

## ASTM and OIML Calibration 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.

| Metric Weight Tolerances - all tolerances stated in milligram (mg) |             |               |               |               |               |               |               |               |                                                                   |          |          |          |          |          |          |  |
|--------------------------------------------------------------------|-------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------------------------------------------------------------|----------|----------|----------|----------|----------|----------|--|
| American Society of Testing & Measurement ASTM E617                |             |               |               |               |               |               |               |               | International Organization of Legal Metrology Recommendation R111 |          |          |          |          |          |          |  |
| Denomination<br>Metric                                             | Ultra Class | Class 1<br>mg | Class 2<br>mg | Class 3<br>mg | Class 4<br>mg | Class 5<br>mg | Class 6<br>mg | Class 7<br>mg | E1<br>mg                                                          | E2<br>mg | F1<br>mg | F2<br>mg | M1<br>mg | M2<br>mg | M3<br>mg |  |
| 5 kg                                                               | 6.00        | 12            | 25            | 50            | 100           | 250           | 500           | 1400          | 2.5                                                               | 7.5      | 25       | 75       | 250      | 750      | 2500     |  |
| 3 kg                                                               | 3.80        | 7.5           | 15            | 30            | 60            | 150           | 300           | 1000          |                                                                   |          |          |          |          |          |          |  |
| 2 kg                                                               | 2.50        | 5.0           | 10            | 20            | 40            | 100           | 200           | 750           | 1.0                                                               | 3.0      | 10       | 30       | 100      | 300      | 1000     |  |
| 1 kg                                                               | 1.25        | 2.5           | 5.0           | 10            | 20            | 50            | 100           | 470           | 0.5                                                               | 1.5      | 5        | 15       | 50       | 150      | 500      |  |
| 500 g                                                              | 0.600       | 1.2           | 2.5           | 5.0           | 10            | 30            | 50            | 300           | 0.25                                                              | 0.75     | 2.5      | 7.5      | 25       | 75       | 250      |  |
| 300 g                                                              | 0.380       | 0.75          | 1.5           | 3.0           | 6.0           | 20            | 30            | 210           |                                                                   |          |          |          |          |          |          |  |
| 200 g                                                              | 0.250       | 0.50          | 1.0           | 2.0           | 4.0           | 15            | 20            | 160           | 0.1                                                               | 0.30     | 1.0      | 3.0      | 10       | 30       | 100      |  |
| 100 g                                                              | 0.125       | 0.25          | 0.50          | 1.0           | 2.0           | 9             | 10            | 100           | 0.05                                                              | 0.15     | 0.5      | 1.5      | 5        | 15       | 50       |  |
| 50 g                                                               | 0.060       | 0.12          | 0.25          | 0.60          | 1.2           | 5.6           | 7             |               | 0.030                                                             | 0.10     | 0.30     | 1.0      | 3.0      | 10       | 30       |  |
| 30 g                                                               | 0.037       | 0.074         | 0.15          | 0.45          | 0.90          | 4.0           | 5             | 44            |                                                                   |          |          |          |          |          |          |  |
| 20 g                                                               | 0.037       | 0.074         | 0.10          | 0.35          | 0.70          | 3.0           | 3             | 33            | 0.025                                                             | 0.080    | 0.25     | 0.8      | 2.5      | 8        | 25       |  |
| 10 g                                                               | 0.025       | 0.050         | 0.074         | 0.25          | 0.50          | 2.0           | 2             | 21            | 0.020                                                             | 0.060    | 0.20     | 0.6      | 2        | 6        | 20       |  |
| 5 g                                                                | 0.017       | 0.034         | 0.054         | 0.18          | 0.36          | 1.3           | 2             | 13            | 0.015                                                             | 0.050    | 0.15     | 0.5      | 1.5      | 5        | 15       |  |
| 3 g                                                                | 0.017       | 0.034         | 0.054         | 0.15          | 0.30          | 0.95          | 2             | 9.4           |                                                                   |          |          |          |          |          |          |  |
| 2 g                                                                | 0.017       | 0.034         | 0.054         | 0.13          | 0.26          | 0.75          | 2             | 7.0           | 0.012                                                             | 0.040    | 0.12     | 0.4      | 1.2      | 4        | 12       |  |
| 1 g                                                                | 0.017       | 0.034         | 0.054         | 0.10          | 0.20          | 0.50          | 2             | 4.5           | 0.010                                                             | 0.030    | 0.10     | 0.3      | 1.0      | 3        | 10       |  |
| 500 mg                                                             | 0.005       | 0.010         | 0.025         | 0.080         | 0.16          | 0.38          | 1             | 3.0           | 0.008                                                             | 0.025    | 0.08     | 0.25     | 0.80     | 2.5      |          |  |
| 200 mg                                                             | 0.005       | 0.010         | 0.025         | 0.060         | 0.12          | 0.26          | 1             | 1.8           | 0.006                                                             | 0.020    | 0.06     | 0.20     | 0.6      | 2        |          |  |
| 100 mg                                                             | 0.005       | 0.010         | 0.025         | 0.050         | 0.10          | 0.20          | 1             | 1.2           | 0.005                                                             | 0.015    | 0.05     | 0.15     | 0.5      | 1.5      |          |  |
| 50 mg                                                              | 0.005       | 0.010         | 0.014         | 0.042         | 0.085         | 0.16          | 0.5           | 0.88          | 0.004                                                             | 0.012    | 0.04     | 0.12     | 0.4      |          |          |  |
| 20 mg                                                              | 0.005       | 0.010         | 0.014         | 0.035         | 0.070         | 0.12          | 0.5           | 0.56          | 0.003                                                             | 0.010    | 0.03     | 0.10     | 0.30     |          |          |  |
| 10 mg                                                              | 0.005       | 0.010         | 0.014         | 0.030         | 0.060         | 0.10          | 0.5           | 0.4           | 0.002                                                             | 0.008    | 0.025    | 0.08     | 0.25     |          |          |  |
| 5 mg                                                               | 0.005       | 0.010         | 0.014         | 0.028         | 0.055         | 0.080         | 0.2           |               | 0.002                                                             | 0.006    | 0.020    | 0.06     | 0.20     |          |          |  |
| 2 mg                                                               | 0.005       | 0.010         | 0.014         | 0.025         | 0.050         | 0.060         | 0.2           |               | 0.002                                                             | 0.006    | 0.020    | 0.06     | 0.20     |          |          |  |
| 1 mg                                                               | 0.005       | 0.010         | 0.014         | 0.025         | 0.050         | 0.050         | 0.1           |               | 0.002                                                             | 0.006    | 0.020    | 0.06     | 0.20     |          |          |  |

*The table above is provided courtesy of Precision Weighing Balances.*

A balance should be calibrated using a weight with a class tolerance factor greater than the readability of the balance. For example, a milligram balance with readability of 0.001g should be calibrated with a weight having a known tolerance of at least 0.0009g.