

Mass Standards Handbook — Metric Weight Tolerances

The table below is a listing of the tolerances of various classes of masses. The weight value can deviate above or below the nominal value by the tolerance defined. To determine the tolerance of a mass, look at the denomination or nominal value of the weight and the appropriate class you need.

Table 9 - Metric Weight Tolerances

Denomination Metric	International Organization of Legal Metrology Recommendation R 111*							Troemner Ultra- Class SM	ANSI/ASTM E617				
	E1	E2	F1	F2	M1	M2	M3		0	1	2	3	4
	mg	mg	mg	mg	mg	mg	mg	mg	mg	mg	mg	mg	g & mg
5000 kg			25000	85000	250000	850000	1250000						100 g
3000 kg													60
2000 kg			10000	33000	100000	330000	1000000						40
1000 kg		1600	5000	16000	50000	160000	500000						20
500 kg		800	2500	8000	25000	80000	250000						10
300 kg													6.0
200 kg		300	1000	3000	10000	30000	100000						4.0
100 kg		160	500	1600	5000	16000	50000						2.0
50 kg	25	75	250	750	2500	7500	25000	75	63	125	250	500	1.0
30 kg								45	38	75	150	300	600 mg
25 kg								37	31	62	125	250	500
20 kg	10	30	100	300	1000	3000	10000	30	25	50	100	200	400
10 kg	5	15	50	150	500	1500	5000	15	13	25	50	100	200
5 kg	2.5	7.5	25	75	250	750	2500	7	6	12	25	50	100
3 kg								4.5	3.8	7.5	15	30	60
2 kg	1.0	3.0	10	30	100	300	1000	3.0	2.5	5.0	10	20	40
1 kg	0.5	1.5	5	15	50	150	500	1.5	1.3	2.5	5.0	10	20
500 g	0.25	0.75	2.5	7.5	25	75	250	0.7	0.60	1.2	2.5	5.0	10
300 g								0.45	0.38	0.75	1.5	3.0	6.0
200 g	0.10	0.30	1.0	3.0	10	30	100	0.30	0.25	0.50	1.0	2.0	4.0
100 g	0.05	0.15	0.5	1.5	5	15	50	0.15	0.13	0.25	0.50	1.0	2.0
50 g	0.030	0.10	0.30	1.0	3.0	10	30	0.07	0.060	0.12	0.25	0.60	1.2
30 g								0.044	0.037	0.074	0.15	0.45	0.90
20 g	0.025	0.080	0.25	0.8	2.5	8	25	0.044	0.037	0.074	0.10	0.35	0.70
10 g	0.020	0.060	0.20	0.6	2	6	20	0.030	0.025	0.050	0.074	0.25	0.50
5 g	0.015	0.050	0.15	0.5	1.5	5	15	0.020	0.017	0.034	0.054	0.18	0.36
3 g								0.020	0.017	0.034	0.054	0.15	0.30
2 g	0.012	0.040	0.12	0.4	1.2	4	12	0.020	0.017	0.034	0.054	0.13	0.26
1 g	0.010	0.030	0.10	0.3	1.0	3	10	0.020	0.017	0.034	0.054	0.10	0.20
500 mg	0.008	0.025	0.08	0.25	0.8	2.5		0.005	0.005	0.010	0.025	0.080	0.16
300 mg								0.005	0.005	0.010	0.025	0.070	0.14
200 mg	0.006	0.020	0.06	0.20	0.6	2.0		0.005	0.005	0.010	0.025	0.060	0.12
100 mg	0.005	0.015	0.05	0.15	0.5	1.5		0.005	0.005	0.010	0.025	0.050	0.10
50 mg	0.004	0.012	0.04	0.12	0.4			0.005	0.005	0.010	0.014	0.042	0.085
30 mg								0.005	0.005	0.010	0.014	0.038	0.075
20 mg	0.003	0.010	0.03	0.10	0.3			0.005	0.005	0.010	0.014	0.035	0.070
10 mg	0.002	0.008	0.025	0.08	0.25			0.005	0.005	0.010	0.014	0.030	0.060
5 mg	0.002	0.006	0.020	0.06	0.20			0.005	0.005	0.010	0.014	0.028	0.055
3 mg								0.005	0.005	0.010	0.014	0.026	0.052
2 mg	0.002	0.006	0.020	0.06	0.20			0.005	0.005	0.010	0.014	0.025	0.050
1 mg	0.002	0.006	0.020	0.06	0.20			0.005	0.005	0.010	0.014	0.025	0.050
0.5 mg													
0.3 mg													
0.2 mg													
0.1 mg													
0.05 mg													

* OIML - International Recommendation R 111 replaces International Recommendation numbers 1, 2, 20, 52.

** NIST 105-1 Class F tolerances are rounded to two significant figures



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			National Bureau of Standards Circular 547 Section 1									NIST Handbooks			
5	6	7	J	M		S		S-1	P	Q	T	105-1**	44		
g & mg	g & mg	g & mg	mg	Ind mg	Crp mg	Ind mg	Grip mg	mg	g & mg	g & mg	g & mg	g & mg	Accept mg	Maint mg	Denomination Metric
250 g	500 g	750 g										500 g			5000 kg
150	300	450										300			3000 kg
100	200	300										200			2000 kg
50	100	150							20 g	50 g	150 g	100			1000 kg
25	50	75							10	25	75	50			500 kg
15	30	45										30			300 kg
10	20	30							4.0	10	30	20			200 kg
5	10	15							2.0	5	15	10			100 kg
2.5	5	7.5						500	1.0	2.5	7.5	5.0			50 kg
1.5	3	4.5										3.0			30 kg
1.2	2.5	4.5		125				250	500 mg	1.2	4.5	2.5			25 kg
1.0	2	3.8		100				200	400	1	3.8	2.0	750	1500	20 kg
500 mg	1	2.2		50				100	200	500 mg	2.2	1.0	500	1000	10 kg
250	500 mg	1.4		25				50	100	250	1.4	0.50	400	800	5 kg
150	300	1.0		15		7.5		30	60	150	1.0	0.30	250	500	3 kg
100	200	750 mg		10		5.0		20	40	100	750 mg	0.20	200	400	2 kg
50	100	470		5.0		2.5		10	20	50	470	0.10	120	250	1 kg
30	50	300		2.5		1.2		5.0	10	30	300	70 mg	88	175	500 g
20	30	210		1.5		0.75		3.0	6.0	20	210	60	75	150	300 g
15	20	160		1.0		0.50		2.0	4.0	15	160	40	50	100	200 g
9	10	100		0.50		0.25		1.0	2.0	9.0	100	20	35	70	100 g
5.6	7	62		0.25		0.12		0.60	1.2	5.6	62	10	20	40	50 g
4.0	5	44		0.15		0.074		0.45	0.90	4.0	44	6.0	15	30	30 g
3.0	3	33		0.10		0.074		0.35	0.70	3.0	33	4.0	10	20	20 g
2.0	2	21		0.050		0.074		0.25	0.50	2.0	21	2.0	8	15	10 g
1.3	2	13		0.034		0.054		0.18	0.36	1.3	13	1.5	5	10	5 g
0.95	2.0	9.4		0.034		0.054		0.15	0.30	0.95	9.4	1.3	4	8	3 g
0.75	2.0	7.0		0.034		0.054		0.13	0.26	0.75	7.0	1.1	3	6	2 g
0.50	2.0	4.5		0.034		0.054		0.10	0.20	0.50	4.5	0.90	2	4	1 g
0.38	1.0	3.0		0.010		0.025		0.080	0.16	0.38	3.0	0.72	1.5	3.0	500 mg
0.30	1.0	2.2		0.010		0.025		0.070	0.14	0.30	2.2	0.61	1.0	2.0	300 mg
0.26	1.0	1.8		0.010		0.025		0.060	0.12	0.26	1.8	0.54	0.8	1.5	200 mg
0.20	1.0	1.2		0.010		0.025		0.050	0.10	0.20	1.2	0.43	0.5	1.0	100 mg
0.16	0.50	0.88	0.010	0.010		0.014		0.042	0.085	0.16	0.88	0.35	0.4	0.8	50 mg
0.14	0.50	0.68	0.010	0.010		0.014		0.038	0.075	0.14	0.68	0.30	0.3	0.6	30 mg
0.12	0.50	0.56	0.010	0.010		0.014		0.035	0.070	0.12	0.56	0.26	0.2	0.4	20 mg
0.10	0.50	0.4	0.010	0.010		0.014		0.030	0.060	0.10	0.40	0.21	0.15	0.3	10 mg
0.080	0.20		0.010	0.010		0.014		0.028	0.055	0.080		0.17	0.05	0.1	5 mg
0.070	0.20		0.010	0.010		0.014		0.026	0.052	0.070		0.14	0.05	0.1	3 mg
0.060	0.20		0.010	0.010		0.014		0.025	0.050	0.060		0.12	0.05	0.1	2 mg
0.050	0.10		0.010	0.010		0.014		0.025	0.050	0.050		0.10	0.05	0.1	1 mg
			0.010	0.010		0.014		0.025							0.5 mg
			0.010	0.010		0.014		0.025							0.3 mg
			0.010	0.010		0.014		0.025							0.2 mg
			0.010	0.010		0.014		0.025							0.1 mg
			0.010	0.010		0.014		0.025							0.05 mg



Mass Standards Handbook — Avoirdupois and Troy Nominal Tolerances

The table below is a listing of the tolerances of various classes of masses. The weight value can deviate above or below the nominal value by the tolerance defined. To determine the tolerance of a mass, look at the denomination or nominal value of the weight and the appropriate class you need.

Table 10 - Avoirdupois and Troy Nominal Tolerances

NIST Handbook 105-1*									
Denomination Ounce	F mg	Denomination Pound	F g & mg	Denomination Troy	F g & mg	Denomination Grains	F mg	Denomination Apothecary	F mg
12 oz	70	10 000 lb	450 g	500 oz t	1.7 g	10 000 grains	70	12 oz ap	70
8 oz	45	5 000 lb	230	200 oz t	0.62	5 000 grains	70	10 oz ap	62
4 oz	23	3 000 lb	140	100 oz t	0.31	3 000 grains	39	6 oz ap	37
2 oz	11	2 500 lb	110	50 oz t	0.16	2 000 grains	26	5 oz ap	31
1 oz	5.4	2 000 lb	91	20 oz t	70 mg	1 000 grains	13	4 oz ap	25
1/2 oz	2.8	1 000 lb	45	12 oz t	70	500 grains	6.5	3 oz ap	19
1/4 oz	1.7	500 lb	23	10 oz t	62	300 grains	3.9	2 oz ap	12
1/8 oz	1.3	100 lb	4.5	6 oz t	37	200 grains	2.6	1 oz ap	6.2
1/16 oz	1.1	50 lb	2.3	5 oz t	31	100 grains	1.6		
1/32 oz	0.87	30 lb	1.4	4 oz t	25	50 grains	1.3	6 dr ap	4.7
1/64 oz	0.69	25 lb	1.1	3 oz t	19	30 grains	1.1	5 dr ap	3.9
		20 lb	0.91	2 oz t	12	20 grains	0.98	4 dr ap	3.1
0.5 oz	2.8	10 lb	0.45	1 oz t	6.2	12 grains	0.82	3 dr ap	2.3
0.3 oz	1.8	5 lb	0.23	1/2 oz t	3.1	10 grains	0.78	2 dr ap	1.7
0.2 oz	1.6	4 lb	0.18	1/4 oz t	1.7	6 grains	0.65	1 dr ap	1.4
0.1 oz	1.3	3 lb	0.14	1/8 oz t	1.4	5 grains	0.63	0.5 dr ap	1.1
0.05 oz	1.0	2 lb	91 mg	1/16 oz t	1.1	4 grains	0.58	2 s ap	1.2
0.03 oz	0.85	1 lb	70	1/32 oz t	0.89	3 grains	0.53	1 s ap	0.98
0.02 oz	0.75	0.5 lb	45			2 grains	0.47	0.5 s ap	0.78
0.01 oz	0.60	0.3 lb	27	0.5 oz t	3.1	1 grains	0.38		
		0.2 lb	18	0.2 oz t	1.6	0.5 grains	0.30		
		0.1 lb	9.1	0.1 oz t	1.3	0.3 grains	0.26		
		0.05 lb	4.5	0.05 oz t	1.0	0.2 grains	0.23		
		0.03 lb	2.7	0.02 oz t	0.77	0.1 grains	0.18		
		0.02 lb	1.8	0.01 oz t	0.62				
		0.01 lb	1.5	0.005 oz t	0.50				
		0.005 lb	1.2						
		0.003 lb	0.99	20 dwt	6.2				
		0.002 lb	0.87	10 dwt	3.1				
		0.001 lb	0.70	5 dwt	1.7				
				2 dwt	1.3				
				1 dwt	1.0				
				0.5 dwt	0.83				
				0.2 dwt	0.62				
				0.1 dwt	0.50				

*NIST 105-1 Class F tolerances are rounded to two significant figures