



NATIONAL QUALITY INFRASTRUCTURE SYSTEM



HELLENIC INSTITUTE OF METROLOGY

# **SERVICE CATALOGUE AND PRICELIST**

**HELLENIC INSTITUTE OF METROLOGY**

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## 1 Service policy

EIM, the National Metrology Institute of Greece, provides services according to its responsibilities and its objectives as stated in its founding law (Law 2231/1994).

The services are specified under strict conditions and requirements of technical competence, reliability and transparency according to international standards, agreements and responsibilities.

The services provided by EIM aim at:

- The support of the national metrological system of the country by providing measurement traceability to the national standards of Greece, which are maintained in EIM laboratories.
- The support of the national metrological system of the country by providing knowledge and metrology know-how, which contribute to the economy and the society.
- Covering the needs in metrology and calibration at the higher level of accuracy.
- The promotion of metrology and measurement science.
- The contribution to the quality of products and services and its continuous improvement.

The main objective of the services is not profit. Income from services should cover part of the operating expenses of EIM by making optimal use of the resources provided to EIM by the Greek State.

The services are not competitive against other metrological institutes or laboratories, especially from the private sector, since they are offered under terms and conditions, which are in agreement with the terms of funding national infrastructures in the country.

The prices and the cost of EIM services:

- Are determined with transparent and non-competitive terms against calibration laboratories and other parties.
- Indicate the level of technical and scientific competence of the staff, the technical capabilities of its infrastructure the level of their expertise and their reliability.
- Promote conditions of a fair and a transparent environment in metrological services in the country.
- Provide a reference level for the prices and the technical competence of metrological services in the country.

The terms and priorities of the services are determined in a transparent way by using appropriate hierarchy criteria aiming at the optimum use of resources and the efficiency of the services.

The services are under continuous control regarding the satisfaction of quality requirements and clients' requests and needs.

## 2 Framework and Terms of Service

### 2.1 Groups of services

EIM services are provided under the Law 2231/94 and they are organized in three main groups:

1. Calibration services of metrological equipment,
2. Measurement services for type approval of equipment of measurements,
3. Metrological support services.

Each of the service group includes sub-groups, which further include individual services fully described in the following chapters of this catalogue.

### 2.2 Information and communication

Information regarding the services is provided through the web, email, telephone and fax as follows:

HELLENIC INSTITUTE OF METROLOGY (EIM)

Industrial Area of Thessaloniki, Sindos

57 022 THESSALONIKI

Tel.: +30 - 2310 – 569 999, Fax: +30 - 2310 – 569 996, e-mail: [info@eim.gr](mailto:info@eim.gr)

[www.eim.gr](http://www.eim.gr)

### 2.3 Organisation of the Service System

All the services are covered by the management system of EIM, which meets the quality and technical requirements of the ISO 17025 and ISO 9001:2000 standards, as well as requirements of the legislation and the laws applied to the operation of EIM.

Requests for service provision are submitted in written form. Each request may include different services either within the same period of time or within a year. In any case, the service provisions are introduced into the EIM service implementation plan. Clients are encouraged to contact EIM by the end of each year in order to make an arrangement with EIM for the annual plan of the requested services.

The short term and the long term performance of the service system are under control by the use of appropriate quantitative indicators. Complaints, as well as recommendations, suggestions and proposals for improvements are mostly welcome to be submitted in written form at any time. Feedback provided by third parties is processed according to specific procedures.

### 2.4 Cooperation Framework

#### 2.4.1 Services Cost

The cost of each service is determined by:

- A. The service price according to:
  1. The explicit price corresponding to the respective service code in chapters 2, 3 and 4 of the catalog.
  2. The required workload in man-hours and a unit charge per man-hour, which is specified by the Management Council of EIM.
- B. The amount of the discount, according to the criteria of chapter 5 of the catalog.



- C. The amount of additional expenses, if any, covered by the client and defined in par.1.4.2 of the catalog.

#### **2.4.2 Additional expenses**

Additional expenses are paid by the clients for services provided by EIM on-site, such as:

1. Transportation and insurance of the equipment of EIM that is used for calibration services and measurements carried out outside EIM premises.
2. Transportation of EIM staff which is involved in the services.
3. Special charge per man-day, which is:
  - €40/man-day for services provided within a distance of 40 km from EIM and €100/man-day if the services are provided during the weekend or in holidays.
  - €160/man-day for services provided within a distance higher than 40 km from EIM and €250 /man-day if the services are provided during the weekend or in holidays.

#### **2.4.3 Terms and Conditions**

The clients who receive calibration services have to:

1. Make all the necessary arrangements and pay for the transportation, as well as the respective insurance, of their equipment to be calibrated to and from the premises of EIM.
2. Provide the necessary means and resources for the safe loading and reloading of:
  - Their equipment to be calibrated, such as big weight standards, volume standards, etc.
  - The standard equipment of EIM when used out of the premises of EIM.
3. Provide the necessary information for the implementation of services.
4. Provide the necessary means and resources, when required according to the financial offer of EIM, for the implementation of services in their premises, such as:
  - Technicians and/or labor to support on site measurements.
  - Constructions and other technical work necessary for adjustments.
5. Meet the terms and conditions of the respective offers of EIM.

#### **2.4.4 Terms of payment**

1. Calibration fees are paid before the delivery of the calibration certifications to the client.
2. Payment of the participation fees in training and know how transfer programs organised by EIM is made after the completion of the programs and the issue of the certificates.
3. Payment of the fees for other metrological support services is made according to the terms and the conditions of the respective offers or contracts.

#### **2.4.5 Planning of Services and Priorities**

An annual plan for calibration services is conducted by EIM at the end of each year in cooperation with all interested parties. The calibration services are offered according to the following priorities:

1. At the highest level of priorities stand services included in the annual plan.

2. At the second level of priorities, stand calibration services corresponding to standards of high level of accuracy and specialisation.
3. At the third level, stand calibration services to the Calibration Laboratories, not included in the annual plan.
4. At the fourth level stand, other services provided to any third party upon request.

The basic criterion to determine the planning and the priorities of the services is the optimum use of the means and the resources of EIM and the consistent satisfaction of the clients.

### 3 Calibration Services

#### 3.1 Mass Calibration Services (CAL-MAS)

**Table 1 Determination of Mass and Conventional Mass of standard weights with Uncertainty Equal to  $1/3m_{pe}$  of Accuracy E1 class of OIML R111 (2005) (without volume definition)**

Code	Description / Range	Price (€)
CAL-MAS-100	Standard fee for calibration of individual weight standards	100
CAL-MAS-101	Individual weight standards of 1 kg	100 /piece
CAL-MAS-102	Individual weight standards different from 1 kg	Review
CAL-MAS-111	Set of 13 pieces of weight standards 1 g – 1 kg	900 /set
CAL-MAS-112	Set of 25 pieces of weight standards 1 mg – 1 kg	2.200 /set
CAL-MAS-113	Σετ of 29 pieces of weight standards 1 mg – 10 kg	2.700 /set

**Method:** Automatic comparison with reference standards from stainless steel according to a weighing scheme (the dissemination of mass scale in the range 1mg... 1 kg in EIM), under the condition that the density of the weight standard to be calibrated is known.

**Table 2 Determination of Mass and Conventional Mass and Volume of weight standards with Uncertainty Equal to  $1/3m_{pe}$  of the Accuracy of E1 class of OIML R111 (2005) (with volume definition)**

Code	Description / Range	Price (€)
CAL-MAS-150	Standard fee for calibration of individual weight standards	100
CAL-MAS-151	Individual weight standards of 1 kg	150 /piece
CAL-MAS-152	Individual weight standards different from 1 kg	Review
CAL-MAS-161	Set of 13 pieces of weight standards 1 g – 1 kg	1.600 /set
CAL-MAS-162	Set of 25 pieces of weight standards 1 mg – 1 kg	2.800 / set
CAL-MAS-163	Σετ of 29 pieces of weight standards 1 mg – 10 kg	3.500 /set

**Method:** Volume determination of the weight standard to be calibrated by hydrostatic weighing and automatic comparison with reference standards from stainless steel according to a weighing scheme (the dissemination of mass scale in the range 1mg... 1 kg in EIM). It is noted that volume termination takes place only for weight standards with mass values higher than 1 g, according to OIML-R 111.

**Table 3 Determination of Conventional Mass - Weight standards with Uncertainty Equal to 1/3mpe of the Accuracy of E2 class of OIML R111 (2005)**

Code	Description / Range	Price (€)
CAL-MAS-200	Standard fee for calibration of individual weight standards	80
CAL-MAS-201	1 mg – 500 mg	45 /piece
CAL-MAS-202	1 g – 1 kg	40 /piece
CAL-MAS-203	2 kg, 5 kg, 10 kg	55 /piece
CAL-MAS-204	20 kg	80 /piece
CAL-MAS-205	50 kg	100 /piece
CAL-MAS-211	Calibration of set of E2 Weight Standards	<i>Depending on the number of pieces</i>
CAL-MAS-212	Calibration of Individual E2 Weight Standards	<i>Depending on the number of pieces</i>

**Method:** Automatic comparison of the standard to be calibrated in one by one with the reference standard from stainless steel in 6 ABBA cycles.

**Table 4 Determination of Conventional Mass - Weight standards with Uncertainty Equal to 1/3mpe of the Accuracy F1/F2 class, OIML R111 (2005)**

Code	Description / Range	Price (€)
CAL-MAS-300	Standard fee for calibration of individual weight standards	80
CAL-MAS-301	1 mg – 500 mg	35
CAL-MAS-302	1 g – 1 kg	30
CAL-MAS-303	2 kg, 5 kg, 10 kg	40
CAL-MAS-304	20 kg	60
CAL-MAS-305	50 kg	80
CAL-MAS-306	100 kg, 200 kg	180
CAL-MAS-311	Calibration of set F1/F2 Weight Standards	<i>Depending on the number of pieces</i>

CAL-MAS-312	Calibration of Individual F1/F2 Weight Standards	<i>Depending on the number of pieces</i>
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**Method:** Automatic comparison one by one with standards of reports from stainless steel with 4 circles weighing ABBA, without setting.

**Table 5 Definition of Conventional Mass - Standard weights with Uncertainty Equal to 1/3mpe of the Accuracy M class, OIML R111 (2005)**

Code	Description / Range	Price (€)
CAL-MAS-400	Standard fee for calibration of individual weight standards	80
CAL-MAS-401	1 mg – 500 mg	30 /piece
CAL-MAS-402	1 g – 1 kg	35 /piece
CAL-MAS-403	2 kg, 5 kg, 10 kg	50 /piece
CAL-MAS-404	20 kg	65 /piece
CAL-MAS-405	50 kg	160 /piece
CAL-MAS-406	500 kg	200 /piece
CAL-MAS-411	Calibration of M Weight Standard	<i>Depending on the number of pieces</i>

**Method:** Automatic comparison of the weight standard to be calibrated in one by one with a reference weight standard from stainless steel with 4 ABBE cycles, without setting.

**Table 6 Determination of Conventional Mass - Standard weights with nominal values non Multiples or Submultiples of 1kg and Relative Uncertainty  $\geq 1, 5$  ppm**

Code	Description / Range	Price (€)
CAL-MAS-500	Standard fee for calibration of individual weight standards	80
CAL-MAS-501	1 mg – 1kg	40 /piece
CAL-MAS-502	2 kg, 5 kg, 10 kg	50 /piece
CAL-MAS-503	20 kg	70 /piece
CAL-MAS-504	50 kg	90 /piece
CAL-MAS-511	Calibration of Weight Standards	<i>Depending on the number of pieces</i>

**Method:** Automatic comparison of the weight standard to be calibrated in one by one with a reference weight standard from stainless steel with 4 ABBE cycles, without setting.

**Table 7 Determination of Conventional Mass - Weight standards with nominal values non-Multiples or Submultiples of 1kg and Relative Uncertainty  $\geq 5$  ppm**

Code	Description / Range	Price (€)
CAL-MAS-600	Standard fee for calibration of individual weight standards	80
CAL-MAS-601	1 mg – 1kg	30 /piece
CAL-MAS-602	2 kg, 5 kg, 10 kg	40 /piece
CAL-MAS-603	20 kg	55 /piece
CAL-MAS-604	50 kg	75 /piece
CAL-MAS-610	Calibration of Weight Standard	<i>Depending on the number of pieces</i>

**Method:** Automatic comparison of the weight standard to be calibrated in one by one with a reference weight standard from stainless steel with 4 ABBE cycles, without setting.

#### **Determination of prices for calibration of weight standards**

The calibration price of a set of weight standards calibration or a group of individual weight standards with N pieces is calculated as follows:

$$[\text{Price}] = [\text{Standard fee}] + N * [\text{Price/ piece}]$$

**Table 8 Non-automatic Electronic Balances (only upon special review)**

Code	Range	Price (€/scale)	
CAL-MAS-801	0 – 200 g	from 220	Depending upon the readability and the method
CAL-MAS-802	0 – 10 kg	from 250	
CAL-MAS-803	0 – 60 kg	from 300	
CAL-MAS-804	0 – 120 kg	from 600	
CAL-MAS-805	higher than 120 kg	Upon special technical Review	

**Method:** The applied method is according to the technical procedure “*Calibration of Non Automatic Electronic Balances*” which is described in EIM Technical Guideline (MM-MA-01a), published in Febr.2003 or to other suitable method.

#### **(CAL-MAS-850) Calibration of weighing systems in industrial processes**

Calibrations are carried out only after special review, while the service prices are determined according to the use of resources.

#### **(CAL-MAS-999) Mass calibration services upon special review**

**Note:** Calibration services of weight balances are provided only in special occasions and after review.

### 3.2 Force Calibration Services (CAL-FOR)

#### Calibration services of force sensors (load cells, rings) in tension and/or compression

Table 9 Sensors with indicators, rings

Code	Range (kN)	Price (€)
CAL-FOR-110	0.5, 1, 2, 5	540
CAL-FOR-120	10, 20, 50, 100	580
CAL-FOR-130	200, 500, 1000	700
CAL-FOR-140	1500, 2000	750
CAL-FOR-150	3000, 5000	820

Table 10 Electronic sensors or settings with compatible interface

Code	Range (kN)	Price (€)
CAL-FOR-111	0.5, 1, 2, 5	440
CAL-FOR-121	10, 20, 50, 100	480
CAL-FOR-131	200, 500, 1000	600
CAL-FOR-141	1500, 2000	650
CAL-FOR-151	3000, 5000	720

#### Calibration services of force sensor (load cells, rings) in tension and compression

Table 11 Sensors with indicators, rings

Code	Range (kN)	Price (€)
CAL-FOR-210	0.5, 1, 2, 5	930
CAL-FOR-220	10, 20, 50, 100	1.030
CAL-FOR-230	200, 500, 1000	1.230
CAL-FOR-240	1500, 2000	1.330
CAL-FOR-250	3000, 5000	1.430

**Table 12 Electronic sensors or settings with compatible interface**

Code	Range (kN)	Price (€)
CAL-FOR-211	0.5, 1, 2, 5	750
CAL-FOR-221	10, 20, 50, 100	850
CAL-FOR-231	200, 500, 1000	1.050
CAL-FOR-241	1500, 2000	1.150
CAL-FOR-251	3000, 5000	1.250

**Method:** The calibration is carried out according to ISO 376:2004, its amendment or other equivalent according to client's requirement using the following force machines:

- Machine of dead charge of force in the range of 50 N - 5 kN (age-group of precision until 00)
- Machine of dead charge of force in the range of 1 kN – 110 kN (age-group of precision until 00)
- Machine of increase of lever in the range 10 kN - 1100 kN (age-group of precision until 00)
- Hydraulic machine of force in the range 200 kN - 5000 kN (age-group of precision until 05)

**(CAL-MAS-999) Force calibration services upon special review**

**Notes:**

1. The term "Calibration of electronic sensors" implies the calibration of the measurement value in mV/V using the electronic setting of the Force Laboratory of EIM.
2. The term "standard interface" implies the communication capability of the sensor to be calibrated with the Force Manager program of the Force Laboratory of EIM.

The client should provide the mountings required for the adjustment of the load cells to be calibrated by EIM Force Machine in force calibration in tension mode.



### 3.3 Flow Calibration Services (CAL- FLO)

**Table 13 Gas flow meters using reference standards**

Measurement Range: 0,5 – 430 L/h (flow standards of piston type)

Measurement Range: 600 – 130000 L/h (flow standards - bell provers)

Code	Type	Price (€)
CAL-FLO-101	Rotameters	400
CAL-FLO-102	Gas Meters of diaphragm type	540
CAL-FLO-103	Mass Flow Controllers	550
CAL-FLO-104	Primary Flow Meters	480
CAL-FLO-105	Soap-film Flow Meters	400
CAL-FLO-106	Wet Gas Meters	540

**Method:** Calibration by comparison in the flow system of the EIM primary standard by conducting three (3) measurements in five (5) points of the measurement scale.

**Note:** The above services are offered according to the EIM proposed method for the calibration in five points. If the calibration is desirable in less or more than 5 points, the price is determined according to a standard fee (€) and a charge per each point (€), as follows:

CAL-FLO-101: 100 + 60 /point

CAL-FLO-102: 140 + 80 /point

CAL-FLO-103: 150 + 80 /point

CAL-FLO-104: 130 + 70 /point

CAL-FLO-105: 100 + 60 /point

CAL-FLO-106: 140 + 80 /point

**Table 14 Liquid flow meters using primary standards**

Measurement range: 2,5 – 70000 kg/h (use of weighing method)

Measurement range: 30 – 90000 L/h (use of volumetric method)

Code	Type	Price (€)
CAL-FLO-201	Electromagnetic water flow meters	540
<b>Method:</b> Calibration by comparison in the flow system of the EIM primary standard by conducting three (3) measurements in five (5) points of the measurement scale.		
CAL-FLO-202	Turbine Meters	700
<b>Method:</b> Calibration by comparison in the flow system of the EIM primary standard by conducting two (2) measurements in ten (10) points of the measurement scale.		

#### Flow Calibration Services in the client's premises

These services are undertaken after technical review. The service price is determined according to the use of required manpower and resources.

#### (CAL-FLO-999) Flow calibration services upon special review

### 3.4 Volume Calibration Services (CAL-VOL)

**Table 15 Glass volumetric flasks and devices (gravimetric method)**

Code	Range	Price (€)
CAL-VOL-101	1ml – 5 L	150

**Table 16 Metal volumetric vessels and devices (gravimetric method)**

Code	Range	Price (€)
CAL-VOL-201	0 – 20 L	250
CAL-VOL-202	20 L – 100 L	400
CAL-VOL-203	100 L – 200 L	550

**Table 17 Metal volumetric vessels (volumetric method)**

Code	Range	Price (€)
CAL-VOL-301	0 – 20 L	200
CAL-VOL-302	20 L – 100 L	330
CAL-VOL-303	100 L – 200 L	450
CAL-VOL-304	200 L and more	After review

**(CAL-VOL-999) Volume calibration services upon special review**

### 3.5 Pressure Calibration Services (CAL-PRE)

**Table 18 Positive relative/ differential pressure and direct reading**

Code	Range	Accuracy	Price (€)
CAL-PRE-101	0 to 70 barg (air or nitrogen)	Less than 0,6% fs	130
CAL-PRE-102		between 0,6% and 0,1% fs	155
CAL-PRE-103	0 to 700 barg (oil)	Better than 0,1% fs	180

**Table 19 Negative (or combination positive/negative) pressure, relative/ differential pressure and direct reading**

Code	Range	Accuracy	Price (€)
CAL-PRE-201	-0,9 to 70 barg (nitrogen)	Less than 0,6% fs	190
CAL-PRE-202		between 0,6% and 0,1% fs	220
CAL-PRE-203		Better than 0,1% fs	250

**Table 20 Relative/ differential pressure by electric exit**

Code	Range	Accuracy	Price (€)
CAL-PRE-301	0 to 70 barg (air or nitrogen)	Less than 0,6% fs	140
CAL-PRE-302		between 0,6% and 0,1% fs	180
CAL-PRE-303	0 to 700 barg (oil)	Better than 0,1% fs	200

**Table 21 Negative (or combination positive/negative) pressure, relative/differential pressure with electrical exit**

Code	Range	Accuracy	Price (€)
CAL-PRE-401	-0,9 to 70 barg (nitrogen)	Less than 0,6% fs	210
CAL-PRE-402		between 0,6% and 0,1% fs	230
CAL-PRE-403		Better than 0,1% fs	260

#### Calibration of Pressure calibrators

**Table 22 Positive relative pressure calibrators**

Code	Range	Price (€)
CAL-PRE-501	0 to 70 barg (air or nitrogen) 0 to 1400 barg (oil)	220 + 160 /additional module

**Table 23 Negative (or combination positive/negative) relative pressure calibrators**

Code	Range	Price (€)
CAL-PRE-502	-0,9 to 70 barg (nitrogen)	280 + 200 /additional module

**Table 24 Absolute pressure and direct reading**

Code	Range	Accuracy	Price (€)
CAL-PRE-601	0 until 70 bara (nitrogen)	Less than 0,6% fs	190
CAL-PRE-602		between 0,6% and 0,1% fs	220
CAL-PRE-603		Better than 0,1% fs	250

**Table 25 Absolute pressure with electrical exit**

Code	Range	Accuracy	Price (€)
CAL-PRE-701	0 to 70 bara (nitrogen)	Less than 0,6% fs	210
CAL-PRE-702		between 0,6% and 0,1% fs	230
CAL-PRE-703		Better than 0,1% fs	260

### Calibration of pressure balances and dead weight testers

**Table 26 Pressure balances and dead weight testers**

Pressure balance with a system piston: range 0-70 barg (air) and 0-1400 barg (oil)

Code	Calibration parameters	Price (€)
CAL-PRE-801	Mass and active area of a system piston/ εμβόλου	900 + 35 /disc mass+ 750 /additional piston
CAL-PRE-802	Produced pressure	900 + 750 /additional piston

**Table 27 Vacuum sensors \***

Code	Range	Price (€)
CAL-PRE-901	10 <sup>-3</sup> to 1000 mbar	550 for two scales, classification value of 10 (6 points) + 100 each additional scale classification value of 10 (3 points)

**Calibration method (CAL-PRE-100 to CAL-PRE-700):** According to the directives *DKD-R 6-1: Calibration of Pressure Gauges (2003)* and *EA-10/17: Guidelines on the calibration of electromechanical manometers (2002)* by the selection of the number of circles and calibration points according to the following criteria:

- Accuracy less than 0,6% fs: 1 increased & 1 decreased series of measurements at 5 points

- Accuracy between 0,6%-0,1% fs: 2 increased & 1 decreased series of measurements at 9 points
- Accuracy better than 0,1% fs: 2 increased & 2 decreased series of measurements at 9 points

**Calibration method (CAL-PRE-800):** According to the Directive EAL-G26 “Calibration of Pressure Balances” (1997).

**(CAL-PRE-999): Calibration services upon special review.**

**Special terms and conditions:**

1. Calibration is not undertaken unless the equipment to be calibrated can be connected with measuring standards of the Pressure Laboratory.
2. The medium (either oil or gas), used for the calibration, is selected by the Pressure Laboratory, unless there is a specific client request.
3. The Pressure Laboratory does not proceed in regulation, unless otherwise requested by the client.
4. Undertaking of calibration of vacuum sensors by the Pressure Laboratory only if the sensors to be calibrated are clean.

### 3.6 Temperature-Humidity Calibration Services (CAL- TEM)

**Table 28** Liquid-in-glass thermometers in the range from 80 °C to 270 °C

Code	Type	Price (€)
CAL-TEM-101	Thermometers of smaller graduation scale	0,5 °C or bigger
CAL-TEM-102		0,2, 0,1 or 0,05 °C
CAL-TEM-103		0,02 or 0,01 °C
CAL-TEM-104	Control of thermometers in	one (1) point
CAL-TEM-105		three (3) points

**Method:** Calibration by comparison in baths using 2 Pt100 (CAL-TEM-101) or 2 SPRT (remainder services) as standards.

**Table 29** Digital thermometers in 5 points in the range from -80°C to 1200°C

Code	Temperature	Distinctive faculty	Price (€)
CAL-TEM-201	Until 300 °C	0,1 °C or higher	120 + 20 /extra point
CAL-TEM-202	Until 550 °C		140 + 30 /extra point
CAL-TEM-203	Until 1200 °C		170 + 35 /extra point
CAL-TEM-204	Until 450 °C	0,01 °C or higher	220 + 35 /extra point

CAL-TEM-205: Calibration of temperature sensors embedded in dipsticks used for measuring liquid level and temperature in fuel tanks:

- 200€/piece for calibration of up-to two (2) sensors separately and/or simultaneously.
- 170€/piece for simultaneous calibration of three (3) and more sensors.

**Method:** Calibration by comparison in baths and furnaces using 2 Pt100 (CAL-TEM-201, 202, 203) or 2 thermocouples of type R (CAL-TEM-203) or 2 SPRT (CAL-TEM-204) as standards.

**Table 30** Calibration of thermocouples of Base Metals (K,J,N,...) by electrical measurements in the range from -80 °C to 1200 °C

Code	Method	Temperature	Price (€)
CAL-TEM-301	Calibration at 5 points	to 300 °C	145 + 20 /extra point
CAL-TEM-302		to 550 °C	180 + 30 /extra point
CAL-TEM-303		to 1200 °C	215 + 35 /extra point

**Method:** Calibration by comparison in baths (CAL-TEM-301) and furnaces (CAL-TEM-302, 303) using 2 Pt100 (CAL-TEM-301) or 2 thermocouples of type R (CAL-TEM-302, 303) as standards and multimeters for electrical measurements.

**Table 31 Thermocouples of Noble Metals (R, S, B, T ...) by electrical measurements in the range from -80 °C to 1200 °C**

Code	Method		Price (€)
CAL-TEM-401	Calibration at 5 points	to 300 °C	190 + 30 /extra point
CAL-TEM-402		to 550 °C	215 + 35 /extra point
CAL-TEM-403		to 1200 °C	250 + 40 / xtra point
CAL-TEM-404	Directly to the fixed points of ITS 90		150 /point (Sn, Zn) and 200 /point (Al, Ag, Cu)

**Method:** Calibration by comparison in baths (CAL-TEM-401) and furnaces (CAL-TEM-402,403) using 2 Pt100 (CAL-TEM-401) or 2 thermocouples of type R (CAL-TEM-402,403) as standards and multimeters for electrical measurements. Determination of ITS 90 fixed points using standard cells (CAL-TEM-404).

**Table 32 Platinum resistance sensors (PRT – Pt100) by measuring electrical resistance in up- to 5 points (-80 ... +450 °C)**

Code	Method	Price (€)
CAL-TEM-501	Comparative calibration in baths using 2 SPRT as standards and bridge resistance for the electric tendency measurement.	250 + 40 /extra point

**Table 33 Standard platinum resistance thermometers (SPRT) directly in the fixed points of ITS 90**

Code	Method	Price (€)
CAL-TEM-502	Determination of fixed points of ITS 90 using standard cells	200 /point (Ar, Hg) 100 /point (H <sub>2</sub> O, Ga) 200 /point o (In, Sn, Zn) 300 /point (Al, Ag)

**Notes:** The ITS 90 fixed points scale correspond to the phase equilibrium temperature values of specific substances as follows:

Ar	Hg	H <sub>2</sub> O	Ga	In	Sn	Zn	Al	Ag
-189,3°C	-38,8 °C	0,01 °C	29,8 °C	156,6 °C	231,9 °C	419,5 °C	660,3 °C	961,8 °C

The calibration of SPRT's according to ITS 90, is carried to in one or more of the following areas:

- H<sub>2</sub>O – Ag: calibration in the fixed points H<sub>2</sub>O, Ga, Sn, Zn, Al, Ag

- H<sub>2</sub>O – Al: calibration in the fixed points H<sub>2</sub>O, Ga, Sn, Zn, Al
- H<sub>2</sub>O – Zn: calibration in the fixed points H<sub>2</sub>O, Ga, Sn, Zn
- H<sub>2</sub>O – Sn: calibration in the fixed points H<sub>2</sub>O, Ga, In, Sn
- H<sub>2</sub>O – In: calibration in the fixed points H<sub>2</sub>O, Ga, In
- H<sub>2</sub>O – Ga: calibration in the fixed points H<sub>2</sub>O, Ga
- Hg – Ga: calibration in the fixed points Hg, H<sub>2</sub>O, Ga

**Table 34 Measuring devices of relative humidity and temperature**

Calibration for <i>relative humidity (RH)</i> in up- to 5 different points for one point of temperature.		
Code	Method	Price (€)
CAL-TEM-601	Calibration by comparison in a chamber under controlled conditions using a standard Pt100 as reference standard.	170 + 30 /extra RH point + 130 /extra temperature point (for the same RH points)

**Table 35 Calibration for the temperature parameter in 5 points**

CAL-TEM-602	Calibration by comparison in a chamber under controlled conditions using a standard Pt100 as reference standard.	120 + 30 /extra temperature point
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**Table 36 Calibration of instruments for measurement of dew point in 5 points**

CAL-TEM-603	Calibration by comparison in a chamber under controlled conditions using a reference standard of dew point measurement	200 + 50 /extra point
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**Table 37 Calibration of dew point measuring instruments (-30 oC to + 90 oC) by the standard humidity generator**

CAL-TEM-604	Realization of dew point using standard humidity generator	300 + 120 /measurement point
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**Table 38 Laboratory furnaces, temperature chambers, baths, incubators etc (on site calibrations)**

Code	Method	Price (€)
CAL-TEM-701	Determination of temperature profile in several geometrical points (min 9 points)	150 + 30 /geometrical point for one temperature + 100 extra temperature value
CAL-TEM-702	Calibration of temperature and relative humidity sensors	150 + 30 / temperature value + 40 / humidity value + 30 / sensor

**Note:** The number of points is such that the distance between 2 successive points is less than 1 m.



**Table 39 Furnaces with isothermal block (dry block calibrator)**

Code	Range	Method	Price (€)
CAL-TEM-801	to 350 °C	Calibration using 2 Pt100 according to Euramet cg no.13 version 4.0 (09/2017)}	550
CAL-TEM-802	to 1200 °C		800

**(CAL-TEM-999) Calibration services upon special review.**

### 3.7 Dimensional Calibration Services (CAL- DIM)

**Table 40 Gauge blocks**

Code	Type	Method	Price (€)
CAL-DIM-100	Standard calibration fee	Defined per each individual service	
CAL-DIM-110	gauge blocks 0 – 100 mm	Calibration of central length, flatness and parallelism [by interferometry] (ISO 3650) (grade K, 0) Uncertainty: $\{(25^2 + 0,41^2 L^2)^{0.5} \text{ (nm)}, L \text{ in mm}\}$	200 + 25/piece
CAL-DIM-120		Block to block calibration by comparison for central length, flatness and parallelism (ISO 3650) (grade K, 0, 1, 2), Uncertainty: $\{(50^2 + L^2)^{0.5} \text{ (nm)}, L \text{ in mm}\}$	150 + 20/piece
CAL-DIM-121		Calibration by comparison with 9 gauge blocks for central length, flatness and parallelism (ISO 3650) (grade 0, 1, 2), Uncertainty: $\{(100^2 + L^2)^{0.5} \text{ (nm)}, L \text{ in mm}\}$	100 + 20/piece
CAL-DIM-130	gauge blocks 100 – 1000 mm	Calibration using contact sensors and interferometry (ISO 3650), Uncertainty: $\{(200^2 + L^2)^{0.5} \text{ (nm)}, L \text{ in mm}\}$	150 + 70/piece
CAL-DIM-131	Rods 0 – 1000 mm	Calibration/measurement using contact sensors and interferometry, Uncertainty: $\{(400^2 + L^2)^{0.5} \text{ (nm)}, L \text{ in mm}\}$	150 + 70/piece

**Table 41 Angle gauge blocks and objects**

Code	Type	Method	Price (€)
CAL-DIM-200	Standard calibration fee	Defined per each individual service	
CAL-DIM-210	Angle blocks	Use of rotary table and autocollimator	150+70 /piece
CAL-DIM-220	Optical polygons (12 sides)		700 /piece
CAL-DIM-221	Optical polygons (24sides)		1.400 /piece
CAL-DIM-222	Other Optical polygons		Upon review
CAL-DIM-230	Protractors	Use of angle table	120 /piece

**Table 42 Cylinders, spheres, rings and Straightness standards**

Code	Type	Method	Price (€)
CAL-DIM-300	Standard calibration fee	Defined per each individual service	
CAL-DIM-310	Diameter measurements	Use of Mahr 828	100 + 50 /piece
CAL-DIM-311	Roundness, Straightness, squareness, measurements	Use of Talyrond 290	120 /piece
CAL-DIM-320	Straightness standards (Knife Edges)	Use of Talyrond 290	120 /piece
CAL-DIM-330	Cylinders	Use of Mahr 828 and Talyrond 290	350 /piece

**Table 43 Flatness and roughness of standards and objects**

Code	Type	Method	Price (€)
CAL-DIM-400	Standard calibration fee	Defined per each individual service	
CAL-DIM-410	Optical flats	Use of monochromatic light	50 + 200 /piece
CAL-DIM-415	Optical parallel	Calibration using monochromatic light and comparator	100 + 200 /piece
CAL-DIM-420	Surface flatness	On site calibration using laser interferometer	From 760/piece
CAL-DIM-430	Surface roughness	Calibration with stylus instrument ( -250 µm to +250 µm) vertically on the surface	100 + 150 /piece

**Table 44 Laser dimensional measurements**

Code	Type	Method	Price (€)
CAL-DIM-510	Laser 633 nm	By comparison to the iodine stabilized He-Ne laser	550 /piece
CAL-DIM-511	Laser 543 nm	By comparison to the iodine stabilized He-Ne laser	550 /piece

**Table 45 Rulers and microscopes**

Code	Type	Method	Price (€)
CAL-DIM-600	Standard calibration fee	Defined per each individual service	
CAL-DIM-610	Line scales	Use of microscope up-to 200X100 mm	(50 + 10 /point)/ piece
CAL-DIM-620	High accuracy rulers (glass scales)	Use of microscope up-to 200 mm	150 /piece
CAL-DIM-621	Rulers 0 – 200 mm		(50 + 10 /point) / piece
CAL-DIM-630	Rulers 200 - 2000 mm	Use of laser interferometer	150 /piece

**Table 46 Dimensional measuring instruments**

Code	Type	Method	Price (€)
CAL-DIM-700	Standard calibration fee	Defined per each individual service	
CAL-DIM-710	Levels	Use of rotary table	30 + 50 /piece
CAL-DIM-711	Square Levels	Use of rotary table and measurement of straightness, parallelism and squareness	100 + 100 /piece
CAL-DIM-720	Calipers 0 – 300 mm	Use of gauge blocks	70 + 50 /piece
CAL-DIM-721	Calipers 300 – 1000 mm		80 + 100 /piece
CAL-DIM-730	Micrometers	Measurements in one axis UMM	50 + 100 /piece
CAL-DIM-731	Depth gauge		
CAL-DIM-732	Fillers	Measurements in one axis UMM	50 + 10 /piece
CAL-DIM-740	2-Dimensional measurements	Use of CMM in two (2) dimensions	100 + 50 /piece
CAL-DIM-741	3-Dimensional measurements	Use of CMM in three (3) dimensions	100 + (from 200 /piece) depending on number of measurements
CAL-DIM-750	Dimensional measurements (length, angles, etc)	Use of optical microscope up-to 200 mm X 100 mm	

CAL-DIM-760	Angles	Use of Talyrond 290 or CMM	100 + 90/piece
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**Table 47 Mechanical comparators of gauges blocks and CNC machines**

Code	Type	Method	Price (€)
CAL-DIM-810	Gauge blocks mechanical comparators	On site calibration using gauge blocks	500 /piece
CAL-DIM-820	CNC machines	On site calibration using laser interferometer	From 1000 / piece

**(CAL-DIM-999) Calibration services upon special review.**

### 3.8 Measuring Acoustic and Vibration Services (CAL-AUV)

**Table 48 Sound & Sound Level Calibrators**

Code	Method	Price ( € )
CAL-AUV-101	Sound calibrator: calibration for frequency and level parameters for one (1) diameter value	200 + 20 * [ # frequency + # levels –2]
CAL-AUV-102	Sound calibrator: calibration for frequency and level parameters for two (2) diameter values.	200+20* [ # frequency + # levels –2] + 70 € + 20* [ # frequency + # levels –2]

**Table 49 Sound Level Meters**

Code	Method	Price ( € )
CAL-AUV-201	Sound Level Meter: Calibration with full acoustic test (parameters: levels and frequencies). Method: calibration of 3 frequencies (125, 1, 4 kHz) and 3 sound levels (94, 104, 114 dB).	200 + 20*[ # frequency + # levels - 1]
CAL-AUV-202	Sound Level Meter: Calibration with Full acoustic and electric test, according to the BS 7580, EN 60651, EN 61672 standards.	600 €

**Table 50 Sound Exposure Meter**

Code	Method	Price ( € )
CAL-AUV-301	Sound Exposure Meter: Calibration according to standard EN61252.	400

**Table 51 Accelerometers**

Code	Method	Price ( € )
CAL-AUV-401	Accelerometer: Calibration of 1 shaft comparatively (back to back - ISO 16063-21: 2003) in 26 standardized to ISO 266:1997 proposed 1/3 octal frequencies of 20Hz - 6300Hz (16Hz, 31.5 Hz, 63Hz, 125 Hz, 159.13 Hz, 250Hz, 500Hz, 1000Hz, 2000Hz, 4000Hz, 8000Hz) and up to 5g acceleration level.	250€
CAL-AUV-402	Calibration of accelerometer sensitivity in 1 shaft at 100 or 159 Hz and frequency response in 1 frequency range depending on its characteristics.	120 €

CAL-AUV-403	Calibration of accelerometer sensitivity in 3 shafts at 100 or 159 Hz, and frequency response in 1 frequency range depending on its characteristics.	300 €
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**CAL-AUV-999: Calibration services upon special review.**

### 3.9 Electrical Calibration Services (Low Frequencies CAL-ELF)

#### Calibration for Resistance

**Table 52 Calibration of standard resistors in one or more values of current and temperature.**

**Temperature:** 23 °C±0,01 °C (oil resistors), 23 °C±0,5 °C (air resistors)

Code	Range	Uncertainty	Method	Price (€)
CAL-ELF-101	100μΩ to <1Ω	1- 3 ppm	Comparison with standard resistance using Bridge Comparator of current and Range Extender. Max Current value: 10A	180 + 60 extra current value + 100 /extra temperature value
CAL-ELF-102	0,1Ω - 10 kΩ	1 ppm	Comparison with standard resistance using Bridge Comparator of current	150 + 40 /extra current value + 70 /extra temp. value
CAL-ELF-103	1Ω - 10 kΩ in decimal steps	Min 0,005 ppm	Comparison with the primary standard (Quantum Hall Effect), using Cryogenic bridge	400 + 100 /extra temp. value
CAL-ELF-104	1Ω - 100 MΩ	> 10 ppm	Comparison with standard resistance using multimeter	100 + 50 /extra temp. value

**Table 53 Calibration of Resistance standards in one voltage and one temperature value.**

**Temperature:** 23 °C±0,01 °C (oil resistors), 23 °C±0,5 °C (air resistors)

Code	Nominal value	Uncertainty	Method	Price (€)
CAL-ELF-105	$\geq 10 \text{ k}\Omega - 100 \text{ M}\Omega$	2 - 6 ppm	Comparison with standard resistance using potentiometer method	150 + 40 /extra voltage value+70 /extra temp. value

**Table 54 Calibration of Resistance standards in two values of voltage and one temperature**

**Temperature:** 23 °C±0,5 °C

Code	Nominal value	Uncertainty	Method	Price (€)
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CAL-ELF-106	$\frac{>100 \text{ M}\Omega - 1}{\text{T}\Omega}$	10 - 200 ppm	Comparison with standard resistance using modified Wheatstone bridge	180 +70 /extra voltage value+100 / extra temp. value
CAL-ELF-107	$\frac{>1 \text{ T}\Omega - 100}{\text{T}\Omega}$	200 -600 ppm		200 +70 /extra voltage value+100 /extra temp.value
CAL-ELF-108	$\frac{>100 \text{ T}\Omega - 10}{\text{P}\Omega}$	>0,3%		180 +70 /extra voltage value+100 / extra temp. value

**Table 55 Measurement of Resistance of Surface Insulation according to the standard ELOT EN 1081:1998**

Code	Uncertainty	Method	Price (€)
CAL-ELF-110	>1% depends on the conditions of measurement (on site measurements)	On site measurements in one voltage value and in 5 points of surface.	400 + 200 / 5 extra points

**Table 56 Decimal Resistances (calibration in one temperature).**

**Temperature:** 23 °C±0,5 °C

Code	Range	Uncertainty	Method	Price (€)
CAL-ELF-120	1Ω -100 MΩ	>20 ppm	Using resistance calibrator	120 + 40 /extra decimal

**Table 57 Resistance calibrators**

**Temperature:** 23 °C±0,5 °C

Code	Range	Uncertainty	Method	Price (€)
CAL-ELF-130	1Ω -100 MΩ	>1 ppm	Comparison with standard resistor using multimeter.	150 + 50 /extra resistance

**Table 58 Calibration of Resistance Bridge for current comparison to measure Resistance**

**Temperature:** 23 °C±0,5 °C

Code	Range	Uncertainty	Method	Price (€)
CAL-ELF-140	1Ω -10 kΩ	>1 ppm	Calibration for the ratio 10:1. Measurement of standard resistance	700
CAL-ELF-141			Linearity of the bridge for the ratio from 10 to 100 Ω	500



CAL-ELF-142			Calibration for the ratio 1:1 Standard resistance measurement.	300
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Calibration of DC voltage standards

**Table 59 Zener standards in one voltage and one temperature value**

**Temperature:** 23 °C±0,5 °C

Code	Range of measurement	Uncertainty	Method	Price (€)
CAL-ELF-201	10 V, 1,018V	0,2 ppm	Min 20 measurements points in 10 days by comparison with group of 4 Zener Standards	350

**Table 60 DC OF Report Standards**

Lower possible **uncertainty**: It depends on the to calibration appliance

Code	Range	Method	Price (€)
CAL-ELF-202	1V -10V	Comparison with the primary Josephson standard (only upon request)	From 520 / voltage value

**Table 61 Digital volt- meters**

Lower possible **uncertainty**: It depends on the calibration appliance

Code	Range	Method	Price (€)
CAL-ELF-203	100mV -10 V	Comparison with the primary standard Linearity of one scale. 20 measurement points for two voltage polarities.	350 + 200 /linearity in other scale

*Calibration of calibrators DC voltage ⇒ see Multifunction Calibrator CAL-ELF-701,702,751,752*

Calibrations for Voltage ratio

**Table 62 Voltage dividers**

Code	Range	Uncertainty	Method	Price (€)
CAL-ELF-251	1:10 and 1:100	0,5 ppm	Ratios 1000 V:10 V , 100 V: 10 V voltage input max 1000 V comparison with standard divider	400

Calibration appliances as for the size of Capacity

**Table 63 Standard capacitors**

Code	Range	Uncertainty	Method	Price (€)
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CAL-ELF-301	10pF -100 nF	>1 ppm	Calibration in one frequency value frequency:1 kHz, 1,452 kHz Comparison with standard capacitor and bridge	200 +80 /extra frequency value
CAL-ELF-302	1 aF - 10 $\mu$ F	>10 ppm	Calibration in one frequency and one temperature value. Frequency: 10 Hz to 100 kHz. Using Bridge	160 + 60 / extra frequency value
CAL-ELF-303	0,01fF - 9,9999F	>0,05%	Calibration in one frequency value.Frequency:20 Hz to 1MHz calibration with counter LCR .	120 + 50 / Extra frequency value
CAL-ELF-304	0,1fF - 100mF	>0,15%	Calibration in one frequency value. Frequency:5 Hz to 13MHz calibration with LCR meter	120 + 50 /extra frequency value

Table 64 Decimal capacitors

Code	Range	Uncertainty	Method	Price (€)
CAL-ELF-305	1 pF - 10 $\mu$ F	> 10 ppm	Calibration of 1 <sup>st</sup> decimal in one frequency and temperature value. Frequency: 10 Hz to 100 kHz. Calibration using Bridge	250 + 60 /extra frequency value+100 / extra decimal
CAL-ELF-306	0,01fF - 9,9999F	>0,05%	Calibration of the first decimal in one frequency value. Frequency: 20 Hz to 1MHz calibration with counter LCR.	170 + 50 /extra frequency value + 90 /extra decimal
CAL-ELF-307	0,1fF - 100mF	>0,15%	Calibration of the first decimal in one frequency value. Frequency: 5 Hz - 13MHz calibration with counter LCR .	170 + 50 /extra frequency value + 90 /extra decimal

Table 65 Bridge comparison Capacity

Code	Range	Uncertainty	Method	Price (€)
CAL-ELF-308	1 pF - 1 $\mu$ F	> 7 ppm	Frequency values 50 Hz, 100 Hz, 400 Hz, 1 kHz, 1,452 kHz	800

			using standard capacitors	
CAL-ELF-309	1 pF - 1 $\mu$ F	-	In 5 frequency values different from CAL-ELF-308	1.000

Table 66 Counters LCR

Code	Range	Uncertainty	Method	Price (€)
CAL-ELF-310	1 pF - 100 $\mu$ F	> 100 ppm	Frequency values 50 Hz, 100 Hz, 400 Hz, 1 kHz, 5 kHz using standard capacitors	500
CAL-ELF-311	1 pF - 100 $\mu$ F	> 100 ppm	In 5 frequency values different from CAL-ELF-310	700

Calibrations of appliances as for the factor loss

Table 67 Standard capacitors

Code	Range	Uncertainty	Method	Price (€)
CAL-ELF-351	0 - 0,1	$>8 \times 10^{-6}$	Calibration in one frequency and one temperature value Frequency: 10 Hz to 100 kHz. Use of bridge	160 + 60 /extra frequency value

Calibrations of appliances as for the size of DC Intensity

Table 68 Digital Ampere-meters

Code	Range	Uncertainty	Method	Price (€)
CAL-ELF-401	1 $\mu$ A - 10A	>0,2 ppm	Calibration with reference generator in temperature $23^{\circ}\text{C} \pm 0,5^{\circ}\text{C}$ . (number of measurement per scale depends on the calibrated device)	From 60
CAL-ELF-402	10A - 100A	depends on the device	Measurement with resistance shunt	Upon review

*Calibration of calibrators DC voltage  $\Rightarrow$  see Multifunction Calibrator) CAL-ELF-703, CAL-ELF-753*

Calibrations AC/DC transfer

Table 69 Calibrations that concern AC/DC difference

**Method:** Comparison with AC/DC standard. Temperature:  $23^{\circ}\text{C}$ . Range: 10 Hz- 1 MHz

Code	Device	Range	Uncertainty	Measurement	Price (€)
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				points	
CAL-ELF-501	AC/DC voltage transfer standards	2 mV-1000 V	>0,2 ppm	Upon request	Upon review
CAL-ELF-502	AC/DC voltage transfer standard, Fluke 792A	2 mV-1000 V	>0,2 ppm	350	2000
CAL-ELF-503	AC/DC voltage transfer standard Fluke 5790	10 mV - 1000 V	>0,2 ppm	250	1800
CAL-ELF-504	AC/DC voltage transfer standard, 1395A	0,45V, 1V, 3V, 6V	>0,2 ppm	5 frequency values	890

**Table 70** Calibration that concern AC/DC difference

**Method:** Comparison with AC/DC standard. Temperature 23 °C. Frequency: 1 MHz έως 100 MHz

Code	Device	Range	Uncertainty	Measurement points	Price (€)
CAL-ELF-505	AC/DC voltage transfer standard Standards in high frequency values	500 mV-30 V	>40 ppm	Upon request	Upon review

**Table 71** Calibrations that concern AC/DC difference

**Method:** Calibration with generator in temperature 23°C± 0,5°C. The number of measurement points per scale depends on the device.

Code	Device	Range	Uncertainty	Measurement points	Price (€)
CAL-ELF-506	Digital AC Volt-meters	100mV - 1000 V	15 - 2600 ppm	Upon request	From 40
CAL-ELF-507	Digital AC	10 mA - 20A	70 - 190	Upon request	From 40

	current meters		ppm		
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**Table 72 Calibrations for AC Voltage**

**Method:** Comparison of DC reference values of the device under calibration with a digital Multimeter to calculate the AC Voltage function characteristics. Temperature 23 °C. Frequency: 10 Hz to 1 MHz  
Comparison with standard report AC/DC transfer

Code	Device	Range	Uncertainty	Measurement points	Price (€)
CAL-ELF-508	AC/DC Standards, Fluke 5790	10 mV-1000 V	>0,2 ppm	250	300

*Calibration of calibrators' AC Voltage and AC Volume ⇒ See multifunction calibrators CAL-ELF-700, 750.*

**Table 73 Calibrations of digital multimeters for the following parameters:**

- DC Voltage: 10  $\mu$ V to 1200V
- DC Current: 2  $\mu$ A to 10A
- AC Voltage: 1mV to 750V, 10Hz to 100kHz
- AC Current: 2  $\mu$ A to 10A, 10Hz to 20kHz
- Resistance: 10 $\Omega$  to 100M $\Omega$
- Frequency: 10Hz to >100MHz

**Method:** According to EA-10/15 procedure. (Temperature 23°C $\pm$ 0,5°C).

Code	Appliance for calibration	Uncertainty	Price (€)
CAL-ELF-601	3 ½ digits	Depending on the device	50 + 30 /per parameter
CAL-ELF-602	4 ½ digits		50 + 40 /per parameter
CAL-ELF-603	5 ½ digits		50 + 50 /per parameter
CAL-ELF-604	6 ½ digits		50 + 60 /per parameter
CAL-ELF-605	7 ½ digits		50 + 70 /per parameter
CAL-ELF-606	8 ½ digits		50 + 80 /per parameter

**Table 74 Multifunction Calibrators of High Accuracy**

**Method:** Measurement with Reference Multimeter (Temperature 23°C $\pm$  0,5°C)

Code	Type	Range	Uncertainty	Measurement points	Price (€)
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CAL-ELF-701	DC Voltage	10 $\mu$ V-1200V	>2 ppm	First scale-5 points of measurement	70 +40 / extra scale
CAL-ELF-702		1 V - 20V	>2 ppm	Control of linearity-10 measurement points	70 +40 / extra scale
CAL-ELF-703	DC Volume	2 $\mu$ A - 10A	>2 ppm	First scale-5 points of measurement	70 + 40 / extra scale
CAL-ELF-704	AC Voltage	1mV - 750V, 10Hz-100kHz	>15 ppm	First scale-5 measurement points	70 +40 / extra scale
CAL-ELF-705	AC Volume	2 $\mu$ A -10A, 20Hz - 10kHz	>60 ppm	First scale-5 measurement points	70 + 40 / extra scale
CAL-ELF-706	Resistance	0,1 $\Omega$ - 100M $\Omega$	>1 ppm	First scale-5 measurement points	70 +40 / extra scale
CAL-ELF-707	Frequency	10Hz - >100MHz		All the scales-2 measurement points	70
CAL-ELF-749	Regulation				100

**Table 75 Multifunction Calibrators of Low Accuracy**

**Method:** Measurement with reference multimeter (Temperature 23°C $\pm$  0,5°C)

Κωδικός	Parameter	Range	Uncertainty	Measurement points	Price (€)
CAL-ELF-751	DC Voltage	10 $\mu$ V - 1200V	>10 ppm	First scale-5 measurement points	30 + 20 / extra scale
CAL-ELF-752		1 V - 20V	>10 ppm	Linearity control-10 measurement points	30 + 20 / extra scale
CAL-ELF-753	DC Volume	2 $\mu$ A - 10A	>10 ppm	First scale-5 measurement points	30 + 20 / extra scale
CAL-ELF-754	AC Voltage	1mV-750V, 10Hz-100kHz	>100 ppm	First scale-5 measurement points	30 + 20 / extra scale
CAL-ELF-755	AC Volume	2 $\mu$ A - 10A, 20Hz -10kHz	>100 ppm	First scale-5 measurement points	30 + 20 / extra scale

CAL-ELF-756	Resistance	0,1Ω - 100MΩ	>10 ppm	First scale-5 measurement points	30 + 20 / additional scale
CAL-ELF-757	Frequency	10Hz->100MHz		All the scales-2 measurement points	30
CAL-ELF-799	Regulation				100

**Table 76 Temperature Simulators**

**Measurements:** 15 points of measurement in the whole scale of temperature

Code	Parameter	Range	Uncertainty	Method	Price (€)
CAL-ELF-801	DC Voltage	-100°C to 1500°C	>0,1°C	Thermocouple with compensation of cold junction. Measurement with reference thermocouple to ice temperature	200
CAL-ELF-802		-100°C to 1500°C	>0,1°C	Voltage measurement	150
CAL-ELF-803	Resistance	-100°C to 500°C	0,004°C	Thermocouple with compensation of cold junction. Resistance measurement	250

**Table 77 Temperature Bridges as for the size of Resistance**

**Method:** Calibrations with Standard Resistance (10 points of measurement/ scale of measurement)

Code	Range of measurement	Uncertainty	Price (€)
CAL-ELF-851	10Ω to 500Ω	>2ppm	250 + 120 /extra scale of measurement or channel of input + 50 /extra measurements

**Table 78 Electric energy and force calibrations**

Code	Device	Range	Uncertainty	Method	Price (€)
CAL-ELF-901	Reference Standard of energy/power, verification of energy meters	until 115 kVA one phase: until 38 kVA	>0,02% (k=1.0,0.8c) >0,1% (k=0.5i)	Voltage: 48V-320 V, Volume: 2mA-120A Frequency: 45-65 Hz. 4w/3Φ- 3w/3Φ	From 1100

CAL-ELF-902	Power Comparator				From 1300
CAL-ELF-903	Power Standard	until 115 kVA one phase: until 38 kVA	>0,009% (k=1.0)	Voltage: 48V -320 V, Volume: 2mA- 120A Frequency: 45-65 Hz.	From 600 upon review
CAL-ELF-904	Force gauge- Watt-meter	until 38 kVA	>0,02%		From 500 upon review

Table 79 DC Voltage and energy calibrations

Code	Device	Range	Uncertainty	Method	Price (€)
CAL-ELF-905	Reference Standard of energy/power, verification of energy meters	1 V - 10 V	1 ppm	Calibration using multifunction calibrator	80
CAL-ELF-906	Energy meter	115 kVA	0,04%	Voltage: 48V- 320 V, Volume: 2mA-120A k: -1 until +1 Frequency:45-65 Hz. Comparison with reference standards	From 50 upon review

Table 80 Error Ration, phase displacement

Code	Device	Range	Uncertainty	Method	Price (€)
CAL-ELF-907	Current Transformer	$\pm 0,050$ , $\pm 100,0'$	$>4 \times 10^{-5}$ 0,5'	Comparison with the Primary Standard. Linearity of one scale. 20 points of measurement f	From 100 upon review
CAL-ELF-908	Voltage Transformer	$\pm 0,050$ , $\pm 100,0'$	$>1 \times 10^{-6}$ 0,5'	Linearity in other scale. 20 points of measurement.	From 100 upon review
CAL-ELF-909	Phase meter				From 300



**Table 81 Special Calibrations**

Code	Appliance for calibration	Price (€)
CAL-ELF-951	Transfer Standard Multifunction Wavetek 4950 (calibration)	1615
CAL-ELF-952	Electronic indicators of loadcells (calibration)	300
CAL-ELF-953	Electronic indicators of dynamo- cells (calibration+ regulation)	400
CAL-ELF-954	Data loggers	300

**(CAL-ELF-999) Calibration services upon special review**

**3.10 Time-Frequency Calibration Services (CAL-TFR)**

**Table 82 Time Standards and Instruments**

Code	Description	Price (€)
CAL-TFR-101	Rubidium Frequency Standard Racal 9475	From 350
CAL-TFR-102	Cesium Time Standard	From 1.470

**Table 83 Time Instruments**

CAL-TFR-201	Simple Chronometers	From 90
CAL-TFR-202	Calibration of counters (any model) based on Time (Measurement of difference phase from the primary standard of time & frequency - range of measurement 10 MHz)	From 160

**Table 84 Devices for Speed Control of Vehicles**

Code	Description	Price (€)
CAL-TFR-301	Lidars (in EIM)	250
CAL-TFR-302	Piezoelectric and closed loop systems (on site - 2 systems per day)	200

**(CAL-TFR-999) Calibration services upon special review**

### 3.11 Electrical Calibration Services (High Frequencies, CAL-EHF)

Table 85 Oscilloscopes. Method: Using Wavetek 9500, according to EA-10/07 & VDI/VDE/DGQ/DKD 2622 Blatt 4

Code	Device	Range	Price (€)
CAL-EHF-101	Oscilloscopes (2 channels)	BW<60 MHz	150 + 30 /extra channel + 30 /extra time base
CAL-EHF-102		60 MHz<BW<200 MHz	180 + 30 /extra channel + 30 /extra time base
CAL-EHF-103		200 MHz<BW<500 MHz	210 + 30 /extra channel + 30 /extra time base
CAL-EHF-104		BW>500 MHz	250 + 30 /extra channel + 30 /extra time base
CAL-EHF-105		Characteristics	After review

Table 86 Calibrations concerning reflection coefficient: 1-port termination

Code	Range	Method	Price (€)
CAL-EHF-201	-1 until 1	45 MHz - 26,5 GHz, 3,5mm, N-type Electrical calibration using network analyzer	From 100

Table 87 Calibrations concerning reflection and transmission coefficients. Calibration of Attenuators and set of exactly similar attenuators of fixed value 2-port and calibration of splitter 3-port

Code	Range	Method	Price (€)
CAL-EHF-250	-	Standard calibration fee	70
CAL-EHF-251	0 dB -60 dB	45 MHz - 26,5 GHz, up-to 30 frequencies, electrical calibration. Measurement with network analyzer.	50
CAL-EHF-252	0 dB -60 dB	45 MHz - 26,5 GHz-30, up-to 30 frequencies, electrical calibration with network analyzer	60
CAL-EHF-253	Type N	45 MHz - 18 GHz. Electrical characterization, inspection of connectors, calculation of equivalent reflection coefficients with network analyzer. Appliance of calibration: <u>splitter –(3-port)</u>	From 300
CAL-EHF-254	3,5 mm	45 MHz - 26,5 GHz. Electrical characterization, inspection of connectors, calculation of equivalent reflection coefficients with network analyzer. Appliance of calibration: <u>splitter –(3-port)</u>	From 300

**Note:** the standard calibration fee is assigned for each attenuator of group of attenuators, which do not make a set of similar attenuators.

**Table 88 Generators. Calibration method according to the instructions of the manufacturers**

Code	Device		Range	Price (€)
CAL-EHF-301	Generator of sinusoidal signals	Tektronix SG-503	250 kHz-250 MHz	From 300
CAL-EHF-302	Central unit of sweep oscillator	HP 8350B		From 380
CAL-EHF-303	Portable generator	HP 85640A	300 kHz - 2,9 GHz	From 380
CAL-EHF-304	Signal generator	Wiltron 6769B	Until 26,5 GHz	After review
CAL-EHF-305		Markoni 2022C	10 kHz - 1 GHz	After review
CAL-EHF-306	Synthesized signal generator	HP 8673E	2 - 18 GHz	After review
CAL-EHF-307	High power sweep generator	HP 83623B	0,01 - 20 GHz	After review
CAL-EHF-308	Synthesized / sweep generator	HP 83623L	0,01 - 20 GHz	After review
CAL-EHF-309		HP 83752A	0,01 - 20 GHz	Upon review
CAL-EHF-310	Calibration Generator	Tektronix PG506	-	From 380
CAL-EHF-311	Time Mark Generator	Tektronix TG-501	-	From 180
CAL-EHF-312	Function Generator	Tektronix FG-504	-	From 180

**Table 89 Counters. Calibration method according to the instructions of the manufacturers**

Code	Device		Range	Price (€)
CAL-EHF-400	Universal Counter	HP 5334A HP 5335A HP 5345A		320 for basic configuration
CAL-EHF-405		HP 5334A HP 5335A HP 5345A		380 for basic configuration and extra option for extension frequency range up-to 1,3 GHz

CAL-EHF-410	Frequency counter	Dagatron 7013		From 160
CAL-EHF-411	Pulse and CW frequency counter	EIP 585C	until 20 GHz	440
CAL-EHF-412	Microwave frequency counter	Agilent 5350B		440
CAL-EHF-413	Pulse / Microwave frequency counter	Agilent 5361B	until 26,5 GHz	440
CAL-EHF-414	Frequency counter, power meter and digital multimeter	Agilent 53148A		From 320
CAL-EHF-415	Frequency counter and power meter	Agilent 53151A		From 465

**Note:** the price €320 of the service CAL-EHF-414 includes only the calibration of the frequency counter. The calibration of the power meter and the digital multimeter are not included.

**Table 90 Calibrations concerning RF power. Range of measurement: 0,8 - 1 . Uncertainty: 0,9-1,5 %**

**Method:** Effective efficiency (comparison with calibrated standard by microcalometer), reflection coefficient using Network Analyzer -

Code	Description			Price (€)
CAL-EHF-500	Standard due of calibration			1000
Code	Device	Range	Price (€)	
CAL-EHF-501	Coaxial Power Standards	TEGAM/ WEINSCHEL F1119, 1109N	10 MHz-18 GHz	10 /Frequency specified points(*)
CAL-EHF-502				Upon review in non-specified points(*)
CAL-EHF-503		TEGAM/ WEINSCHEL 1807A	10 MHz-18 GHz	10 /Frequency in specified points
CAL-EHF-504				Upon review in non-specified points
CAL-EHF-505		TEGAM/ WEINSCHEL F1117AC	50 MHz-26,5 GHz	10 /Frequency in specified points
CAL-EHF-506				Upon review in non-specified points
CAL-EHF-507	Thermistor Mounts	HP 478A	10 MHz-10 GHz	10 /Frequency in specified points
CAL-EHF-508				Upon review in non-specified points
CAL-EHF-509		HP 8478B	10 MHz-18 GHz	10 /Frequency in specified points
CAL-EHF-510				Upon review in non-specified points

**Table 91 Calibrations concerning RF power. Range of measurement: 0,8 - 1 . Uncertainty: 1,5-3,0 %**

**Method:** Frequency Response, Reflection coefficient, Effective Efficiency, Measurement with reference power meter

Code	Device		Range	Price (€)
CAL-EHF-521	Power Sensors	HP 8481D	10 MHz-18 GHz	From 220
CAL-EHF-522		HP 8481A	10 MHz-18 GHz	From 220
CAL-EHF-523		HP 8485D	50 MHz-26,5 GHz	From 220
CAL-EHF-524		IFR 6923	10 MHz-26,5 GHz	From 220
CAL-EHF-525		HP 8483A	100 kHz έως 2 GHz	From 220
CAL-EHF-526		HP 8485A	50 MHz-26,5 GHz	From 220
CAL-EHF-527		IFR 6913	10 MHz-26,5 GHz	From 220
CAL-EHF-528		HP E4413A	50 MHz-26,5 GHz	From 220
CAL-EHF-529	Thermistor Mount	HP 478A	10 MHz-10 GHz	From 220
CAL-EHF-530	Thermistor Mounts (TEGAM/WEINSCHEL F1109N) using secondary standard		10 MHz-18 GHz (in more than 24 specified points)	From 220
CAL-EHF-531	Thermistor Mounts (TEGAM/WEINSCHEL F1116) using secondary standard		0,1 MHz-10 MHz (in more than 9 specified points)	From 220

**Table 92 Calibrations concerning RF power.**

**Method:** Zero check, power measurement, reference power level, functionality check. Measurement with reference power meter and range calibrator.

Code	Device		Range	Price (€)
CAL-EHF-540	Power meters	HP 435B, HP 436A, HP 4418A, HP EPM441A, IFR 6970	30 kHz until 26,5 GHz	From 240

**Note:** The frequency points are specified by EIM.

**Table 93 Spectrum Analysers**

<b>Method:</b> According to the instructions of the manufacturer using standard generators, sensors and power meters, oscilloscopes and frequency counters - <b>Range:10 Hz – 26,5 GHz</b>			
Code	Device	Description	Price (€)
CAL-EHF-601	Portable Spectrum Analysers	Calibration for basic configuration	From 350
CAL-EHF-602	Portable Spectrum Analysers	Calibration for basic configuration and additional options	Upon review
CAL-EHF-603	Spectrum Analysers	Calibration for basic configuration	From 700
CAL-EHF-604	Spectrum Analysers	Calibration for basic configuration and additional options	Upon review

**Table 94 Special calibrations**

Code	Device	Method	Price (€)
CAL-EHF-951	Attenuators HP 350D	Use of calibrator and multimeter	250

**(CAL-EHF-999) Calibration services upon special review**

## 4 Type Approval Services for Measuring Devices

EIM provides services and issues the respective results reports according to the law 2231/94 (article 1, paragraph 4), for measurement devices type approval. The reports of these services are submitted to the notified body, which is responsible for granting type approval. These services are provided by EIM laboratories as follows.

**Table 95 Type Approval Services for Measuring Devices**

Code	Measurement Field	Price (€)
TAP-MAS-100	Mass	After review
TAP-DEN-100	Density	
TAP-ELF-100	Electrical Low Frequencies	
TAP-EHF-100	Electrical Higher Frequencies	
TAP-FOR-100	Force	
TAP-FLO-100	Flow of liquids	
TAP-VOL-100	Volume	
TAP-TOR-100	Momentum	
TAP-PRE-100	Pressure	
TAP-TEM-100	Temperature	
TAP-DIM-100	Dimensional	
TAP-OPT-100	Optical- Photometry	
TAP-ACO-100	Audits	
TAP-TFR-100	Time- Frequency	

## 5 Metrological Support Services (MES)

Table 96 (MES-TKT) Training and Know-how transfer

Code	Description	Price (€)
MES-TKT-110	Training in open seminar Seminars of 7 to 8 hours/day in subjects assigned by EIM are organised in EIM and outside EIM for participants from different organizations.	300 /day of participant
MES-TKT-120	Training in closed seminar in the facilities of EIM. Seminars of 7 to 8 hours/day in subjects assigned by EIM are organised in EIM for participants coming from the same organization.	300 /day of participant
MES-TKT-121	Training in closed seminar in the facilities of the client. Seminars of 7 to 8 hours/day in subjects assigned by EIM are organised in the facilities of the client participants coming from the same organization.	300 /day of participant + extra cost for transportation, accommodation, etc.
MES-TKT-130	Training in closed or opened seminar funded by programs. Seminars of 7 to 8 hours/day in several subjects in metrology and related areas.	Determined according to the status and the rules of the programs.
MES-TKT-140	Specialized training and know- how transfer. Training and transport of highly specialized know-how and applications in subjects assigned according to special review of needs and requirements.	500 /day of participant + extra cost for transportation, accommodation (for on-site).

### (MES-CON) Metrological Support and Consulting Services

**MES-CON-210:** Special consulting services in specialized subjects of metrological and laboratory support.

Description: Specialized support in subjects of:

- Selection and evaluation of laboratory equipment based on metrological needs and requirements
- Uncertainty balances and calculation of measurement uncertainties
- Development of measurement procedures and processes
- Laboratory organization and management
- Interpretation and analysis of measurement results
- Evaluation, inspection and auditing of laboratories, according to the requirements of standards

Price: €80 / man-hour + extra cost for transportation, accommodation (for on-site)



**MES-CON-211:** Metrological support services by providing licenses for the use of EIM volume tank calibration web applications. The prices are determined as follows:

**Table 97 Web applications for the calibration of tanks and vessels license packs**

Type of charge	Package 1 (5 licenses)	Package 2 (15 licenses)	Package 3 (30 licenses)	Package 4 (50 licenses)	Package 5 (100 licenses)
New users	€300	€750	€1.300	€1.800	€2.900
Old users	€250	€600	€950	€1.400	€2.500

**Description:** The web application of EIM is data driven and carries out processing of measurement data, calculates the key parameters of volume calibration and provides the explicit tank calibration table.

**Table 98 National Time Services**

Code	Type of service	Charge (€/year)
MES-CON-215	Service 1: Provision of the National Time to entities announcing "Greece Time"	10.000
MES-CON-216	Service 2: Provision of time stamping	4.000
MES-CON-217	Service 3: Provision of the National Time to entities providing services based on time charging or making synchronization of networks	5.000
MES-CON-218	Service 4: Provision of the National Time to entities providing time stamping services	15.000

**Description:** The services are based on the measurement of time at the National Laboratory of Time-Frequency at EIM and in this respect they provide measurement traceability to the national standard of time-frequency of Greece.

**MES-CON-220:** Consulting Services with demonstration of measurements

**Description:** Support and transfer of know-how in limited number of participants of the client.

**Price:** €300 / day of participant

### **(MES-INT) Services for Proficiency Testing– Coo laboratorial Measurements**

**MES-INT-310:** Multilateral Inter-laboratory Measurement Schemes

**Description:** Schemes of inter-laboratory comparison measurements with the participation of at least two laboratories.

**Price:** Determined upon review

**MES-INT-311:** Multilateral Inter-laboratory Measurement Schemes (in mechanical measurements)

**Description:** Schemes of inter-laboratory comparison measurements with the participation of at least two laboratories in the field of mechanical measurements.

Price: Determined upon review

**MES-INT-312:** Multilateral Inter-laboratory Measurement Schemes (in physical measurements)

Description: Schemes of inter-laboratory comparison measurements with the participation of at least two laboratories in the field of physical measurements.

Price: Determined upon review

**MES-INT-313:** Multilateral Inter-laboratory Measurement Schemes (in electrical measurements)

Description: Schemes of inter-laboratory comparison measurements with the participation of at least two laboratories in the field of electrical measurements.

Price: Determined upon review.

**MES-INT-320:** Bilateral Inter-laboratory Measurement Schemes

Description: Bilateral inter-laboratory measurement scheme between the client laboratory and one of EIM laboratories.

Price: Determined upon review.

**MES-INT-321:** Bilateral Inter-laboratory Measurement Schemes (in mechanical measurements)

Description: Bilateral inter-laboratory measurement scheme between the client laboratory and one of EIM laboratories in the field of mechanical measurements.

Price: Determined upon review.

**MES-INT-322:** Bilateral Inter-laboratory Measurement Schemes (in physical measurements)

Description: Bilateral inter-laboratory measurement scheme between the client laboratory and one of EIM laboratories in the field of physical measurements.

Price: Determined upon review.

**MES-INT-323:** Bilateral Inter-laboratory Measurement Schemes (in electrical measurements)

Description: Bilateral inter-laboratory measurement scheme between the client laboratory and one of EIM laboratories in the field of electrical measurements.

Price: Determined upon review.

## 6 Discounts

### 6.1 Calibration Services

#### 6.1.1 Discounts for Groups of Similar Instruments

Discounts are provided for the calibration of measurement instruments, which are calibrated at the same time: a) simultaneous in groups in the same measurements range and points, b) or/and through procedures which lead to scale economies of laboratory operation. The discount is determined according to the number of instruments, which meet the previous criteria as follows:

Number of instruments	Discount
From 2 up-to 4	10%
From 5 and higher	15%

*It is noted that this discount is not provided for calibrations of sets of instruments and standards for which the catalog price is determined by a fixed calibration fee and a unit price per piece.*

#### 6.1.2 Discounts for Adjustment and Recalibration

Discount is provided for adjustment and recalibration after initial calibration. The amount of discount is 40% of the price of the calibration service, according to the catalog.

#### 6.1.3 Scale Discounts based on Amount of Services

Scale discounts are provided according to the amount of the total service cost per each individual as follows.

Scale for total service cost of offer (€)	Amount of discount (€)	Scale discount (%)	Scale discount (€)	Total (cumulative) discount of offer (€)
0 –3.000	0	0	0	0
3.000-6.000	3.000	10	300	300 for offer of 6.000
Higher than 6.000		15		

**Example:** The discount for an offer of calibration services of €20.000 is determined as follows:

- In the scale 3.000 – 6.000 =  $(3000 \cdot 10\%) = €300$
- In the scale 6.000 – 20.000 =  $(14.000 \cdot 15\%) = €2.100$

In this respect:

- The total discount amounts to €2.400
- The final total cost to €17.600

*An offer is considered to be supplementary of a previous offer (basic offer), if it is submitted while the execution of the previous offer is in progress. In this case, the supplementary offer follows the terms and conditions of the previous-basic offer.*

### 6.2 Type Approval Services

Discounts are provided according to the criteria of par.5.1.

## 6.3 Metrological Support Services

### 6.3.1 Training Seminars (MES-TKT-110, 120, 121)

Any extra participation/day from the same organization in any seminar of the same cycle is provided with 20% discount.

**Example:** An organization participates in a cycle of 3 EIM open seminars for one (1) day each and with 9 days of participations. The total cost to be paid is calculated as follows:

- Cost of 1<sup>st</sup> participation/day: €300 (MES-TKT-110)
- Cost of the rest of participations (2<sup>st</sup>, 3<sup>st</sup>, ..., 9<sup>st</sup>): €240/day of participation

### 6.3.2 Training- Know- how transfer (MES-TKT-140)

Discounts are provided according to the criteria of par.5.1.

### 6.3.3 Discounts to Students

Students participating in EIM training programs on individual basis have 50% discount in the original participation cost.

### 6.3.4 Consulting Services

Discounts are provided according to the criteria of par.5.1.

## 6.4 Contracts

Discounts are provided for services offered in the context of contracts and they are determined by the Management Council according to:

1. The initial contract total cost.
2. The contract period.
3. EIM Service Policy.

## 6.5 Discounts to Accredited or pending accreditation Laboratories

Accredited or pending accreditation laboratories which participate in EIM inter-laboratory measurement schemes receive **30% discount**.

## 6.6 Other Discounts

**40%** discount on the initial cost of inter-laboratory measurement schemes is provided, in cases where repetition of the schemes taken place leads to new results.