



STANDARD WEIGHTS

CLASS E1, E2, F1, F2

CATALOGUE 2015

Reaching Worldwide



E1
E2
F1
F2



The Weights conform to
International Recommendation
OIML R111

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The accuracy class for weights used as standards for the verification of weights or weighing instruments should be in accordance with the requirements of the relevant OIML Recommendations.

The letter "E" for Classes E1 and E2 refers to EXTRA FINE where the letter "F" for Classes F1 & F2 refers FINE

The Class F1 & F2 weight bear number indicating the nominal value, but E1 & E2 unmarked. Duplicated weights are marked with a dot and weight composition is according to OIML recommendations mainly 5-2-2-1 composition.

Our main range of Weights

Class	Denomination	Part No.
E1	1mg to 200g	1110100
E1	1mg to 500mg	1110111

Class	Denomination	Part No.
E2	1mg to 200g	1110200
E2	1mg to 500mg	1110222

Class	Denomination	Part No.
F1	1mg to 200g	1110300
F1	1mg to 500g	1110310
F1	1mg to 1kg	1110320
F1	1mg to 2kg	1110330
F1	1mg to 5kg	1110340
F1	1mg to 500mg	1110333
F1	50g	1110301
F1	100g	1110302
F1	200g	1110303
F1	500g	1110304
F1	1kg	1110305
F1	2kg	1110306
F1	5kg	1110307
F1	10kg	1110308
F1	20kg	1110309

Class	Denomination	Part No.
F2	1mg to 200g	1110400
F2	1mg to 500g	1110410
F2	1mg to 1kg	1110420
F2	1mg to 2kg	1110430
F2	1mg to 5kg	1110440
F2	1mg to 500mg	1110444
F2	50g	1110401
F2	100g	1110402
F2	200g	1110403
F2	500g	1110404
F2	1kg	1110405
F2	2kg	1110406
F2	5kg	1110407
F2	10kg	1110408
F2	20kg	1110409

Accuracy differentiate between E1, E2 , F1, F2 Class Weights (Example 100g)

Maximum Permissible error for 100g Weight (\pm mg)

E1 - 100g \pm 0.05mg = 99.99995g to 100.00005g

E2 - 100g \pm 0.16mg = 99.99984g to 100.00016g

F1 - 100g \pm 0.5mg = 99.99950g to 100.00050g

F2 - 100g \pm 1.60mg = 99.99840g to 100.00160g



Limits of polarization

The magnetization, M , expressed in terms of the polarization, $\mu_0 M$, should not exceed the values given

Weight Class	E1	E2	F1	F2
Maximum Polarization $\mu_0 M$, (μT)	2.5	8	25	80

Limits of magnetic susceptibility

Weight Class	E1	E2	F1	F2
$m \leq 1\text{g}$	0.25	0.9	10	-
$2\text{g} \leq m \leq 10\text{g}$	0.06	0.18	0.7	4
$20\text{g} \leq m$	0.02	0.07	0.2	0.8

Maximum value Surface Roughness

Weight Class	E1	E2	F1	F2
R_z (μm)	0.5	1	2	5
R_a (μm)	0.1	0.2	0.4	1

Ambient Temperature during the calibration

Weight Class	Temperature change during calibration
E1	$\pm 0.3^\circ\text{C}$ per hour with a maximum of $\pm 0.5^\circ\text{C}$ per 12 hours
E2	$\pm 0.7^\circ\text{C}$ per hour with a maximum of $\pm 1^\circ\text{C}$ per 12 hours
F1	$\pm 1.5^\circ\text{C}$ per hour with a maximum of $\pm 2^\circ\text{C}$ per 12 hours
F2	$\pm 2^\circ\text{C}$ per hour with a maximum of $\pm 3.5^\circ\text{C}$ per 12 hours





Maximum Permissible error for Weights (\pm mg) as per OIML R111 tolerance Table.

OIML R111 Tolerance Table (\pm mg)				
Denomination	E1	E2	F1	F2
50 kg	25	80	250	800
20 kg	10	30	100	300
10 kg	5.0	16	50	160
5 kg	2.5	8.0	25	80
2 kg	1.0	3.0	10	30
1 kg	0.5	1.6	5.0	16
500g	0.25	0.8	2.5	8.0
200 g	0.10	0.3	1.0	3.0
100 g	0.05	0.16	0.5	1.6
50 g	0.03	0.10	0.3	1.0
20 g	0.025	0.08	0.25	0.8
10 g	0.020	0.06	0.20	0.6
5 g	0.016	0.05	0.16	0.5
2 g	0.012	0.04	0.12	0.4
1 g	0.010	0.03	0.10	0.3
500 mg	0.008	0.025	0.08	0.25
200 mg	0.006	0.020	0.06	0.20
100 mg	0.005	0.016	0.05	0.16
50 mg	0.004	0.012	0.04	0.12
20 mg	0.003	0.010	0.03	0.10
10 mg	0.003	0.008	0.025	0.08
5 mg	0.003	0.006	0.020	0.06
2 mg	0.003	0.006	0.020	0.06
1 mg	0.003	0.006	0.020	0.06

Weights Class Selection for Calibration of Weighing Scales	Capacity \ Accuracy	100 mg	10 mg	1 mg	0.1 mg	< 0.1 mg
	50g	-	M1	F2	E2	E1
100 g	-	M1	F1	E1	E1	
500 g	M1	F2	E2	-	-	
1 kg	M1	F1	E1	-	-	
5 kg	F2	E2	-	-	-	
10 kg	F1	E1	-	-	-	



Specification

Class	E1
Standard	OIML R111
Material	Austenitic Stainless Steel
Construction	Solid single piece fabrication
Cavity	No cavity adjustment
Density	8.00g/cm ³
Magnetic Susceptibility	<0.005
Shape	Cylindrical with knob
Finish	Mirror Polish
Packing	Aluminum Box
Accessories	Tweezer, Cloth, Gloves

E1



Our E1 range

Class	Denomination	Part No.
E1	1mg to 200 g	1110100
E1	1mg to 500 mg	1110111

Application

E1 Class weights are recommended for primary reference standard for calibration other reference standard and weights. It cannot use in General Laboratory

Denomination	1mg	2mg	5mg	10mg	20mg	50mg	100mg	200mg	500mg	1g	2g	5g	10g	20g	50g	100g	200g
Sets	1	2	1	1	2	1	1	2	1	1	2	1	1	2	1	1	2
Pcs.	1	2	1	1	2	1	1	2	1	1	2	1	1	2	1	1	2

We can Provide Calibration Certificate from NABL Accredited Lab (Charges applicable)

Denomination	E1
200 g	± 0.10 mg
100 g	± 0.05 mg
50 g	± 0.03 mg
20 g	± 0.025 mg
10 g	± 0.020 mg
5 g	± 0.016 mg
2 g	± 0.012 mg
1 g	± 0.010 mg
500 mg	± 0.008 mg
200 mg	± 0.006 mg
100 mg	± 0.005 mg
50 mg	± 0.004 mg
20 mg	± 0.003 mg
10 mg	± 0.003 mg
5 mg	± 0.003 mg
2 mg	± 0.003 mg
1 mg	± 0.003 mg

Maximum Permissible error for Weights (\pm mg) as per OIML R111 tolerance Table.



Specification

Class	E2
Standard	OIML R111
Material	316 Stainless Steel
Construction	Solid single piece fabrication
Cavity	No cavity adjustment
Density	7.96g/cm ³
Magnetic Susceptibility	<0.005
Shape	Cylindrical with knob
Finish	Mirror Polish
Packing	Aluminum Box
Accessories	Tweezer, Cloth, Gloves

E2



Our E2 range

Class	Denomination	Part No.
E2	1mg to 200 g	1110200
E2	1mg to 500 mg	1110222

Denomination	E2
200 g	± 0.3 mg
100 g	± 0.16 mg
50 g	± 0.10 mg
20 g	± 0.08 mg
10 g	± 0.06 mg
5 g	± 0.05 mg
2 g	± 0.04 mg
1 g	± 0.03 mg
500 mg	± 0.025 mg
200 mg	± 0.020 mg
100 mg	± 0.016 mg
50 mg	± 0.012 mg
20 mg	± 0.010 mg
10 mg	± 0.008 mg
5 mg	± 0.006 mg
2 mg	± 0.006 mg
1 mg	± 0.006 mg

Maximum Permissible error for Weights (\pm mg) as per OIML R111 tolerance Table.

Application

E2 Class weights are recommended for the calibration of micro, semi-micro and analytical balances where very high accuracy is required. E2 Class weights also can use to calibrate F1 Class weights

Denomination	1mg	2mg	5mg	10mg	20mg	50mg	100mg	200mg	500mg	1g	2g	5g	10g	20g	50g	100g	200g
Sets																	
Pcs.	1	2	1	1	2	1	1	2	1	1	2	1	1	2	1	1	2

We can Provide Calibration Certificate from NABL Accredited Lab (Charges applicable)



Specification

Class	F1
Standard	OIML R111
Material	304 Stainless Steel
Construction	One or two pieces of same material
Cavity	May contain adjusting cavity
Density	7.90g/cm ³
Magnetic Susceptibility	<0.05
Shape	Cylindrical with knob
Finish	Mirror Polish
Packing	Aluminum Box
Accessories	Tweezer, Gloves

Denomination	F1
20 kg	± 100 mg
10 kg	± 50 mg
5 kg	± 25 mg
2 kg	± 10 mg
1 kg	± 5.0 mg
500g	± 2.5 mg
200 g	± 1.0 mg
100 g	± 0.5 mg
50 g	± 0.30 mg
20 g	± 0.25 mg
10 g	± 0.20 mg
5 g	± 0.16 mg
2 g	± 0.12 mg
1 g	± 0.10 mg
500 mg	± 0.08 mg
200 mg	± 0.06 mg
100 mg	± 0.05 mg
50 mg	± 0.04 mg
20 mg	± 0.03 mg
10 mg	± 0.025 mg
5 mg	± 0.020 mg
2 mg	± 0.020 mg
1 mg	± 0.020 mg

Our F1 range - Individual Weights

Class	Denomination	Part No.
F1	50g	1110301
F1	100g	1110302
F1	200g	1110303
F1	500g	1110304
F1	1kg	1110305
F1	2kg	1110306
F1	5kg	1110307
F1	10kg	1110308
F1	20kg	1110309



F1

Our F1 range - Weights Set

Class	Denomination	Part No.
F1	1 mg to 200g	1110300
F1	1 mg to 500g	1110310
F1	1 mg to 1 kg	1110320
F1	1 mg to 2 kg	1110330
F1	1 mg to 5 kg	1110340
F1	1mg to 500mg	1110333



Application

F1 Class weights are recommended for calibration High Precision, Top loading balances with readability 0.001g .
 F1 Class weights also can be use calibrate F2 Class weights

Denomination	1mg	2mg	5mg	10mg	20mg	50mg	100mg	200mg	500mg	1g	2g	5g	10g	20g	50g	100g	200g	500g	1kg	2kg	
Sets																					
Pcs.	1	2	1	1	2	1	1	2	1	1	2	1	1	2	1	1	2	1	1	2	

We can Provide Calibration Certificate from NABL Accredited Lab (Charges applicable)

Maximum Permissible error for Weights (± mg) as per OIML R111 tolerance Table.



Specification

Class	F2
Standard	OIML R111
Material	304 Stainless Steel
Construction	One or more pieces of same material
Cavity	May contain adjusting cavity
Density	7.85g/cm ³
Magnetic Susceptibility	<0.05
Shape	Cylindrical with knob
Finish	Polish
Packing	Aluminum / Wooden Box
Accessories	Tweezer

Denomination	F2
20 kg	± 300 mg
10 kg	± 160 mg
5 kg	± 80 mg
2 kg	± 30 mg
1 kg	± 16 mg
500g	± 8.0 mg
200 g	± 3.0 mg
100 g	± 1.6 mg
50 g	± 1.0 mg
20 g	± 0.8 mg
10 g	± 0.6 mg
5 g	± 0.5 mg
2 g	± 0.4 mg
1 g	± 0.3 mg
500 mg	± 0.25 mg
200 mg	± 0.20 mg
100 mg	± 0.16 mg
50 mg	± 0.12 mg
20 mg	± 0.10 mg
10 mg	± 0.08 mg
5 mg	± 0.06 mg
2 mg	± 0.06 mg
1 mg	± 0.06 mg

Our F2 range - Individual Weights

Class	Denomination	Part No.
F2	50g	1110401
F2	100g	1110402
F2	200g	1110403
F2	500g	1110404
F2	1kg	1110405
F2	2kg	1110406
F2	5kg	1110407
F2	10kg	1110408
F2	20kg	1110409

F2



Our F2 range - Weights Set

Class	Denomination	Part No.
F2	1 mg to 200g	1110400
F2	1 mg to 500g	1110410
F2	1 mg to 1 kg	1110420
F2	1 mg to 2 kg	1110430
F2	1 mg to 5 kg	1110440
F2	1mg to 500mg	1110444



Maximum Permissible error for Weights (± mg) as per OIML R111 tolerance Table.

Application

F2 Class weights are recommended for calibration Weighing Scale and balances readability 0.1g.
F2 Class weights also can be use calibrate M1Class weights

Denomination	1mg	2mg	5mg	10mg	20mg	50mg	100mg	200mg	500mg	1g	2g	5g	10g	20g	50g	100g	200g	500g	1kg	2kg
Pcs.	1	2	1	1	2	1	1	2	1	1	2	1	1	2	1	1	2	1	1	2

Sets

We can Provide Calibration Certificate from NABL Accredited Lab (Charges applicable)



Our range of Weighing Balance



Analytical Balance - 0.1mg



Analytical Balance - 0.1mg



Moisture Balance



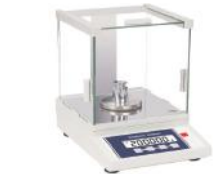
Moisture Analyzer 110



HPB 220 / 0.001g



PGB 200 / 0.001g



PGB 204 / 0.001g



PGB 220 / 0.001g



2000g / 0.01g



20kg / 0.1g



PGB 610 / 0.01g
Glass Windshield



PGB 600 / 0.01g
Regular



PGB 600 / 0.01g
Design-TB



6kg / 1g



300g / 0.01g

Our range of Scientific Instruments



Automatic Polarimeter



Digital Refractometer



Abbe Refractometer



PCR Gradient Thermal Cycler



Cooling Water Bath (-20°C)



Probe Sonicator



Tintometer



Ceramic Hotplate



Digital Ultrasonic Cleaner



Rotational Viscometer



UV-VIS. Double Beam



UV-VIS Spectrophotometer



Ice Flaker



pH/Cond./Multiparameter



Ion Meter & ISEs

★ Specifications subject to change without notice.



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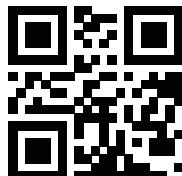
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