Gauge Blocks

Series 516

Precision gauge blocks are the primary standards vital to dimensional quality control in the manufacture of parts. Mitutoyo offers an extensive selection of gauge blocks available in a choice of rectangular or square, metric or inch, and steel or ceramic types.

Accuracy

Gauge blocks offered by Mitutoyo guarantee such a high accuracy that users can use them complete confidence. Needless to say, Mitutoyo has established a traceability system for our measurement products, up to the Metrology Management Center of the National Institute of Advanced Industrial Science and Technology (AIST) and we have been certified by the Japanese government as an accredited laboratory.

Wringing

The lapping technique is one of Mitutoyo's specialties. Our advanced technique, developed over more than a half century, enables us to achieve the best flatness and surface roughness 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 high and low temperature cycles, simultaneously achieves excellent abrasion resistance and reduces change in length over time to the minimum.

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.

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 Dents, etc.

Since the CERA Block is very hard, it will not scratch 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. Sizes Clearly Marked

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

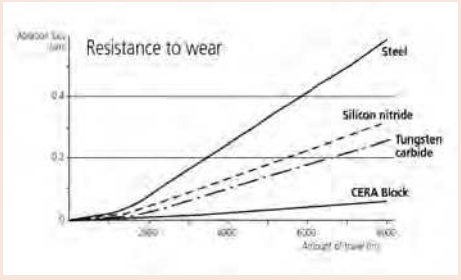
7. High Wringing Force

Superior flatness and surface finish

8. Superior Material Characteristics of CERA Block

Property / Material	CERA Block (ZrO_2)	Steel (Fe)	Carbide (WC-Co)	Silicon nitride (Si_3N_4)
Hardness (HV)	**1350**	800	1650	1500
Coefficient of thermal expansion (10^{-6}/K)	**9,3±0,5**	10,8±0,5	5,5±1,0	2
Flexural strength (MPa)	**1270**	1960	1960	580
Fracture toughness K1c (MPa•$m^{1/2}$)	**7**	120	12	6,5
Young's modulus x10^{-4} (MPa)	**20,6**	20,6	61,8	28,4
Poisson's ratio	**0,3**	0,3	0,2	0,3
Specific gravity	**6,0**	7,8	14,8	3,2
Thermal conductivity (W/m•k)	**2,9**	54,4	79,5	16,7

CERA Blocks



CERA Blocks - Abrasion Resistant

CERA Blocks - Non magnetic

Selecting Gauge Blocks

- Gauge blocks are designed to offer the construction of practically any size, within the range of a set, using the minimum number of blocks. Long block sets are available if a longer length is required than is provided by the standard sets.
- Gauge block sets should be selected in accordance with the minimum length step required. Wear block sets should be used if the application is likely to involve rapid wear of the end blocks in a stack (and the minimum sizes required allow this). This will preserve the life of the set by confining wear to the wear blocks, whose cost of replacement is far less than that of a complete set.
- If a set containing a large number of gauge blocks is selected, the number of gauge blocks required for any particular length may be reduced and the number of combinations is increased. Accuracy will be retained and wear will be reduced.
- Dedicated gauge block sets for micrometer inspection and caliper inspection are available.