

Gauge Blocks

Features and Accuracies

Features of Mitutoyo Gauge Blocks

Mitutoyo offers rectangular steel and ceramic (CERA Blocks) gauge blocks for use as length standards in variously sized sets and as individual blocks. Accessories include wear blocks in tungsten carbide and ceramic in the standard thicknesses. Mitutoyo gauge blocks are recognized to be of the highest quality and are available in various grades to meet every need in respect of working conditions, environment and application.

Accuracy

As a world-leading precision measuring equipment manufacturer, Mitutoyo is certified by the Japanese government as an accredited calibration laboratory, which means that the accuracy of its gauge blocks is guaranteed through traceability to the Metrology Management Centre of the National Institute of Advanced Industrial Science and Technology (AIST).

Wringing

Lapping measuring surfaces is one of Mitutoyo's specialties. Our advanced technique, developed over more than half a century, enables us to achieve the optimum flatness and surface finish needed for gauge blocks and thus maximize the wringing force.

Abrasion Resistance and Dimensional Stability of Steel Blocks

High-carbon high-chrome steel is employed to satisfy a variety of the material characteristics required for gauge blocks. Our advanced heat treatment technology for steel blocks, which involves repeated temperature cycling, simultaneously achieves excellent abrasion resistance and minimizes any change in length over time.

CERA Blocks

CERA blocks are made of a ceramic material with a superior surface finish, created by Mitutoyo's ultra-precision machining techniques, that provides a premium quality block with significant advantages:

1. Corrosion Resistant

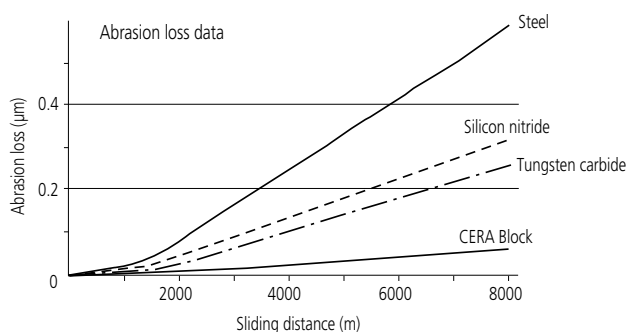
Anti-corrosion treatment is not required when handled normally (i.e. with fingers), resulting in simple maintenance and storage.

2. No Burrs Caused by Accidental Mishandling

Since the CERA Block is very hard, it will not scratch easily and is highly resistant to burrs. If a burr is formed, it can easily be removed with a ceramic deburring stone (Ceraston).

3. Abrasion Resistant

CERA Blocks have 10 times the abrasion resistance of steel gauge blocks.



4. Dimensionally Stable

CERA Blocks are free from dimensional change over time.

5. Clearly Marked Sizes

Black characters, indicating the nominal length, are inscribed by laser and are clearly visible against the white surface of the block.

6. Non-Magnetic Nature Prevents Steel Swarf Contamination

7. High Wringing Force

Superior flatness and surface finish provides maximum wringing force.



Grade and Application

Grade 2:

These gauge blocks are intended for shop floor use to set and calibrate fixtures as well as precision instruments.

Grade 1:

This grade is used within an inspection area to verify the accuracy of plug and snap gauges as well as for setting electronic measuring devices.

Grade 0:

These higher accuracy gauges are intended for use within a controlled environment by skilled inspection staff. Mainly used as reference standards for setting high precision measuring equipment and for the calibration of lower grade gauge blocks.

The following table can be used to select the gauge block grade according to usage (specified by DIN861, BS4311, and JIS B 7506).

Usage	Applications	Grade
Workshop use	• Mounting tools and cutters	2
	• Manufacturing gauges • Calibrating instruments	1 or 2
Inspection use	• Inspecting mechanical parts, tools, etc.	1 or 2
	• Checking the accuracy of gauges • Calibrating instruments	0 or 1
Calibration use	• Checking the accuracy of gauge blocks for workshop • Checking the accuracy of gauge blocks for inspection • Checking the accuracy of instruments	0

Constructing a Gauge Block Stack

The following points should be noted when constructing a gauge block stack:

1. Use as few gauge blocks as possible to obtain the required length by selecting thick blocks wherever possible.
2. Select the block for the least significant digit first, then work back through the more significant digits until the required length is attained.
3. There are multiple combinations for the integer part of a length. To reduce wear as much as possible, do not always use the same gauge blocks.

Example: Required length = 45.6785 mm

- For a 1 mm-based gauge block set (112 pcs.)

$$\begin{array}{r}
 1.0005 \\
 1.008 \\
 1.17 \\
 17.5 \\
 +) 25.0 \\
 \hline
 45.6785 \text{ mm}
 \end{array}$$

- For a 2 mm-based gauge block set (112 pcs.)

$$\begin{array}{r}
 2.0005 \\
 2.008 \\
 2.17 \\
 14.5 \\
 +) 25.0 \\
 \hline
 45.6785 \text{ mm}
 \end{array}$$

Note: For details on the recommended method of wringing, refer to page E-17.