.237	10.298	10.358	10.418	10.478	10.539	10.599	10.659	10.719	10.779
18	10.840	10.900	10.960	11.020	11.081	11.141	11.201	11.261	11.321	11.382
19	11.442	11.502	11.562	11.623	11.683	11.743	11.803	11.863	11.924	11.984

续表 2

$\frac{u}{kg}$ ($\times 10^{27}$)	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
20	12.044	12.104	12.165	12.225	12.285	12.345	12.405	12.466	12.526	12.586
21	12.646	12.707	12.767	12.827	12.887	12.947	13.008	13.068	13.128	13.188
22	13.248	13.309	13.369	13.429	13.489	13.550	13.610	13.670	13.730	13.790
23	13.851	13.911	13.971	14.031	14.092	14.152	14.212	14.272	14.332	14.393
24	14.453	14.513	14.573	14.634	14.694	14.754	14.814	14.874	14.935	14.995
25	15.055	15.115	15.176	15.236	15.296	15.356	15.416	15.477	15.537	15.597
26	15.657	15.718	15.778	15.838	15.898	15.958	16.019	16.079	16.139	16.199
27	16.260	16.320	16.380	16.440	16.500	16.561	16.621	16.681	16.741	16.802
28	16.862	16.922	16.982	17.042	17.103	17.163	17.223	17.283	17.343	17.404
29	17.464	17.524	17.584	17.645	17.705	17.765	17.825	17.885	17.946	18.006
30	18.066	18.126	18.187	18.247	18.307	18.367	18.427	18.488	18.548	18.608
31	18.668	18.729	18.789	18.849	18.909	18.969	19.030	19.090	19.150	19.210
32	19.271	19.331	19.391	19.451	19.511	19.572	19.632	19.692	19.752	19.813
33	19.873	19.933	19.993	20.053	20.114	20.174	20.234	20.294	20.355	20.415
34	20.475	20.535	20.595	20.656	20.716	20.776	20.836	20.896	20.957	21.017
35	21.077	21.137	21.198	21.258	21.318	21.378	21.438	21.499	21.559	21.619
36	21.679	21.740	21.800	21.860	21.920	21.980	22.041	22.101	22.161	22.221
37	22.282	22.342	22.402	22.462	22.522	22.583	22.643	22.703	22.763	22.824
38	22.884	22.944	23.004	23.064	23.125	23.185	23.245	23.305	23.366	23.426
39	23.486	23.546	23.606	23.667	23.727	23.787	23.847	23.908	23.968	24.028
40	24.088	24.148	24.209	24.269	24.329	24.389	24.450	24.510	24.570	24.630
41	24.690	24.751	24.811	24.871	24.931	24.991	25.052	25.112	25.172	25.232
42	25.293	25.353	25.413	25.473	25.533	25.594	25.654	25.714	25.774	25.835
43	25.895	25.955	26.015	26.075	26.136	26.196	26.256	26.316	26.377	26.437
44	26.497	26.557	26.617	26.678	26.738	26.798	26.858	26.919	26.979	27.039
45	27.099	27.159	27.220	27.280	27.340	27.400	27.461	27.521	27.581	27.641
46	27.701	27.762	27.822	27.882	27.942	28.003	28.063	28.123	28.183	28.243
47	28.304	28.364	28.424	28.484	28.544	28.605	28.665	28.725	28.785	28.846
48	28.906	28.966	29.026	29.086	29.147	29.207	29.267	29.327	29.388	29.448
49	29.508	29.568	29.628	29.689	29.749	29.809	29.869	29.930	29.990	30.050
50	30.110	30.170	30.231	30.291	30.351	30.411	30.472	30.532	30.592	30.652
51	30.712	30.773	30.833	30.893	30.953	31.014	31.074	31.134	31.194	31.254
52	31.315	31.375	31.435	31.495	31.556	31.616	31.676	31.736	31.796	31.857
53	31.917	31.977	32.037	32.097	32.158	32.218	32.278	32.338	32.399	32.459
54	32.519	32.579	32.639	32.700	32.760	32.820	32.880	32.941	33.001	33.061
55	33.121	33.181	33.242	33.302	33.362	33.422	33.483	33.543	33.603	33.663
56	33.723	33.784	33.844	33.904	33.964	34.025	34.085	34.145	34.205	34.265
57	34.326	34.386	34.446	34.506	34.567	34.627	34.687	34.747	34.807	34.868
58	34.928	34.988	35.048	35.109	35.169	35.229	35.289	35.349	35.410	35.470
59	35.530	35.590	35.651	35.711	35.771	35.831	35.891	35.952	36.012	36.072

续表 2

$\frac{u}{kg}$ ($\times 10^{27}$)	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
60	36.132	36.192	36.253	36.313	36.373	36.433	36.494	36.554	36.614	36.674
61	36.734	36.795	36.855	36.915	36.975	37.036	37.096	37.156	37.216	37.276
62	37.337	37.397	37.457	37.517	37.578	37.638	37.698	37.758	37.818	37.879
63	37.939	37.999	38.059	38.120	38.180	38.240	38.300	38.360	38.421	38.481
64	38.541	38.601	38.662	38.722	38.782	38.842	38.902	38.963	39.023	39.083
65	39.143	39.204	39.264	39.324	39.384	39.444	39.505	39.565	39.625	39.685
66	39.745	39.806	39.866	39.926	39.986	40.047	40.107	40.167	40.227	40.287
67	40.348	40.408	40.468	40.528	40.589	40.649	40.709	40.769	40.829	40.890
68	40.950	41.010	41.070	41.131	41.191	41.251	41.311	41.371	41.432	41.492
69	41.552	41.612	41.673	41.733	41.793	41.853	41.913	41.974	42.034	42.094
70	42.154	42.215	42.275	42.335	42.395	42.455	42.516	42.576	42.636	42.696
71	42.757	42.817	42.877	42.937	42.997	43.058	43.118	43.178	43.238	43.299
72	43.359	43.419	43.479	43.539	43.600	43.660	43.720	43.780	43.840	43.901
73	43.961	44.021	44.081	44.142	44.202	44.262	44.322	44.382	44.443	44.503
74	44.563	44.623	44.684	44.744	44.804	44.864	44.924	44.985	45.045	45.105
75	45.165	45.226	45.286	45.346	45.406	45.466	45.527	45.587	45.647	45.707
76	45.768	45.828	45.888	45.948	46.008	46.069	46.129	46.189	46.249	46.310
77	46.370	46.430	46.490	46.550	46.611	46.671	46.731	46.791	46.852	46.912
78	46.972	47.032	47.092	47.153	47.213	47.273	47.333	47.393	47.454	47.514
79	47.574	47.634	47.695	47.755	47.815	47.875	47.935	47.996	48.056	48.116
80	48.176	48.237	48.297	48.357	48.417	48.477	48.538	48.598	48.658	48.718
81	48.779	48.839	48.899	48.959	49.019	49.080	49.140	49.200	49.260	49.321
82	49.381	49.441	49.501	49.561	49.622	49.682	49.742	49.802	49.863	49.923
83	49.983	50.043	50.103	50.164	50.224	50.284	50.344	50.405	50.465	50.525
84	50.585	50.645	50.706	50.766	50.826	50.886	50.946	51.007	51.067	51.127
85	51.187	51.248	51.308	51.368	51.428	51.488	51.549	51.609	51.669	51.729
86	51.790	51.850	51.910	51.970	52.030	52.091	52.151	52.211	52.271	52.332
87	52.392	52.452	52.512	52.572	52.633	52.693	52.753	52.813	52.874	52.934
88	52.994	53.054	53.114	53.175	53.235	53.295	53.355	53.416	53.476	53.536
89	53.596	53.656	53.717	53.777	53.837	53.897	53.958	54.018	54.078	54.138
90	54.198	54.259	54.319	54.379	54.439	54.500	54.560	54.620	54.680	54.740
91	54.801	54.861	54.921	54.981	55.041	55.102	55.162	55.222	55.282	55.343
92	55.403	55.463	55.523	55.583	55.644	55.704	55.764	55.824	55.885	55.945
93	56.005	56.065	56.125	56.186	56.246	56.306	56.366	56.427	56.487	56.547
94	56.607	56.667	56.728	56.788	56.848	56.908	56.969	57.029	57.089	57.149
95	57.209	57.270	57.330	57.390	57.450	57.511	57.571	57.631	57.691	57.751
96	57.812	57.872	57.932	57.992	58.053	58.113	58.173	58.233	58.293	58.354
97	58.414	58.474	58.534	58.594	58.655	58.715	58.775	58.835	58.896	58.956
98	59.016	59.076	59.136	59.197	59.257	59.317	59.377	59.438	59.498	59.558
99	59.618	59.678	59.739	59.799	59.859	59.919	59.980	60.040	60.100	60.160
100	60.220	60.281	60.341	60.401	60.461	60.522	60.582	60.642	60.702	60.762

附加说明：

本标准由全国量和单位标准化技术委员会提出并审查通过。主任委员杜庆华,副主任委员陈明绍。由该委员会的第一委员会负责起草,其成员如下:主任委员余梦生,副主任委员张士相,委员(按姓氏笔划为序)王家石,王建辉,史光筠,吕东明,陈业勤,陈铭铮,俞鸿儒,黄最明,彭秉璞。

本标准主要起草人吕东明。

