RICE LAKE
WEIGHING SYSTEMS

Weight Conversions

To convert one unit of measure to another, use our online weight conversion tool located with our resources found at **www.ricelake.com/scaletools**

Units of Mass Not Greater Than Pounds and Kilograms

(All underlined figures are exact) multiply by the conversion factor shown below:

Units	Grains	Apothecaries Scruples	Pennyweights	Avoirdupois Drams	Apothecaries Drams	Avoirdupois Ounces
1 grain =	1	0.05	0.041 666 67	0.036 571 43	0.016 666 67	0.002 285 714
1 apoth. scruple =	20	1	0.833 333 3	0.731 428 6	0.333 333 3	0.045 714 29
1 pennyweight =	24	1.2	1	0.877 714 3	0.4	0.054 857 14
1 avdp. dram =	27.343 75	1.367 187 5	1.139 323	1	0.455 729 2	0.062 5
1 apoth. dram =	60	3	2.5	2.194 286	1	0.137 142 9
1 avdp. ounce =	437.5	21.875	18.229 17	16	7.291 667	1
1 apoth. or troy oz. =	480	24	20	17.554 29	8	1.097 143
1 apoth. or troy pound =	5 760	288	240	210.651 4	96	13.165 71
1 avdp. pound =	7 000	350	291.666 7	256	116.666 7	16
1 milligram =	0.015 432 36	0.000 771 617 9	0.000 643 014 9	0.000 564 383 4	0.000 257 206 0	0.000 035 273 96
1 gram =	15.432 36	0.771 617 9	0.643 014 9	0.564 383 4	0.257 206 0	.035 273 96
1 kilogram =	15432.36	771.617 9	643.014 9	564.383 4	257.206 0	35.273 96

Units	Apothecaries or Troy Ounces	Apothecaries or Troy Pounds	Avoirdupois Pounds	Milligrams	Grams	Kilograms
1 grain =	0.002 083 333	0.000 173 611 1	0.000 142 857 1	64.798 91	0.064 798 91	0.000 064 798 91
1 apoth. scruple =	0.041 666 67	0.003 472 222	0.002 857 143	1 295.978 2	1.295 978 2	0.001 295 978 2
1 pennyweight =	0.05	0.004 166 667	0.003 428 571	1 555.173 84	1.555 173 84	0.001 555 173 84
1 avdp. dram =	0.56 966 15	0.004 747 179	0.003 906 25	1 771.845 195 312 5	1.771 845 195 312 5	0.001 771 845 195 312 5
1 apoth. dram =	0.125	0.010 416 67	0.008 571 429	3 887.934 6	3.887 934 6	0.003 887 934 6
1 avdp. ounce =	0.911 458 3	0.075 954 86	0.062 5	28 349.523 125	28.349 523 125	0.028 349 523 125
1 apoth. or troy ounce =	1	0.083 333 333	0.068 571 43	31 103.476 8	31.103 476 8	0.031 103 476 8
1 apoth. or troy pound =	12	1	0.822 857 1	373 241.721 6	373.241 721 6	0.373 241 721 6
1 avdp. pound =	14.583 33	1.215 278	1	453 592.37	453.592 37	0.453 592 37
1 milligram =	0.000 032 150 75	0.000 002 679 229	0.000 002 204 623	1	0.001	0.000 001
1 gram =	0.032 150 75	0.002 679 229	0.002 204 623	1 000	1	0.001
1 kilogram =	32.150 75	2.679 229	2.204 623	1 000 000	1 000	1

Units	Avoirdupois Ounces	Avoirdupois Pounds	Short Hundredweights	Short Tons	Long Tons	Kilograms	Metric Tons
1 avoirdupois ounce =	1	0.0625	0.000 625	0.000 031 25	0.000 027 901 79	0.028 349 523 125	0.000 028 349 523 125
1 avoirdupois pound =	16	1	0.01	0.000 5	0.000 446 428 6	0.453 592 37	0.000 453 592 37
1 short hundredweight =	1 600	100	1	0.05	0.044 642 86	45.359 237	0.045 359 237
1 short ton =	32 000	2 000	20	1	0.892 857 1	907.184 74	0.907 184 74
1 long ton =	35 840	2 240	22.4	1.12	1	1016.046 908 8	1.016 046 908 8
1 kilogram =	35.273 96	2.204 623	0.022 046 23	0.001 102 311	0.000 984 206 5	1	0.001
1 metric ton =	35 273.96	2204.623	22.046 23	1.102 311	0.984 206 5	1 000	1

Based on NIST Handbook 44, Appendix C - General Tables of Measurement

Weight Tolerances

Tolerance for weights of denominations between those listed can be determined as follows:

- If the unit of measure is non-metric, convert the nominal value to a metric unit.
- For weights that are between those listed, the tolerance for the next lower weight shall be applied.

Weight Tolerance, Metric*

ASTM E617-23

Nominal Size	Class 000	Class 00	Class 0	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7
	mg	mg	mg	mg	g and mg	g and mg	g and mg	g and mg	g and mg	g and mg
5 000 kg					25 g	50 g	100 g	250 g	500 g	750 g
3 000 kg					15 g	30 g	60 g	150 g	300 g	450 g
2 000 kg					10 g	20 g	40 g	100 g	200 g	300 g
1 000 kg					5.0 g	10 g	20 g	50 g	100 g	150 g
500 kg					2.5 g	5.0 g	10 g	25 g	50 g	75 g
300 kg					1.5 g	3.0 g	6.0 g	15 g	30 g	45 g
200 kg					1.0 g	2.0 g	4.0 g	10 g	20 g	30 g
100 kg					500 mg	1.0 g	2.0 g	5.0 g	10 g	15 g
50 kg	13 mg	25 mg	63 mg	120 mg	250	500 mg	1.0 g	2.5 g	5.0 g	7.5 g
30 kg	7.5	15	38	75	150	300	600 mg	1.5 g	3.0 g	5.1 g
25 kg	6.25	12.5	31	62	125	250	500	1.3 g	2.5 g	4.5 g
20 kg	5.0	10	25	50	100	200	400	1.0 g	2.0 g	3.8 g
10 kg	2.5	5.0	13	25	50	100	200	500 mg	1.0 g	2.2 g
5 kg	1.3	2.5	6.0	12	25	50	100	250	500 mg	1.4 g
3 kg	0.75	1.5	3.8	7.5	15	30	60	150	300	1.0 g
2 kg	0.5	1.0	2.5	5.0	10	20	40	100	200	750 mg
1 kg	0.25	0.5	1.3	2.5	5.0	10	20	50	100	470
500 g	0.13	0.25	0.60	1.2	2.5	5.0	10	35	70	300
300 g	0.075	0.15	0.38	0.75	1.5	3.0	6.0	30	60	210
200 g	0.05	0.10	0.25	0.50	1.0	2.0	4.0	20	40	160
100 g	0.025	0.05	0.13	0.25	0.50	1.0	2.0	10	20	100
50 g	0.015	0.030	0.060	0.12	0.25	0.60	1.2	5.0	10	62
30 g	0.014	0.026	0.037	0.074	0.15	0.45	0.90	3.0	6.0	44
20 g	0.013	0.025	0.037	0.074	0.10	0.35	0.70	2.0	4.0	33
10 g	0.010	0.020	0.025	0.050	0.074	0.25	0.50	1.0	2.0	21
5 g	0.005	0.010	0.017	0.034	0.054	0.18	0.36	0.75	1.5	13
3 g	0.005	0.010	0.017	0.034	0.054	0.15	0.30	0.64	1.3	9.4
2 g	0.005	0.010	0.017	0.034	0.054	0.13	0.26	0.56	1.1	7.0
1 g	0.005	0.010	0.017	0.034	0.054	0.10	0.20	0.45	0.90	4.5
500 mg	0.002	0.003	0.005	0.010	0.025	0.080	0.16	0.36	0.72	3.0
300 mg	0.002	0.003	0.005	0.010	0.025	0.070	0.14	0.31	0.61	2.2
200 mg	0.002	0.003	0.005	0.010	0.025	0.060	0.12	0.27	0.054	1.8
100 mg	0.002	0.003	0.005	0.010	0.025	0.050	0.10	0.22	0.43	1.2
50 mg	0.002	0.003	0.005	0.010	0.014	0.042	0.085	0.17	0.35	0.88
30 mg	0.002	0.003	0.005	0.010	0.014	0.038	0.075	0.15	0.30	0.68
20 mg	0.002	0.003	0.005	0.010	0.014	0.035	0.070	0.13	0.26	0.56
10 mg	0.002	0.003	0.005	0.010	0.014	0.030	0.060	0.10	0.21	0.40
5 mg	0.002	0.003	0.005	0.010	0.014	0.028	0.055	0.083	0.17	
3 mg	0.002	0.003	0.005	0.010	0.014	0.026	0.052	0.071	0.14	
2 mg	0.002	0.003	0.005	0.010	0.014	0.025	0.050	0.062	0.12	
1 mg	0.002	0.003	0.005	0.010	0.014	0.025	0.050	0.050	0.10	
0.5 mg	0.002	0.003	0.005	0.010	0.014	0.025	0.050	0.050	0.080	
0.3 mg	0.002	0.003	0.005	0.010	0.014	0.025				
0.2 mg	0.002	0.003	0.005	0.010	0.014					
0.1 mg	0.002	0.003	0.005	0.010						
0.05 mg	0.002	0.003	0.005	0.010						

Weight Tolerance, Avoirdupois*

ASTM E617-23

Nominal Size	Class 0	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7
	mg	mg	mg	g and mg	g and mg	g and mg	g and mg	g and mg
10 000 lb				45 g	91 g	230 g	450 g	680 g
5 000 lb				23 g	45 g	110 g	230 g	340 g
3 000 lb				14 g	27 g	68 g	140 g	200 g
2 500 lb				11 g	23 g	57 g	110 g	170 g
2 000 lb				9.1 g	18 g	45 g	91 g	140 g
1 000 lb				4.5 g	9.1 g	23 g	45 g	68 g
500 lb				2.3 g	4.5 g	11 g	23 g	34 g
300 lb				1.4 g	2.7 g	6.8 g	14 g	20 g
200 lb				910 mg	1.8 g	4.5 g	9.1 g	14 g
100 lb	57	110	230	450	910 mg	2.3 g	4.5 g	6.8 g
50 lb	29	57	110	230	450	1.1 g	2.3 g	4.1 g
30 lb	17	32	68	140	270	680 mg	1.4 g	2.7 g
25 lb	14	28	57	110	230	570	1.1 g	2.4 g
20 lb	12	23	45	91	180	450	910 mg	2.0 g
10 lb	5.5	11	23	45	91	230	450	1.3 g
5 lb	2.7	5.4	11	23	45	110	230	780 mg
3 lb	1.7	3.4	6.8	14	27	68	140	580
2 lb	1.2	2.3	4.5	9.1	18	45	91	440
1 lb	0.55	1.1	2.3	4.5	9.1	35	70	270
0.5 lb	0.27	0.54	1.1	2.3	4.5	23	45	170
0.3 lb	0.17	0.34	0.68	1.4	2.7	14	27	120
0.2 lb	0.12	0.23	0.45	0.91	1.8	9.0	18	97
0.1 lb	0.055	0.11	0.23	0.57	1.1	4.5	9.1	59
0.05 lb	0.037	0.074	0.11	0.36	0.77	2.3	4.5	37
0.03 lb	0.029	0.059	0.083	0.32	0.59	1.4	2.7	26
0.02 lb	0.024	0.047	0.070	0.23	0.45	0.91	1.8	20
0.01 lb	0.017	0.034	0.054	0.16	0.34	0.73	1.5	12
0.005 lb	0.017	0.034	0.054	0.14	0.27	0.58	1.2	7.8
0.003 lb	0.017	0.034	0.054	0.11	0.22	0.50	0.99	5.4
0.002 lb	0.015	0.030	0.049	0.091	0.19	0.44	0.87	4.2
0.001 lb	0.0050	0.010	0.024	0.078	0.15	0.35	0.70	2.9
0.0005 lb	0.0045	0.0091	0.023	0.064	0.13	0.28	0.56	2.0

Weight Tolerance, Avoirdupois Ounces*

ASTM E617-23

Nominal Size	Class 0	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7
	mg	mg	mg	mg	mg	mg	mg	mg
10 oz	0.35	0.70	1.4	2.8	5.4	28	57	200
8 oz	0.27	0.54	1.1	2.3	4.5	23	45	170
5 oz	0.18	0.35	0.71	1.4	2.8	14	28	130
4 oz	0.14	0.28	0.57	1.1	2.3	11	23	110
3 oz	0.10	0.21	0.43	0.91	1.8	8.5	17	90
2 oz	0.070	0.14	0.28	0.64	1.3	5.7	11	70
1 oz	0.037	0.074	0.14	0.43	0.86	2.8	5.4	42
1/2 oz	0.030	0.060	0.085	0.30	0.59	1.4	2.8	27
1/4 oz	0.020	0.041	0.062	0.20	0.43	0.84	1.7	17
1/8 oz	0.017	0.034	0.054	0.16	0.31	0.67	1.3	10
1/16 oz	0.017	0.034	0.054	0.12	0.24	0.50	1.1	6.5
1/32 oz	0.014	0.029	0.047	0.095	0.19	0.43	0.87	4.2
1/64 oz	0.0050	0.010	0.023	0.077	0.15	0.35	0.69	2.8

Weight Tolerances for Historical NIST Class F Handbook 105-1 (1990)*

NIST Handbook

Metric

Nominal Value	Class F
	g and mg
500 kg	50 g
300 kg	30
200 kg	20
100 kg	10
50 kg	5.0
30 kg	3.0
20 kg	2.0
10 kg	1.0
5 kg	0.50
3 kg	0.30
2 kg	0.20
1 kg	0.10
500 g	70 mg
300 g	60
200 g	40
100 g	20
50 g	10
30 g	6.0
20 g	4.0
10 g	2.0
5 g	1.5
3 g	1.3
2 g	1.1
1 g	0.90
500 mg	0.72
300 mg	0.61
200 mg	0.54
100 mg	0.43
50 mg	0.35
30 mg	0.30
20 mg	0.26
10 mg	0.21
5 mg	0.17
3 mg	0.14
2 mg	0.12
1 mg	0.10

Avoirdupois Pounds

Nominal Value	Class F
	g and mg
10,000 lb	450 g
5,000 lb	230
3,000 lb	140
2,500 lb	110
2,000 lb	91
1,000 lb	45
500 lb	23
100 lb	4.5
50 lb	2.3
30 lb	1.4
25 lb	1.1
20 lb	0.91
10 lb	0.45
5 lb	230 mg
3 lb	140
2 lb	91
1 lb	70
0.5 lb	45
0.3 lb	27
0.2 lb	18
0.1 lb	9.1
0.05 lb	4.5
0.03 lb	2.7
0.02 lb	1.8
0.01 lb	1.5
0.005 lb	1.2
0.003 lb	0.99
0.002 lb	0.87
0.001 lb	0.70

Avoirdupois Ounces

Nominal Value	Class F
	F mg
8 oz	45
4 oz	23
2 oz	11
1 oz	5.4
0.5 (1/2) oz	2.8
0.3 oz	1.8
0.25 (1/4) oz	1.7
0.2 oz	1.6
0.125 (1/8) oz	1.3
0.1 oz	1.3
0.0625 (1/16) oz	1.1
0.05 oz	1.0
0.03125 (1/32) oz	0.87
0.03 oz	0.85
0.02 oz	0.75
0.012325 (1/64) oz	0.69
0.01 oz	0.60

Weight Tolerances Metric*

OIML INTERNATIONAL ORGANIZATION OF LEGAL METROLOGY RECOMMENDATIONS OIML R111

OIML R111-1 2004

Nominal Size	Class E1	Class E2	Class F1	Class F2	Class M1	Class M2	Class M3
	mg	mg	mg	mg	mg	mg	mg
5 000 kg			25,0000	80,000	250,000	800,000	2,500,000
2 000 kg			10,000	30,000	100,000	300,000	1,000,000
1 000 kg		1,600	5,000	16,000	50,000	160,000	500,000
500 kg		800	2,500	8,000	25,000	80,000	250,000
200 kg		300	1,000	3,000	10,000	30,000	100,000
100 kg		160	500	1,600	5,000	16,000	50,000
50 kg	25	80	250	800	2,500	8,000	25,000
20 kg	10	30	100	300	1,000	3,000	10,000
10 kg	5.0	16	50	160	500	1,600	5,000
5 kg	2.5	8.0	25	80	250	800	2,500
2 kg	1.0	3.0	10	30	100	300	1,000
1 kg	0.5	1.6	5.0	16	50	160	500
500 g	0.25	0.8	2.5	8.0	25	80	250
200 g	0.1	0.3	1.0	3.0	10	30	100
100 g	0.05	0.16	0.5	1.6	5.0	16	50
50 g	0.03	0.10	0.3	1.0	3.0	10	30
20 g	0.025	0.08	0.25	0.8	2.5	8.0	25
10 g	0.020	0.06	0.20	0.6	2.0	6.0	20
5 g	0.016	0.05	0.16	0.5	1.6	5.0	16
2 g	0.012	0.04	0.12	0.4	1.2	4.0	12
1 g	0.010	0.03	0.10	0.3	1.0	3.0	10
500 mg	0.008	0.025	0.08	0.25	0.8	2.5	
200 mg	0.006	0.020	0.06	0.20	0.6	2.0	
100 mg	0.005	0.016	0.05	0.16	0.5	1.6	
50 mg	0.004	0.012	0.04	0.12	0.4		
20 mg	0.003	0.010	0.03	0.10	0.3		
10 mg	0.003	0.008	0.025	0.08	0.25		
5 mg	0.003	0.006	0.020	0.06	0.20		
2 mg	0.003	0.006	0.020	0.06	0.20		
1 mg	0.003	0.006	0.020	0.06	0.20		

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