

Calibration Certificate**61493****Applicant**

Customer name CCSTEC GesmbH
Address Triesterstrasse 36
2512 Oeynhausen
Austria

Order reference applicant CP0999
Order reference TPF Control 61492

Instrument information

Instrument type Flow Calibrator
Manufacturer Mesalabs
Model Definer 220H
Serial number 115673
Tag number C63

Calibration method

The temperature calibration is done by comparing the DUT reading to a PT-100 reading in Air. The pressure DUT is directly, connected to a pressure standard to compare pressure readings. The flow measurements are made in a parallel setup.

A flow source is connected to the inlet of the instrument to generate a flow.

Environmental conditions

The laboratory environment was maintained at $21^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and $40\%\text{rh} \pm 20\%\text{rh}$.
The atmospheric pressure at the time of calibration was 1021 mBar.

Date (or period) of calibration 15 May 2020 - 18 May 2020

Results The results of the calibration are presented on the following page(s).

Uncertainty The reported uncertainty of measurement is based on the standard uncertainty multiplied by a coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

The standard uncertainty of measurement has been determined in accordance with EA-4/02.

Traceability

The measurements have been executed using standards for which the traceability to (inter)national standards has been demonstrated towards the RvA.

Date 18 May 2020

Calibration Technician



Bart Visser

Technical Manager



Rik van de Bovenkamp

Calibration Certificate

61493

Instrument specification [Device Under Test]

Q_{max} : 30000 sccm
Reference conditions : 21.1 °C & 1013.25 mBar

Serial number : 115673
Tag number : C63

Calibration conditions

Calibration gas : Air

Calibration results

| Instrument reading | | Deviation (ERROR) | | | Uncertainty |
|---------------------|-----------------------|-------------------|---------------------|------------------|------------------------|
| Flow [sccm] | Reference Flow [sccm] | Of rate [%] | DUT- REF [sccm] | Limit [%] | Calibration [%] |
| 300.82 | 301.28 | -0.15 | -0.46 | 1.00 | 0.20 |
| 4990.4 | 5009.8 | -0.39 | -19.40 | 1.00 | 0.18 |
| 29907 | 29938 | -0.10 | -31.00 | 1.00 | 0.23 |
| Temperature [°C] | Temperature [°C] | Of rate [%] | DUT - REF [°C] | Limit [°C] | Calibration [°C] |
| 21.3 | 21.1 | 0.95 | 0.2 | 0.8 | 0.4 |
| Pressure [mBar (a)] | Pressure [mBar (a)] | Of rate [%] | DUT- REF [mBar (a)] | Limit [mBar (a)] | Calibration [mBar (a)] |
| 1021 | 1022 | -0.10 | -1 | 5 | 3 |

Calibration results after adjustment

| Instrument reading | | Deviation (ERROR) | | | Uncertainty |
|---------------------|-----------------------|-------------------|---------------------|------------------|------------------------|
| Flow [sccm] | Reference Flow [sccm] | Of rate [%] | DUT- REF [sccm] | Limit [%] | Calibration [%] |
| 301.57 | 301.97 | -0.13 | -0.40 | 1.00 | 0.19 |
| 4995.8 | 5004.2 | -0.17 | -8.40 | 1.00 | 0.18 |
| 29964 | 29911 | 0.18 | 53.00 | 1.00 | 0.18 |
| Temperature [°C] | Temperature [°C] | Of rate [%] | DUT - REF [°C] | Limit [°C] | Calibration [°C] |
| 21.1 | 21.1 | 0.00 | 0.0 | 0.8 | 0.4 |
| Pressure [mBar (a)] | Pressure [mBar (a)] | Of rate [%] | DUT- REF [mBar (a)] | Limit [mBar (a)] | Calibration [mBar (a)] |
| 1021 | 1021 | 0.00 | 0 | 5 | 3 |

Note

- The deviation is determined by : $\text{Deviation} = \frac{\text{Instrument reading} - \text{Reference}}{\text{Reference}} \cdot 100 \%$
- Calibrations are performed at mentioned pressure and temperature conditions. Reference temperatures are defined according the ITS-90.