

## Prices and Service Descriptions – CalLab PV Cells 2020

Stepped pricing applies to the number of services requested per cell type, per shipment of cells.

### Calibration of a solar cell under STC\*\* using the filter monochromator

- spectral response from the range of 300 nm to 1,200 nm using the filter monochromator
- IV characteristics with indication of  $V_{OC}$ ,  $I_{SC}$ ,  $V_{MPP}$ ,  $I_{MPP}$ ,  $P_{MPP}$ ,  $FF$  and  $\eta$
- indication of measurement uncertainties\* ( $V_{OC}$ ,  $I_{SC}$ ,  $P_{MPP}$ , and  $\eta$ )

Number of Cells/Types	Price (€) per Cell/Type
1	830.00
2	750.00
3	710.00
4	670.00
5	640.00
6	610.00
7	580.00
8	550.00
9	520.00
10 or more	490.00

### Determination of the temperature coefficients of a solar cell

- temperature range from 15°C to 75°C in accordance with IEC 61853-1
- 4 IV characteristics ( $V_{OC}$ ,  $I_{SC}$ ,  $V_{MPP}$ ,  $I_{MPP}$ ,  $P_{MPP}$ ,  $FF$  and  $\eta$ )
- 2 determinations of spectral response (25°C and 75°C)
- each 4 measuring points with linear regression
- TC including the indication of measurement uncertainties\* ( $V_{OC}$ ,  $I_{SC}$ ,  $P_{MPP}$ , and  $\eta$ )
- calibration included (see calibration service description)

Price (€) per Cell/Type:	2270.00
--------------------------	---------

## Determination of the irradiance dependence of a solar cell

- option available only in addition to the service of calibration or in addition to determination of IV characteristics
- additional determination of IV parameters at the irradiance intensities: 900, 500, 300 and 200 W/m<sup>2</sup>

Price (€) per Cell/Type: 760.00

---

## Determination of dark IV characteristics of a solar cell

- determination of dark IV characteristics at 25°C

Number of Cells/Types	Price (€) per Cell/Type
1	140.00
2	130.00
3	120.00
4	110.00
5 or more	100.00

---

## Special Service for Thin Film Cells

### Calibration of a solar cell under STC\*\*using the laser/grating monochromator

- spectral response from the range of 300 nm up to 2,000 nm using the laser/grating monochromator
- IV characteristics with indication of  $V_{OC}$ ,  $I_{SC}$ ,  $V_{MPP}$ ,  $I_{MPP}$ ,  $P_{MPP}$ ,  $FF$  and  $\eta$
- indication of measurement uncertainties\* ( $V_{OC}$ ,  $I_{SC}$ ,  $P_{MPP}$ , and  $\eta$ )

Number of Cells/Types	Price (€) per Cell/Type
1	1130.00
2	1070.00
3	1020.00
4	970.00
5	920.00
6	870.00
7	830.00
8	790.00
9	750.00
10 or more	710.00

---

## Special Service for Bifacial Cells

### **Calibration and Determination of IV Characteristics of a Bifacial Cell under Single and Dual Sided Illumination**

#### Calibration of the front side of a bifacial solar cell under STC\*\* using the filter monochromator

- spectral response from the range of 300 nm up to 1,200 nm
- measurement under STC\*\* with bias illumination
- filter bandwidth 5 to 15 nm depending on wavelength
- IV characteristics with indication of  $V_{OC}$ ,  $I_{SC}$ ,  $V_{MPP}$ ,  $I_{MPP}$ ,  $P_{MPP}$ ,  $FF$  and  $\eta$
- correction of spectral mismatch using the spectral response of Pos. 1
- indication of measurement uncertainties for the front side of the bifacial solar cell\* ( $V_{OC}$ ,  $I_{SC}$ ,  $P_{MPP}$ , and  $\eta$ )

#### Determination of spectral response of the back side of the bifacial solar cell using the filter monochromator

- spectral response from the range of 300 nm to 1200 nm
- measurements with additional bias irradiance intensities in the range from 0 to 250 W/m<sup>2</sup>
- Determination of the relation between back side current and back side irradiance

#### Determination of IV characteristics of the bifacial solar cell under dual sided illumination

- front side irradiance of 1000 W/m<sup>2</sup>
- back side irradiance of 100, 150, and 200 W/m<sup>2</sup>
- IV characteristics with indication of  $V_{OC}$ ,  $I_{SC}$ ,  $V_{MPP}$ ,  $I_{MPP}$ ,  $P_{MPP}$ ,  $FF$  and  $\eta$ , and *Gain Efficiency Product (GEP)*

#### Determination of IV characteristics of the bifacial solar cell under single sided illumination

- Equivalent irradiance calculated by a front side irradiance of 1000 W/m<sup>2</sup> and back side irradiance of 100, 150, and 200 W/m<sup>2</sup>, respectively
- IV characteristics with indication of  $V_{OC}$ ,  $I_{SC}$ ,  $V_{MPP}$ ,  $I_{MPP}$ ,  $P_{MPP}$ ,  $FF$  and  $\eta$ , and *Gain Efficiency Product (GEP)*

Price (€) per Cell/Type: 2470.00

---

\* Indication of measurement uncertainties, provided the test device is viable for calibration

\*\* Standard test conditions: AM 1.5 global, 1000W/m<sup>2</sup>, 25 °C

Please note that, each group of cells, and each type of cell, that we receive generates work that needs to be done (setting up the order, customs clearance, checking the cells in, setting up the measurement equipment and setting up the software for each cell type in the order, calculating and reviewing the measurement results, producing the certificates, preparing the customs paperwork, packaging the cells for return and sending the cells back to the customer, etc.).

Less time and effort is involved when all of these things happen once as opposed to several times with lesser amounts of cells. Our stepped pricing was put in place to pass that savings on to our customers who send us larger numbers of the same cells at one time. So, the price per service will depend on how many cells of the same type per service are required at one time.