

# Beamex MB

METROLOGY TEMPERATURE BLOCK



Portable temperature dry block delivering bath-level accuracy for industrial applications

# Highly accurate temperature dry block

88



# Portable temperature dry block delivering bath-level accuracy for industrial applications

The Beamex metrology temperature block (MB) is a user friendly and highly accurate temperature dry block. It delivers bath-level accuracy in a convenient dry block with temperature ranges from  $-45\text{ }^{\circ}\text{C}$  ...  $+700\text{ }^{\circ}\text{C}$ . It enables you to take laboratory-level accuracy with you out into the field.

## Main features of MB

### High accuracy and stability

With a conventional dry block, you typically needed an external reference sensor if you wanted better accuracy. The Beamex MB has accurate internal temperature measurement and display accuracy up to  $\pm 0.1\text{ }^{\circ}\text{C}$ , so you can get high accuracy even without an external reference sensor. With the unique temperature control techniques the Beamex® MB has excellent stability up to  $\pm 0.005\text{ }^{\circ}\text{C}$ . This kind of stability has usually been found only in baths, not in dry blocks.

### Built-in high-accuracy reference input

In order to receive the best accuracy from the MB, there is a possibility to connect an external reference sensor into the reference sensor connection (R model). This eliminates the need for a separate reference thermometer. The reference sensor measurement is accurate up to  $\pm 0.006\text{ }^{\circ}\text{C}$ . ITS-90 or CVD coefficients can be used to compensate any sensor errors.

### Axial uniformity

With the unique dual zone control and extended well depth, the Beamex MB has an excellent axial uniformity up to  $\pm 0.02\text{ }^{\circ}\text{C}$ .

### Radial uniformity

Radial uniformity is the temperature difference between the holes in the insert. It is naturally crucial that the reference sensor and the sensor being tested are at the same temperature. The Beamex MB offers radial uniformity up to  $\pm 0.01\text{ }^{\circ}\text{C}$ .

### Immersion Depth

The Beamex MB series provides immersion depth up to 203 mm (160 mm in MB140), which, together with the control techniques, provides more stable calibration. Moreover, a deeper immersion depth reduces the stem conduction error (heat loss into the atmosphere), especially in higher temperatures.

### Loading

With the extended well depth and the dual zone temperature control feature, the Beamex MB can correct the effect of loading and provides loading specifications up to  $\pm 0.005\text{ }^{\circ}\text{C}$ .



# Beamex MB series specifications

|   | MB140   | MB155  | MB425  | MB700   |
|---|---|--|--|---|
| <b>Temperature range at 23 °C</b>   | –45 °C to 140 °C<br>(–49 °F to 284 °F)  | –30 °C to 155 °C<br>(–22 °F to 311 °F)                         | 35 °C to 425 °C<br>(95 °F to 797 °F)                             | 50 °C to 700 °C <sup>3)</sup><br>(122 °F to 1292 °F)            |
| <b>Display accuracy</b>   | ±0.1 °C Full range  | ±0.1 °C Full range   | ±0.1 °C to 100 °C<br>±0.15 °C to 225 °C<br>±0.2 °C to 425 °C     | ±0.2 °C to 425 °C<br>±0.25 °C to 660 °C                         |
| <b>Stability</b>  | ±0.005 °C Full range  | ±0.005 °C Full range   | ±0.005 °C to 100 °C<br>±0.008 °C to 225 °C<br>±0.01 °C to 425 °C | ±0.005 °C to 100 °C<br>±0.01 °C to 425 °C<br>±0.03 °C to 700 °C |
| <b>Axial uniformity<br/>40 mm (1.6 in)</b>                                      | ±0.08 °C to –35 °C<br>±0.04 °C to 0 °C<br>±0.02 °C to 50 °C<br>±0.07 °C to 140 °C | ±0.025 °C to 0 °C<br>±0.02 °C to 50 °C<br>±0.05 °C to 155 °C   | ±0.05 °C to 100 °C<br>±0.09 °C to 225 °C<br>±0.17 °C to 425 °C   | ±0.09 °C to 100 °C<br>±0.22 °C to 425 °C<br>±0.35 °C to 700 °C  |
| <b>Radial uniformity</b>  | ±0.01 °C Full range   | ±0.01 °C Full range  | ±0.01 °C to 100 °C<br>±0.02 °C to 225 °C<br>±0.025 °C to 425 °C  | ±0.01 °C to 100 °C<br>±0.025 °C to 425 °C<br>±0.04 °C to 700 °C |
| <b>Loading effect (with a 6.35 mm reference probe and three 6.35 mm probes)</b> | ±0.02 °C to –35 °C<br>±0.005 °C to 100 °C<br>±0.01 °C to 140 °C                   | ±0.005 °C to 0 °C<br>±0.005 °C to 100 °C<br>±0.01 °C to 155 °C | ±0.01 °C Full range  | ±0.02 °C to 425 °C<br>±0.04 °C to 700 °C                        |
| <b>Hysteresis</b>   | ±0.025 °C   | ±0.025 °C  | ±0.04 °C   | ±0.07 °C  |
| <b>Immersion depth</b>  | 160 mm (6.3 in)   | 203 mm (8 in)  | 203 mm (8 in)  | 203 mm (8 in)   |
| <b>Resolution</b>   | 0.001 °C / °F   |  |  |   |
| <b>Display</b>  | LCD, °C or °F, user-selectable  |  |  |   |
| <b>Key pad</b>  | Ten key with decimal and +/– button. Function keys, menu key, and °C / °F key.    |  |  |   |
| <b>Insert OD dimensions</b>   | 30.0 mm (1.18 in)   | 30.0 mm (1.18 in)  | 30.0 mm (1.18 in)  | 29.2 mm (1.15 in)   |
| <b>Cooling time</b>   | 44 min: 23 °C to –45 °C<br>19 min: 23 °C to –30 °C<br>19 min: 140 °C to 23 °C     | 30 min: 23 °C to –30 °C<br>25 min: 155 °C to 23 °C             | 220 min: 425 °C to 35 °C<br>100 min: 425 °C to 100 °C            | 235 min: 700 °C to 50 °C<br>153 min: 700 °C to 100 °C           |
| <b>Heating time</b>   | 32 min: 23 °C to 140 °C<br>45 min: –45 °C to 140 °C                               | 44 min: 23 °C to 155 °C<br>56 min: –30 °C to 155 °C            | 27 min: 35 °C to 425 °C  | 46 min: 50 °C to 700 °C   |
| <b>Size (H x W x D)</b>   | 366 x 203 x 323 mm<br>(14.4 x 8 x 12.7 in)  |  |  |   |
| <b>Weight</b>   | 14.2 kg (31.5 lb)   | 14.6 kg (32 lb)  | 12.2 kg (27 lb)  | 14.2 kg (31.5 lb)   |
| <b>Power requirements</b>   | 230 VAC (±10%), 550 W<br>115 VAC (±10%), 550 W                                    | 230 VAC (±10%), 550 W<br>115 VAC (±10%), 550 W                 | 230 VAC (±10%), 1025 W<br>115 VAC (±10%), 1025 W                 | 230 VAC (±10%), 1025 W<br>115 VAC (±10%), 1025 W                |
| <b>Computer interface</b>   | RS-232  |  |  |   |
| <b>Calibration</b>  | Accredited calibration certificate provided                                       |  |  |   |
| <b>Environmental operating conditions</b>                                       | 5 °C to 40 °C, 0% to 80% RH (non-condensing)                                      |  |  |   |
| <b>Specifications valid in environmental conditions</b>                         | 18 °C...28 °C   |  |  |   |

3) Calibrated to 660 °C; reference thermometer recommended at higher temperatures.

| R MODEL SPECIFICATIONS                                  | MB   |
|---|--|
| <b>Resistance range</b>                                 | 0 Ω to 400 Ω   |
| <b>Resistance accuracy <sup>1)</sup></b>                | 0 Ω to 20 Ω: ±0.0005 Ω<br>20 Ω to 400 Ω: ±25 ppm of reading  |
| <b>Characterizations</b>                                | ITS-90, CVD, Resistance  |
| <b>Temperature accuracy (100 ohm PRT) <sup>2)</sup></b> | Below zero: ±(0.006 °C + 0.001% of temperature reading)<br>Above zero: ±(0.006 °C + 0.003% of temperature reading) |
| <b>Sensor connection</b>                                | 4-wire, 6-pin Lemo   |
| <b>Calibration</b>                                      | Accredited calibration certificate provided  |

1) Measurement accuracy specifications apply within the specified environmental operating conditions and assume 4-wires for PRTs.

2) The built-in reference thermometer readout accuracy does not include the sensor probe accuracy.

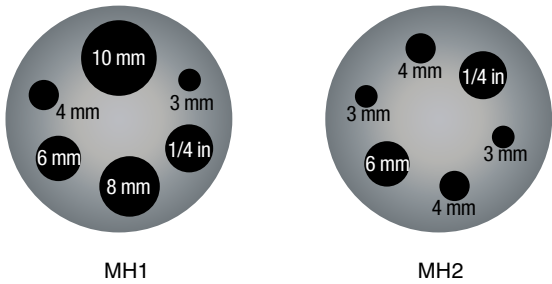


# Inserts

## INSERTS FOR MB MODELS

| INSERT  | MODEL      | DESCRIPTION  |
|---------|------------|--|
| MH1     | All models | Multihole, metric / reference; ¼", 3 mm, 4 mm, 6 mm, 8 mm, 10 mm |
| MH2     | All models | Multihole, metric / reference; ¼", 2x3 mm, 2x4 mm, 6 mm          |
| B       | All models | Blank  |
| Special | All models | Special  |

Please contact Beamex for custom inserts.



## STANDARD ACCESSORIES

- Power Cord
- RS-232 Cable
- User Guide
- Accredited Calibration Certificate
- LEMO Connector for reference sensor (R models only)
- Block Insulator (in MB140, MB155 and MB425)
- Tongs (insert removal tool)

## OPTIONAL ACCESSORIES

- Transport Case for temperature block
- Inserts

## SUMMARY

92

# Beamex MB

## METROLOGY TEMPERATURE BLOCK

The Beamex metrology temperature block (MB) is a highly accurate temperature dry block. It delivers bath-level accuracy in a convenient dry block. It enables you to take laboratory level accuracy with you out into the field. The unique dual zone control technology enables excellent stability and uniformity. Immersion depth up to 203 mm and temperature ranges from  $-45\text{ }^{\circ}\text{C}$  ...  $+700\text{ }^{\circ}\text{C}$ .

### Compact and user-friendly

The MB is a compact, lightweight, portable calibrator with a large graphical display, multilingual interface and full numerical keyboard. Calibration is quick and simple.

### Accuracy guaranteed

- MB140 / MB140R with range  $-45\text{ }^{\circ}\text{C}$  ...  $+140\text{ }^{\circ}\text{C}$
- MB155 / MB155R with range  $-30\text{ }^{\circ}\text{C}$  ...  $+155\text{ }^{\circ}\text{C}$
- MB425 / MB425R with range  $+35\text{ }^{\circ}\text{C}$  ...  $+425\text{ }^{\circ}\text{C}$
- MB700 / MB700R with range  $+50\text{ }^{\circ}\text{C}$  ...  $+700\text{ }^{\circ}\text{C}$

The R models include an internal reference thermometer with a connection for an external reference sensor.

### Smart reference probes

Beamex smart reference probes are high-quality and extremely stable reference PRT probes with an integrated memory to store the individual probe coefficients. They are available in two versions: 300 mm straight version or a  $90^{\circ}$  bent version.



### Main features

- ▶ High accuracy – a dry block that delivers bath-level accuracy
- ▶ The unique dual zone control technology enables excellent stability and uniformity
- ▶ Immersion depth up to 203 mm
- ▶ Wide temperature range from  $-45^{\circ}\text{C}$  to  $+700^{\circ}\text{C}$
- ▶ Accredited calibration as standard
- ▶ Part of the Beamex ICS integrated calibration solution