

Calibration Masses and Certification Services



Calibration Weights and Certification

- **Single-piece construction**
- **Corrosion-resistant stainless steel**
- **Meet or exceed all ASTM and OIML standards**
- **1 gram to 5 kilogram weights**
- **Custom weight sets available**

Electronic balances must be calibrated with a mass standard upon installation and on a regular basis thereafter. Calibration values vary over time because of changing conditions within the balance or its environment, such as:

- Movement or relocation of the balance
- Differing gravitational forces
- Temperature variations
- Aging electronic components

Trust the experts. Denver Instrument has a century-long tradition of quality and innovation in the manufacture of precision mass measurement equipment. The mass standards produced by Denver Instrument are designed to meet or exceed the standards of the American Society of Testing and Materials (ASTM E 617) and the Organization Internationale de Métrologie Légale (OIML R111).

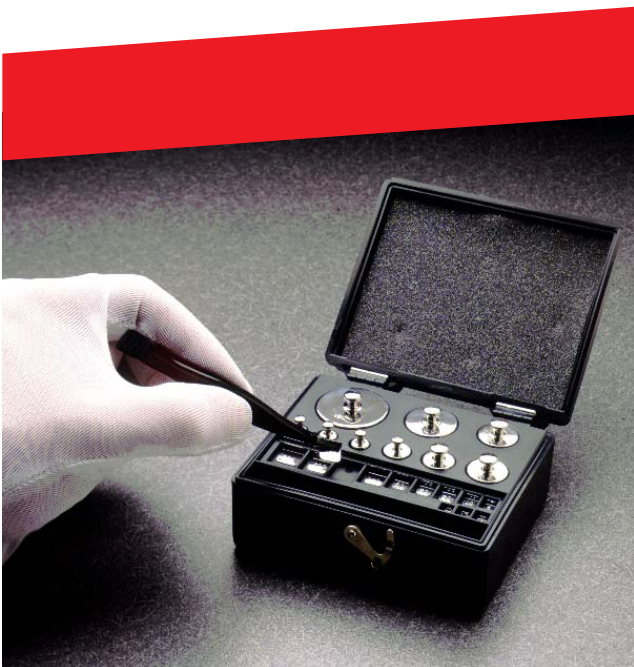
Single-piece construction. All Denver Instrument weights are ASTM Type 1 single-piece weights. They contain no air cavity or foreign adjusting material, thus providing the maximum mass stability. A precise measurement of density can only be made using a single-piece weight and ASTM requires one-piece weights for use as standards and where mass stability is required.

Weight Sets. Count on Denver Instrument for the finest quality analytical weight sets, appropriate for every weighing application. Each set is packaged in a sturdy storage case and supplied with tweezers for handling to protect against dirt and body oils. Sets consist of flat weights ranging from 1mg to 500mg and knob-style weights ranging from 1g to 100g. Masses from 1mg through 5mg are aluminum; the remainder are of stainless-steel construction.

Custom sets are available and quoted upon request.

Certificate of Conformance. Each Denver Instrument weight or weight set is supplied with a certificate of conformance at no additional cost. This report identifies the tolerance class, type of construction and lists the NIST test number and date for the applicable Denver Instrument primary standard(s), the secondary set number and the technician's signature.





Set		Weights Included
1mg-100g	21 Piece Set	1mg, 2 x 2mg, 5mg, 10mg, 2 x 20mg, 50mg, 100mg, 2 x 200mg, 500mg, 1g, 2 x 2g, 5g, 10g, 2 x 20g, 50g, 100g
10mg-50g	16 Piece Set	10mg, 2 x 20mg, 50mg, 100mg, 2 x 200mg, 500mg, 1g, 2 x 2g, 5g, 10g, 2 x 20g, 50g
10mg-100g	17 Piece Set	10mg, 2 x 20mg, 50mg, 100mg, 2 x 200mg, 500mg, 1g, 2 x 2g, 5g, 10g, 2 x 20g, 50g, 100g
1g-50g	8 Piece Set	1g, 2 x 2g, 5g, 10g, 2 x 20g, 50g
1g-100g	9 Piece Set	1g, 2 x 2g, 5g, 10g, 2 x 20g, 50g, 100g
100g-1kg	5 Piece Set	100g, 2 x 200g, 500g, 1000g

Nominal Value	ASTM Ulti-Mass*	ASTM Class 1	ASTM Class 2	ASTM Class 3	ASTM Class 4
Cylindrical, OIML Shape					
30g	870030.7	870030.1	870030.2	870030.3	870030.4
40g	870040.7	870040.1	870040.2	870040.3	870040.4
50g	870050.7	870050.1	870050.2	870050.3	870050.4
100g	870100.7	870100.1	870100.2	870100.3	870100.4
200g	870200.7	870200.1	870200.2	870200.3	870200.4
300g	870300.7	870300.1	870300.2	870300.3	870300.4
400g	870400.7	870400.1	870400.2	870400.3	870400.4
500g	870500.7	870500.1	870500.2	870500.3	870500.4
1kg	871000.7	871000.1	871000.2	871000.3	871000.4
2kg	872000.7	872000.1	872000.2	872000.3	872000.4
5kg	875000.7	875000.1	875000.2	875000.3	875000.4

Small Knob Style, ASTM Shape					
1g	820001.7	820001.1	820001.2	820001.3	820001.4
2g	820002.7	820002.1	820002.2	820002.3	820002.4
5g	820005.7	820005.1	820005.2	820005.3	820005.4
10g	820010.7	820010.1	820010.2	820010.3	820010.4
20g	820020.7	820020.1	820020.2	820020.3	820020.4
50g	820050.7	820050.1	820050.2	820050.3	820050.4
100g	820100.7	820100.1	820100.2	820100.3	820100.4

Flat Weights, ASTM Shape					
1mg	869001.7	869001.1	869001.2	869001.3	869001.4
2mg	869002.7	869002.1	869002.2	869002.3	869002.4
5mg	869005.7	869005.1	869005.2	869005.3	869005.4
10mg	869010.7	869010.1	869010.2	869010.3	869010.4
20mg	869020.7	869020.1	869020.2	869020.3	869020.4
50mg	869050.7	869050.1	869050.2	869050.3	869050.4
100mg	869100.7	869100.1	869100.2	869100.3	869100.4
200mg	869200.7	869200.1	869200.2	869200.3	869200.4
500mg	869500.7	869500.1	869500.2	869500.3	869500.4

Weight Sets, ASTM Shape					
1mg-100g	854254.7	854254.1	854254.2	854254.3	854254.4
10mg-50g	855400.7	855400.1	855400.2	855400.3	855400.4
10mg-100g	854252.7	854252.1	854252.2	854252.3	854252.4
1g-50g	855600.7	855600.1	855600.2	855600.3	855600.4
1g-100g	854050.7	854050.1	854050.2	854050.3	854050.4
100g-1kg	855100.7	855100.1	855100.2	855100.3	855100.4

**Weights are adjusted to Class 0 tolerance but meet Class 1 specification for markings and density*

Certificate of Calibration. For a nominal fee, add a Certificate of Calibration to any Denver Instrument weight or weight set by adding a "C" to the end of the part number. The Certificate of Calibration report includes the nominal value and the conventional mass correction value for each weight certified. It will also list information on the standards the weights were compared against including: identifying number, NIST test number and date the standards were last calibrated.

Recertification Service. Weight values can change over time due to scratches, fingerprints, wear and even corrosion resulting from atmospheric contaminants. Regular checks on the accuracy of your mass standards will ensure the accuracy of your measurements. Our mass metrology lab provides this service at a very competitive price.



Which Class is Right for My Application?

A balance should be calibrated using a weight with a class tolerance factor greater than the readability of the balance. Example: A toploading balance with readability of 0.01g may be calibrated with a weight having a known tolerance of at least 0.009g.

Ulti-Mass Standards. These mass standards provide the greatest precision available from Denver Instrument. They are ideal for use as reference standards to calibrate other weights or for calibrating high-resolution analytical balances. The Ulti-Mass tolerances are approximately two times the precision of ANSI/ASTM Class 1.

ASTM Class 1. Provides high precision. Can be used as reference standards in calibrating other weights and are appropriate for calibration of high-precision analytical balances.

ASTM Class 2. Appropriate for calibrating high-precision toploading balances with readabilities ranging from 0.001g to 0.01g.

ASTM Classes 3 and 4. Appropriate for calibrating balances with moderate precision, ranging from 0.01g to 0.1g.

Table of Weight Tolerances

Nominal Value	ASTM E617				
	Ulti-Mass* Tolerance in mg	Class 1 Tolerance in mg	Class 2 Tolerance in mg	Class 3 Tolerance in mg	Class 4 Tolerance in mg
5 kg	6	12	25	50	100
2 kg	2.5	5.0	10	20	40
1 kg	1.3	2.5	5.0	10	20
500 g	0.60	1.2	2.5	5.0	10.0
300 g	0.38	0.75	1.5	3.0	6.0
200 g	0.25	0.50	1.0	2.0	4.0
100 g	0.13	0.25	0.50	1.0	2.0
50 g	0.060	0.12	0.25	0.60	1.2
30 g	0.037	0.074	0.15	0.45	0.90
20 g	0.037	0.074	0.10	0.35	0.70
10 g	0.025	0.050	0.074	0.25	0.50
5 g	0.017	0.034	0.054	0.18	0.36
2 g	0.017	0.034	0.054	0.13	0.26
1 g	0.017	0.034	0.054	0.10	0.20
500 mg	0.005	0.010	0.025	0.080	0.16
200 mg	0.005	0.010	0.025	0.060	0.12
100 mg	0.005	0.010	0.025	0.050	0.10
50 mg	0.005	0.010	0.014	0.042	0.085
20 mg	0.005	0.010	0.014	0.035	0.070
10 mg	0.005	0.010	0.014	0.030	0.060
5 mg	0.005	0.010	0.014	0.028	0.055
2 mg	0.005	0.010	0.014	0.025	0.050
1 mg	0.005	0.010	0.014	0.025	0.050

**Weights are adjusted to Class 0 tolerance but meet Class 1 specification for markings and density*



Precision laboratory instruments since 1880

1401 17th St. Suite 750
Denver, Colorado 80202
800.321.1135
303.431.7255
303.423.4831 FAX

Laboratory Address:
6542 Fig St.
Arvada, CO 80004

www.denverinstrumentUSA.com