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E

## Small Tool Instruments and Reference Gages

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**Gage Blocks**



**Height Master**



**Reference Gages**



**Granite Surface Plates & Bench Comparator**



**CERA/Steel Combination Gage Block Sets**



**Step Master**



**ZERO CERA BLOCK**



**Ceramic Straight Master**

# Gage Block

## SERIES 516

### FEATURES

Precision gage blocks are the primary standards vital to dimensional quality control in the manufacture of parts. Mitutoyo offers

a complete selection of gage blocks available in a choice of rectangular or square, metric or inch and steel or CERA (ceramic) types.

### Accuracy

Mitutoyo gage blocks guarantee such a high accuracy that users can use them without anxiety. 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 lapping technique, developed for more than a half century, allows us to achieve the best flatness and surface roughness needed for gage blocks.

### Abrasion Resistance and Dimensional Stability

High-carbon, high-chrome steel is employed to sufficiently satisfy a variety of material characteristics required for gage blocks. A high degree of hardness, obtained by our heat treatment technology, as well as methodically repeated heat treatment, have successfully reduced deterioration change over time.

### CERA Blocks

CERA blocks, made of ceramic materials with superior surface quality, were developed by Mitutoyo's ultra-precision machining techniques and solve problems commonly associated with steel gage blocks.

#### 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

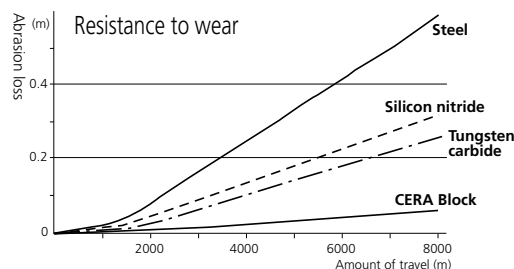
CERA Blocks have 10 times the abrasion resistance of steel gage blocks.

#### 4. Dimensional Stability

CERA Blocks are free from dimensional change over time.

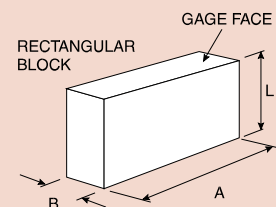
#### 5. Marking

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



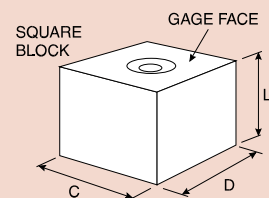
### Selecting Gage Blocks

- Select gage blocks in accordance with the combination range required. If a large length is required, add a long block set.
- Select gage blocks in accordance with the minimum length step required. Add wear block sets if necessary.
- If a set containing a large number of gage blocks is selected, the number of combination gage blocks required for a length is reduced and the number of combinations is increased. The accuracy will be retained and damage will be reduced.
- The specific gage block set for micrometer inspection and caliper inspection is available.
- If using only one length repeatedly, it is a good idea to purchase discrete gage blocks.
- The 2mm-based gage blocks, which take the base of the minimum length step as 2mm, are easy to handle and will not warp, as compared to the 1mm-based gage blocks.



### Rectangular Block

| Gage Size              | Face Width (A) | Face Depth (B) |
|------------------------|----------------|----------------|
| Up to 2"               | 1.181"         | .355"          |
| Over .2" up to 40"     | 1.378"         | .355"          |
| Up to 10mm             | 30mm           | 9mm            |
| Over 10mm up to 1000mm | 35mm           | 9mm            |



### Square Block

| Gage Size             | Face Width (C) | Face Depth (D) |
|-----------------------|----------------|----------------|
| Inch (up to 40")      | .95"           | .95"           |
| Metric (up to 1000mm) | 24.1mm         | 24.1mm         |

## Grade and Application

Refer to the following table to select the gage block grade according to usage.

|                 | Applications                                                                                                                                           | Grade        |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Workshop use    | • Mounting tools and cutters                                                                                                                           | AS-1 or AS-2 |
|                 | • Manufacturing gages<br>• Calibrating instruments                                                                                                     | 0 or AS-1    |
| Inspection use  | • Inspecting mechanical parts, tools, etc.                                                                                                             | 0 or AS-1    |
|                 | • Checking the accuracy of gages<br>• Calibrating instruments                                                                                          | 00 or 0      |
| Calibration use | • Checking the accuracy of gage blocks for workshop<br>• Checking the accuracy of gage blocks for inspection<br>• Checking the accuracy of instruments | K or 00      |
| Reference use   | • Checking the accuracy of gage blocks for calibration<br>• For academic research                                                                      | K            |

### Grade AS-1:

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

### Grade 0:

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

### Grade 00:

These higher accuracy gages 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 gage blocks.

### Grade K:

Gage blocks of this accuracy are intended for use within a temperature-controlled inspection room or calibration laboratory. They should be used as masters with certificates against other gage blocks which are calibrated by comparison.

## Combination of a Required Length

Multiple combinations of gage blocks can be used to make a required length. Care should be exercised in the following points.

1. Use as few gage blocks as possible to obtain the required length. (Select thick gage blocks whenever possible.)
2. Select gage blocks starting with the one that has the least significant digit required, and then work up to ones with more significant digits.
3. There are multiple combinations for the integer part of a length. To prevent wear as much as possible, do not always use the same gage blocks.

Example combination  
Required length = 45.6785mm

### For the 1mm-based gage block set (112 pcs.)

```

1.0005
1.008
1.17
17.5
+ 25
-----
45.6785mm

```

### For the 2mm-based gage block set (112 pcs.)

```

2.0005
2.008
2.17
14.5
+ 25
-----
45.6785mm

```

## 6. Anti-magnetic Nature Keeps Away Steel Powders

## 7. High Wringing Force

An even, dense tissue can maintain a strong wringing force.



## 8. Material of CERA block

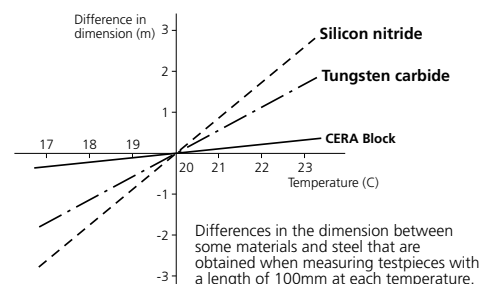
| Property                                               | Material | CERA Block (ZrO <sub>2</sub> ) | Steel (Fe) | Carbide (WC-Co) | Silicon nitride (Si <sub>3</sub> N <sub>4</sub> ) |
|--------------------------------------------------------|----------|--------------------------------|------------|-----------------|---------------------------------------------------|
| Hardness (HV)                                          |          | 1350                           | 800        | 1650            | 1500                                              |
| Coefficient of thermal expansion (10 <sup>-6</sup> /K) |          | 9.3±0.5                        | 10.8±0.5   | 5.5±1.0         | 2                                                 |
| Flexural strength by 3-point bending (MPa)             |          | 1270                           | 1960       | 1960            | 580                                               |
| Fracture toughness K1c (MPa•m <sup>1/2</sup> )         |          | 7                              | 120        | 12              | 6.5                                               |
| Young's Modulus x104 (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                                              |

## 9. Closest Expansion Coefficient to Steel

The thermal expansion coefficient of a CERA Block is similar to that of a steel gage block.

## 10. Highly Resistant Against Drops and Other Shocks

The CERA block material is one of the toughest ceramics materials. It is extremely difficult to crack under normal use.



## Features of Square Gage Blocks

### 1. Perfect wringing is possible using the center hole.

After wringing the square gage blocks, an optional tie rod can be inserted through the center hole to fix the blocks using a screw.

### 2. A height reference standard can easily be made.

A precision height reference standard can be made easily and inexpensively using accessories such as the plain jaw and block base.

### 3. A dedicated inspection jig can be easily made.

A dedicated inspection jig for periodic inspection of instruments can be made easily and inexpensively.

### 4. A wide measuring surface with cross section dimensions of [24.1 x 24.1mm / .95 x .95"] is available.

A square gage block can retain stable orientation both longitudinally and laterally. A wide range of application measurements can be made, including cutting tool positioning, angle measurement with a sine bar, taper measurement with a roller, and inspection of depth micrometers.



## Long and Ultra-Thin Gage Blocks

Mitutoyo offers extra thin gage blocks from 0.10 mm to 0.99 mm (increments of 0.01 mm), as well as long gage blocks up to 1,000 mm as standard products.

# Gage Block

## SERIES 516

### Accuracies of Mitutoyo Gage Blocks

All Mitutoyo gage blocks meet or exceed all known specifications. The flatness, parallelism and surface finish necessary to achieve the required accuracies are the same as or better than government requirements.

### ASME (American Society of Mechanical Engineers) Deviations and Tolerance on Length for Metric and inch Gage Blocks: ASME B89.1.9-2002 (USA)

| Nominal Length Range<br>In inches | Calibration Grade K                                                           |                                                         | Grade 00                                                                      |                                                         | Grade 0                                                                       |                                                         | Grade AS-1                                                                    |                                                         | Grade AS-2                                                                    |                                                         |
|-----------------------------------|-------------------------------------------------------------------------------|---------------------------------------------------------|-------------------------------------------------------------------------------|---------------------------------------------------------|-------------------------------------------------------------------------------|---------------------------------------------------------|-------------------------------------------------------------------------------|---------------------------------------------------------|-------------------------------------------------------------------------------|---------------------------------------------------------|
|                                   | Limit Deviations of Length at any Point From Nominal Length $\pm 1\sigma$ in. | Tolerance for the Variation In Length $\pm 1\sigma$ in. | Limit Deviations of Length at any Point From Nominal Length $\pm 1\sigma$ in. | Tolerance for the Variation In Length $\pm 1\sigma$ in. | Limit Deviations of Length at any Point From Nominal Length $\pm 1\sigma$ in. | Tolerance for the Variation In Length $\pm 1\sigma$ in. | Limit Deviations of Length at any Point From Nominal Length $\pm 1\sigma$ in. | Tolerance for the Variation In Length $\pm 1\sigma$ in. | Limit Deviations of Length at any Point From Nominal Length $\pm 1\sigma$ in. | Tolerance for the Variation In Length $\pm 1\sigma$ in. |
| $1/16 \leq .05$                   | 12                                                                            | 2                                                       | 4                                                                             | 2                                                       | 6                                                                             | 4                                                       | 12                                                                            | 6                                                       | 24                                                                            | 12                                                      |
| $.05 \leq 1/8$                    | 10                                                                            | 2                                                       | 3                                                                             | 2                                                       | 5                                                                             | 4                                                       | 8                                                                             | 6                                                       | 18                                                                            | 12                                                      |
| $.45 \leq 1$                      | 12                                                                            | 2                                                       | 3                                                                             | 2                                                       | 6                                                                             | 4                                                       | 12                                                                            | 6                                                       | 24                                                                            | 12                                                      |
| $1 \leq 2$                        | 16                                                                            | 2                                                       | 4                                                                             | 2                                                       | 8                                                                             | 4                                                       | 16                                                                            | 6                                                       | 32                                                                            | 12                                                      |
| $2 \leq 3$                        | 20                                                                            | 2                                                       | 5                                                                             | 3                                                       | 10                                                                            | 4                                                       | 20                                                                            | 6                                                       | 40                                                                            | 14                                                      |
| $3 \leq 4$                        | 24                                                                            | 3                                                       | 6                                                                             | 3                                                       | 12                                                                            | 5                                                       | 24                                                                            | 8                                                       | 48                                                                            | 14                                                      |
| $4 \leq 5$                        | 32                                                                            | 3                                                       | 8                                                                             | 3                                                       | 16                                                                            | 5                                                       | 32                                                                            | 8                                                       | 64                                                                            | 16                                                      |
| $5 \leq 6$                        | 32                                                                            | 3                                                       | 8                                                                             | 3                                                       | 16                                                                            | 5                                                       | 32                                                                            | 8                                                       | 64                                                                            | 16                                                      |
| $6 \leq 7$                        | 40                                                                            | 4                                                       | 10                                                                            | 4                                                       | 20                                                                            | 6                                                       | 40                                                                            | 10                                                      | 80                                                                            | 16                                                      |
| $7 \leq 8$                        | 40                                                                            | 4                                                       | 10                                                                            | 4                                                       | 20                                                                            | 6                                                       | 40                                                                            | 10                                                      | 80                                                                            | 16                                                      |
| $8 \leq 10$                       | 48                                                                            | 4                                                       | 12                                                                            | 4                                                       | 24                                                                            | 6                                                       | 48                                                                            | 10                                                      | 104                                                                           | 18                                                      |
| $10 \leq 12$                      | 56                                                                            | 4                                                       | 14                                                                            | 4                                                       | 28                                                                            | 7                                                       | 56                                                                            | 10                                                      | 112                                                                           | 20                                                      |
| $12 \leq 16$                      | 72                                                                            | 5                                                       | 18                                                                            | 5                                                       | 36                                                                            | 8                                                       | 72                                                                            | 12                                                      | 144                                                                           | 20                                                      |
| $16 \leq 20$                      | 88                                                                            | 6                                                       | 20                                                                            | 6                                                       | 44                                                                            | 10                                                      | 88                                                                            | 14                                                      | 176                                                                           | 24                                                      |
| $20 \leq 24$                      | 104                                                                           | 6                                                       | 25                                                                            | 6                                                       | 52                                                                            | 10                                                      | 104                                                                           | 16                                                      | 200                                                                           | 28                                                      |
| $24 \leq 28$                      | 120                                                                           | 7                                                       | 30                                                                            | 7                                                       | 60                                                                            | 12                                                      | 120                                                                           | 18                                                      | 240                                                                           | 28                                                      |
| $28 \leq 32$                      | 136                                                                           | 8                                                       | 34                                                                            | 8                                                       | 68                                                                            | 12                                                      | 136                                                                           | 20                                                      | 260                                                                           | 32                                                      |
| $32 \leq 36$                      | 152                                                                           | 8                                                       | 38                                                                            | 8                                                       | 76                                                                            | 14                                                      | 152                                                                           | 20                                                      | 300                                                                           | 36                                                      |
| $36 \leq 40$                      | 160                                                                           | 10                                                      | 40                                                                            | 10                                                      | 80                                                                            | 16                                                      | 168                                                                           | 24                                                      | 320                                                                           | 40                                                      |

| Nominal Length Range<br>In mm | Calibration Grade K                                                               |                                                             | Grade 00                                                                          |                                                             | Grade 0                                                                           |                                                             | Grade AS-1                                                                        |                                                             | Grade AS-2                                                                        |                                                             |
|-------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------|
|                               | Limit Deviations of Length at any Point From Nominal Length $\pm 1\sigma$ $\mu$ m | Tolerance for the Variation In Length $\pm 1\sigma$ $\mu$ m | Limit Deviations of Length at any Point From Nominal Length $\pm 1\sigma$ $\mu$ m | Tolerance for the Variation In Length $\pm 1\sigma$ $\mu$ m | Limit Deviations of Length at any Point From Nominal Length $\pm 1\sigma$ $\mu$ m | Tolerance for the Variation In Length $\pm 1\sigma$ $\mu$ m | Limit Deviations of Length at any Point From Nominal Length $\pm 1\sigma$ $\mu$ m | Tolerance for the Variation In Length $\pm 1\sigma$ $\mu$ m | Limit Deviations of Length at any Point From Nominal Length $\pm 1\sigma$ $\mu$ m | Tolerance for the Variation In Length $\pm 1\sigma$ $\mu$ m |
| $1 \leq 0.5$                  | 0.30                                                                              | 0.05                                                        | 0.10                                                                              | 0.05                                                        | 0.14                                                                              | 0.10                                                        | 0.30                                                                              | 0.16                                                        | 0.60                                                                              | 0.30                                                        |
| $0.5 \leq 10$                 | 0.20                                                                              | 0.05                                                        | 0.07                                                                              | 0.05                                                        | 0.12                                                                              | 0.10                                                        | 0.20                                                                              | 0.16                                                        | 0.45                                                                              | 0.30                                                        |
| $10 \leq 25$                  | 0.30                                                                              | 0.05                                                        | 0.07                                                                              | 0.05                                                        | 0.14                                                                              | 0.10                                                        | 0.30                                                                              | 0.16                                                        | 0.60                                                                              | 0.30                                                        |
| $25 \leq 50$                  | 0.40                                                                              | 0.06                                                        | 0.10                                                                              | 0.06                                                        | 0.20                                                                              | 0.10                                                        | 0.40                                                                              | 0.18                                                        | 0.80                                                                              | 0.30                                                        |
| $50 \leq 75$                  | 0.50                                                                              | 0.06                                                        | 0.12                                                                              | 0.06                                                        | 0.25                                                                              | 0.12                                                        | 0.50                                                                              | 0.18                                                        | 1.00                                                                              | 0.35                                                        |
| $75 \leq 100$                 | 0.60                                                                              | 0.07                                                        | 0.15                                                                              | 0.07                                                        | 0.30                                                                              | 0.12                                                        | 0.60                                                                              | 0.20                                                        | 1.20                                                                              | 0.35                                                        |
| $100 \leq 150$                | 0.80                                                                              | 0.08                                                        | 0.20                                                                              | 0.08                                                        | 0.40                                                                              | 0.14                                                        | 0.80                                                                              | 0.20                                                        | 1.60                                                                              | 0.40                                                        |
| $150 \leq 200$                | 1.00                                                                              | 0.09                                                        | 0.25                                                                              | 0.09                                                        | 0.50                                                                              | 0.16                                                        | 1.00                                                                              | 0.25                                                        | 2.00                                                                              | 0.40                                                        |
| $200 \leq 250$                | 1.20                                                                              | 0.10                                                        | 0.30                                                                              | 0.10                                                        | 0.60                                                                              | 0.16                                                        | 1.20                                                                              | 0.25                                                        | 2.40                                                                              | 0.45                                                        |
| $250 \leq 300$                | 1.4                                                                               | 0.10                                                        | 0.35                                                                              | 0.10                                                        | 0.70                                                                              | 0.18                                                        | 1.40                                                                              | 0.25                                                        | 2.80                                                                              | 0.50                                                        |
| $300 \leq 400$                | 1.80                                                                              | 0.12                                                        | 0.45                                                                              | 0.12                                                        | 0.90                                                                              | 0.20                                                        | 1.80                                                                              | 0.30                                                        | 3.60                                                                              | 0.50                                                        |
| $400 \leq 500$                | 2.20                                                                              | 0.14                                                        | 0.50                                                                              | 0.14                                                        | 1.10                                                                              | 0.25                                                        | 2.20                                                                              | 0.35                                                        | 4.40                                                                              | 0.60                                                        |
| $500 \leq 600$                | 2.60                                                                              | 0.16                                                        | 0.65                                                                              | 0.16                                                        | 1.30                                                                              | 0.25                                                        | 2.60                                                                              | 0.40                                                        | 5.00                                                                              | 0.70                                                        |
| $600 \leq 700$                | 3.00                                                                              | 0.18                                                        | 0.75                                                                              | 0.18                                                        | 1.50                                                                              | 0.30                                                        | 3.00                                                                              | 0.45                                                        | 6.00                                                                              | 0.70                                                        |
| $700 \leq 800$                | 3.40                                                                              | 0.20                                                        | 0.85                                                                              | 0.20                                                        | 1.70                                                                              | 0.30                                                        | 3.40                                                                              | 0.50                                                        | 6.50                                                                              | 0.80                                                        |
| $800 \leq 900$                | 3.80                                                                              | 0.20                                                        | 0.95                                                                              | 0.20                                                        | 1.90                                                                              | 0.35                                                        | 3.80                                                                              | 0.50                                                        | 7.50                                                                              | 0.90                                                        |
| $900 \leq 1000$               | 4.20                                                                              | 0.25                                                        | 1.00                                                                              | 0.25                                                        | 2.00                                                                              | 0.40                                                        | 4.20                                                                              | 0.60                                                        | 8.00                                                                              | 1.00                                                        |

### Mitutoyo Gage Blocks and Inspection Certificates

A Certificate of Inspection is furnished with all Mitutoyo gage blocks with a serial number on the case and an identification number on each block. The deviation of each block is registered. For this inspection, each gage block is measured relative to the upper level master using a gage block comparator. Grade K gage blocks are manufactured by absolute measurement using an interferometer. The gage block set and discrete gage block are supplied with a Certificate of Calibration. The Certificate of Calibration specifies the deviation from the nominal length. (Comparative measurement, however, is performed for all square gage blocks.)



A Certificate of Accuracy, traceable to the NIST, is furnished with each gage block set and individual block.

### Mitutoyo America Corporation Calibration Laboratory:

ISO 17025-2005 accredited calibration available  
Calibration capability up to 1000mm/40" length  
Low measurement uncertainty

### Contact Information:

965 Corporate Blvd.  
Aurora, Illinois 60502  
Phone: (888) 648-8869 option 7  
Fax: (630) 978-6477



# Metric Rectangular Gage Block Set

## SERIES 516 — 1mm Base Block Set



Steel 112-block set



Steel 103-block set



Steel 47-block set



CERA 112-block set



CERA 56-block set



CERA/Steel combination  
47-block set

Provided with Inspection Certificate



## SPECIFICATIONS

### 1mm Base Block Set

| Blocks per set | Order No.  |            | Grade | Blocks included in set |       |      |
|----------------|------------|------------|-------|------------------------|-------|------|
|                | Steel      | CERA       |       | Size                   | Step  | Qty. |
| 112            | 516-531-56 | 516-541-56 | K     | 1.0005                 |       | 1    |
|                | 516-937-26 | 516-337-26 | 00    | 1.001 - 1.009          | 0.001 | 9    |
|                | 516-938-26 | 516-338-26 | 0     | 1.01 - 1.49            | 0.01  | 49   |
|                | 516-939-26 | 516-339-26 | AS-1  | 0.5 - 24.5             | 0.5   | 49   |
|                | 516-940-26 | 516-340-26 | AS-2  | 25 - 100               | 25    | 4    |
|                |            |            |       |                        |       |      |
| 103            | 516-533-56 | 516-542-56 | K     | 1.005                  |       | 1    |
|                | 516-941-26 | 516-341-26 | 00    | 1.01 - 1.49            | 0.01  | 49   |
|                | 516-942-26 | 516-342-26 | 0     | 0.5 - 24.5             | 0.5   | 49   |
|                | 516-943-26 | 516-343-26 | AS-1  | 25 - 100               | 25    | 4    |
|                | 516-944-26 | 516-344-26 | AS-2  |                        |       |      |
|                |            |            |       |                        |       |      |
| 87             | 516-535-56 | 516-543-56 | K     | 1.001 - 1.009          | 0.001 | 9    |
|                | 516-945-26 | 516-345-26 | 00    | 1.01 - 1.49            | 0.01  | 49   |
|                | 516-946-26 | 516-346-26 | 0     | 0.5 - 9.5              | 0.5   | 19   |
|                | 516-947-26 | 516-347-26 | AS-1  | 10 - 100               | 10    | 10   |
|                | 516-948-26 | 516-348-26 | AS-2  |                        |       |      |
|                |            |            |       |                        |       |      |
| 56             | 516-536-56 | 516-544-56 | K     | 0.5                    |       | 1    |
|                | 516-953-26 | 516-353-26 | 00    | 1.001 - 1.009          | 0.001 | 9    |
|                | 516-954-26 | 516-354-26 | 0     | 1.01 - 1.09            | 0.01  | 9    |
|                | 516-955-26 | 516-355-26 | AS-1  | 1.1 - 1.9              | 0.1   | 9    |
|                | 516-956-26 | 516-356-26 | AS-2  | 1 - 24                 | 1     | 24   |
|                |            |            |       | 25 - 100               | 25    | 4    |
| 47             | 516-537-56 | 516-545-56 | K     | 1.005                  |       | 1    |
|                | 516-957-26 | 516-357-26 | 00    | 1.01 - 1.09            | 0.01  | 9    |
|                | 516-958-26 | 516-358-26 | 0     | 1.1 - 1.9              | 0.1   | 9    |
|                | 516-959-26 | 516-359-26 | AS-1  | 1 - 24                 | 1     | 24   |
|                | 516-960-26 | 516-360-26 | AS-2  | 25 - 100               | 25    | 4    |
|                |            |            |       |                        |       |      |

# Metric Rectangular Gage Block Set

SERIES 516 — Long Block Set, Wear Block Set



CERA 8-block set



Steel 8-block set

Provided with Inspection Certificate

## SPECIFICATIONS

### Long Block Set

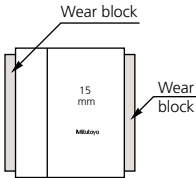
| Blocks per set | Order No.  |            | Grade | Blocks included in set |      |      |
|----------------|------------|------------|-------|------------------------|------|------|
|                | Steel      | CERA       |       | Size                   | Step | Qty. |
| 8              | —          | 516-547-56 | K     | 25-200                 | 25   | 8    |
|                | —          | 516-164-26 | 00    | —                      | —    | —    |
|                | 516-115-26 | 516-165-26 | 0     | —                      | —    | —    |
|                | 516-116-26 | 516-166-26 | AS-1  | —                      | —    | —    |
| 8              | 516-540-56 | 516-546-56 | K     | 125 - 175              | 25   | 3    |
|                | 516-701-26 | 516-731-26 | 00    | 200 - 250              | 50   | 2    |
|                | 516-702-26 | 516-732-26 | 0     | 300 - 500              | 100  | 3    |
|                | 516-703-26 | 516-733-26 | AS-1  | —                      | —    | —    |



CERA 2-block set



Carbide 2-block



## SPECIFICATIONS

### Wear Block Set

| Blocks per set | Order No.  |            | Grade | Blocks included in set |      |
|----------------|------------|------------|-------|------------------------|------|
|                | Carbide    | CERA       |       | Size                   | Qty. |
| 2              | 516-807-26 | 516-832-26 | 0     | 1                      | 2    |
|                | 516-806-26 | 516-833-26 | AS-1  | —                      | —    |
| 2              | 516-803-26 | 516-830-26 | 0     | 2                      | 2    |
|                | 516-802-26 | 516-831-26 | AS-1  | —                      | —    |

# Inch Rectangular Gage Block Set

## SERIES 516 — Inch Block Set, Thin Block Set, Long Block Set, Wear Block Set

### SPECIFICATIONS

#### Inch Block Set

| Blocks per set | Order No.  |            |            | Grade | Blocks included in set |       |      |
|----------------|------------|------------|------------|-------|------------------------|-------|------|
|                | Steel      | CERA       | Steel/CERA |       | Size                   | Step  | Qty. |
| <b>81</b>      | 516-549-56 | 516-557-56 | —          | K     | .1001 – .1009          | .0001 | 9    |
|                | 516-901-26 | 516-301-26 | —          | 00    | .101 – .149            | .001  | 49   |
|                | 516-902-26 | 516-302-26 | —          | 0     | .05 – .95              | .05   | 19   |
|                | 516-903-26 | 516-303-26 | —          | AS-1  | 1 - 4                  | 1     | 4    |
|                | 516-904-26 | 516-304-26 | —          | AS-2  |                        |       |      |
| <b>35</b>      | 516-550-56 | 516-558-56 | —          | K     | .10005                 |       | 1    |
|                | 516-913-26 | 516-313-26 | —          | 00    | .1001 – .1009          | .0001 | 9    |
|                | 516-914-26 | 516-314-26 | —          | 0     | .101 – .109            | .001  | 9    |
|                | 516-915-26 | 516-315-26 | —          | AS-1  | .11 – .19              | .01   | 9    |
|                | 516-916-26 | 516-316-26 | —          | AS-2  | .1 - .3                | .1    | 3    |
|                |            |            |            |       | .5, 1, 2, 4            |       | 4    |

81-block set: All are CERA blocks, except 2", 3", and 4" are steel blocks

Provided with Inspection Certificate



### SPECIFICATIONS

#### Thin Block Set

| Blocks per set | Order No.  |      | Grade | Blocks included in set |       |      |
|----------------|------------|------|-------|------------------------|-------|------|
|                | Steel      | CERA |       | Size                   | Step  | Qty. |
| <b>28</b>      | 516-551-56 | —    | K     | .02005                 |       | 1    |
|                | 516-917-26 | —    | 00    | .0201 – .0209          | .0001 | 9    |
|                | 516-918-26 | —    | 0     | .021 – .029            | .001  | 9    |
|                | 516-919-26 | —    | AS-1  | .01 – .09              | .01   | 9    |
|                | 516-920-26 | —    | AS-2  |                        |       |      |
| <b>10</b>      | 516-926-26 | —    | 0     | .005 - .050            | .005  | 10   |
|                | 516-927-26 | —    | AS-1  |                        |       |      |

### SPECIFICATIONS

#### Long Block Set

| Blocks per set | Order No.  |            | Grade | Blocks included in set |      |      |
|----------------|------------|------------|-------|------------------------|------|------|
|                | Steel      | CERA       |       | Size                   | Step | Qty. |
| <b>8</b>       | 516-126-26 | 516-176-26 | 0     | 1-8                    | 1    | 8    |
|                | 516-127-26 | 516-177-26 | AS-1  |                        |      |      |
| <b>8</b>       | —          | 516-564-56 | K     | 5 - 7                  | 1    | 3    |
|                | —          | 516-741-26 | 00    | 8, 10, 12              | 2    | 3    |
|                | 516-712-26 | 516-742-26 | 0     | 16, 20                 | 4    | 2    |
|                | 516-713-26 | 516-743-26 | AS-1  |                        |      |      |

### SPECIFICATIONS

#### Wear Block Set

| Blocks per set | Order No.  |            | Grade | Blocks included in set |      |
|----------------|------------|------------|-------|------------------------|------|
|                | Carbide    | CERA       |       | Size                   | Qty. |
| <b>2</b>       | 516-809-26 | 516-836-26 | 0     | .05                    | 2    |
|                | 516-808-26 | 516-837-26 | AS-1  |                        |      |
| <b>2</b>       | 516-805-26 | 516-834-26 | 0     | .1                     | 2    |
|                | 516-804-26 | 516-835-26 | AS-1  |                        |      |

# Micrometer Inspection Gage Block Sets

## SERIES 516

- Gage blocks for inspecting a variety of micrometers.
- Can be measured in both vertical and horizontal posture.
- Parallelism is measured by attaching the optical parallel (optional accessory) to the gage block set.

## SPECIFICATIONS

### Metric Micro Checker (holder only)

| Order No.                       | 516-607                                             |
|---------------------------------|-----------------------------------------------------|
| Applicable gage block set       | 516-106-26, 516-107-26, 516-156-26, 516-157-26      |
| Applicable gage block size (mm) | 2.5, 5.1, 7.7, 10.3, 12.9, 15, 17.6, 20.2, 22.8, 25 |

### Inch/Metric Micro Checker (holder only)

| Order No.                         | 516-608                                                                |
|-----------------------------------|------------------------------------------------------------------------|
| Applicable gage block set         | 516-921-26, 516-922-26, 516-923-26, 516-321-26, 516-322-26, 516-323-26 |
| Applicable gage block size (inch) | .105, .210, .315, .420, .5, .605, .815, .920                           |

### Metric Block Set

| Blocks per set | Order No.                | Steel                    | CERA      | Grade | Blocks included in set                                                                 |
|----------------|--------------------------|--------------------------|-----------|-------|----------------------------------------------------------------------------------------|
| 10             | 516-103-26<br>516-101-26 | 516-152-26<br>516-153-26 | 0<br>AS-1 |       | 1.00, 1.25, 1.50, 2, 3, 5, 10, 15, 20, 25mm                                            |
| 10             | 516-106-26<br>516-107-26 | 516-156-26<br>516-157-26 | 0<br>AS-1 |       | 2.5, 5.1, 7.7, 10.3, 12.9, 15, 17.6, 20.2, 22.8, 25mm<br>• Optical parallel (t = 12mm) |

### Inch Block Set

| Blocks per set | Order No.                                            | Steel                                                | CERA                 | Grade | Blocks included in set                                                                   |
|----------------|------------------------------------------------------|------------------------------------------------------|----------------------|-------|------------------------------------------------------------------------------------------|
| 10             | 516-552-56<br>516-921-26<br>516-922-26<br>516-923-26 | 516-559-56<br>516-321-26<br>516-322-26<br>516-323-26 | K<br>00<br>0<br>AS-1 |       | .105, .210, .315, .420, .500, .605, .710, .815, .920, 1"<br>• Optical parallel (t = .5") |
| 10             | 516-529-26*                                          | 516-319-26*                                          | 0                    |       | .087, .189, .307, .409, .472, .598, .669, .772, .890, 1"<br>• Optical parallel (t = .5") |
| 9              | 516-554-56<br>516-929-26<br>516-930-26<br>516-931-26 | 516-561-56<br>516-333-26<br>516-334-26<br>516-335-26 | K<br>00<br>0<br>AS-1 |       | .0625, .100, .125, .200, .250, .300, .500, 1, 2"<br>• Optical parallel (t = .5")         |
| 9              | —<br>—<br>516-934-26<br>516-935-26                   | 516-563-56<br>516-329-26<br>516-330-26<br>516-331-26 | K<br>00<br>0<br>AS-1 |       | .0625, .100, .125, .200, .250, .300, .500, 1, 2"                                         |

\* For QuantuMike

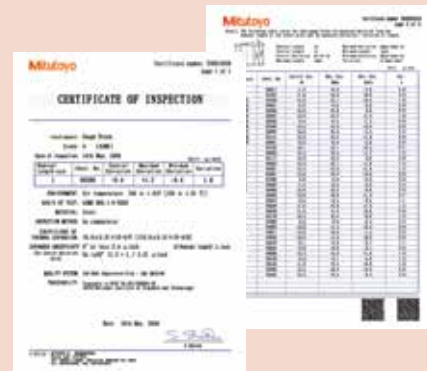
## Micro Checker



(Gage blocks are optional.)



## Provided with Inspection Certificate



# Bore Gage Calibration Kit

## SERIES 516

## SPECIFICATIONS

| Blocks per set | Order No.  | Grade | Blocks included in set                                                                                |
|----------------|------------|-------|-------------------------------------------------------------------------------------------------------|
|                | Carbide    |       | Size                                                                                                  |
| 9              | 516-120-26 | 0     | .04", .08", .16", .2", .4", .8", 1", 2", 3"<br>619018 (plain jaw 2 pc. set) and 619004 (160mm holder) |



# Individual Metric Rectangular Gage Block

## FEATURES

- If using only one length repeatedly, it is good practice to purchase discrete gage blocks.
- Each gage block is supplied with a Certificate of Inspection.
- Each Grade K gage block of ASME standard is specially supplied with a Certificate of Calibration, which certifies that the gage block was manufactured via interferometry.



## Suffix Number for Selecting Standard and Certificate Provided

| ASME  |             |
|-------|-------------|
| Grade | Steel, CERA |
| K     | -516**      |
| 00    | -521*       |
| 0     | -531*       |
| AS-1  | -541*       |
| AS-2  | -551*       |

\* provided with Inspection Certificate

\*\* provided with Calibration Certificate and Inspection Certificate

Example: 611821-521

0.1mm gage block in grade 00.

We make custom length gage blocks:  
0.1-1000mm



Inspection Certificate

## SPECIFICATIONS

### Metric Block

| Length (mm) | Order No. |        | Length (mm) | Order No. |      | Length (mm) | Order No. |        |
|-------------|-----------|--------|-------------|-----------|------|-------------|-----------|--------|
|             | Steel     | CERA   |             | Steel     | CERA |             | Steel     | CERA   |
| 0.1         | 611821    | —      | 0.53        | 611894    | —    | 0.96        | 611937    | —      |
| 0.11        | 611860    | —      | 0.54        | 611895    | —    | 0.97        | 611938    | —      |
| 0.12        | 611861    | —      | 0.55        | 611896    | —    | 0.98        | 611939    | —      |
| 0.13        | 611862    | —      | 0.56        | 611897    | —    | 0.99        | 611940    | —      |
| 0.14        | 611863    | —      | 0.57        | 611898    | —    | 0.991       | 611551    | 613551 |
| 0.15        | 611822    | —      | 0.58        | 611899    | —    | 0.992       | 611552    | 613552 |
| 0.16        | 611864    | —      | 0.59        | 611900    | —    | 0.993       | 611553    | 613553 |
| 0.17        | 611865    | —      | 0.6         | 611901    | —    | 0.994       | 611554    | 613554 |
| 0.18        | 611866    | —      | 0.61        | 611902    | —    | 0.995       | 611555    | 613555 |
| 0.19        | 611867    | —      | 0.62        | 611903    | —    | 0.996       | 611556    | 613556 |
| 0.2         | 611823    | —      | 0.63        | 611904    | —    | 0.997       | 611557    | 613557 |
| 0.21        | 611868    | —      | 0.64        | 611905    | —    | 0.998       | 611558    | 613558 |
| 0.22        | 611869    | —      | 0.65        | 611906    | —    | 0.999       | 611559    | 613559 |
| 0.23        | 611870    | —      | 0.66        | 611907    | —    | 1           | 611611    | 613611 |
| 0.24        | 611871    | —      | 0.67        | 611908    | —    | 1.0005      | 611520    | 613520 |
| 0.25        | 611824    | —      | 0.68        | 611909    | —    | 1.001       | 611521    | 613521 |
| 0.26        | 611872    | —      | 0.69        | 611910    | —    | 1.002       | 611522    | 613522 |
| 0.27        | 611873    | —      | 0.7         | 611911    | —    | 1.003       | 611523    | 613523 |
| 0.28        | 611874    | —      | 0.71        | 611912    | —    | 1.004       | 611524    | 613524 |
| 0.29        | 611875    | —      | 0.72        | 611913    | —    | 1.005       | 611525    | 613525 |
| 0.3         | 611825    | —      | 0.73        | 611914    | —    | 1.006       | 611526    | 613526 |
| 0.31        | 611876    | —      | 0.74        | 611915    | —    | 1.007       | 611527    | 613527 |
| 0.32        | 611877    | —      | 0.75        | 611916    | —    | 1.008       | 611528    | 613528 |
| 0.33        | 611878    | —      | 0.76        | 611917    | —    | 1.009       | 611529    | 613529 |
| 0.34        | 611879    | —      | 0.77        | 611918    | —    | 1.01        | 611561    | 613561 |
| 0.35        | 611826    | —      | 0.78        | 611919    | —    | 1.02        | 611562    | 613562 |
| 0.36        | 611880    | —      | 0.79        | 611920    | —    | 1.03        | 611563    | 613563 |
| 0.37        | 611881    | —      | 0.8         | 611921    | —    | 1.04        | 611564    | 613564 |
| 0.38        | 611882    | —      | 0.81        | 611922    | —    | 1.05        | 611565    | 613565 |
| 0.39        | 611883    | —      | 0.82        | 611923    | —    | 1.06        | 611566    | 613566 |
| 0.4         | 611827    | —      | 0.83        | 611924    | —    | 1.07        | 611567    | 613567 |
| 0.41        | 611884    | —      | 0.84        | 611925    | —    | 1.08        | 611568    | 613568 |
| 0.42        | 611885    | —      | 0.85        | 611926    | —    | 1.09        | 611569    | 613569 |
| 0.43        | 611886    | —      | 0.86        | 611927    | —    | 1.1         | 611570    | 613570 |
| 0.44        | 611887    | —      | 0.87        | 611928    | —    | 1.11        | 611571    | 613571 |
| 0.45        | 611828    | —      | 0.88        | 611929    | —    | 1.12        | 611572    | 613572 |
| 0.46        | 611888    | —      | 0.89        | 611930    | —    | 1.13        | 611573    | 613573 |
| 0.47        | 611889    | —      | 0.9         | 611931    | —    | 1.14        | 611574    | 613574 |
| 0.48        | 611890    | —      | 0.91        | 611932    | —    | 1.15        | 611575    | 613575 |
| 0.49        | 611891    | —      | 0.92        | 611933    | —    | 1.16        | 611576    | 613576 |
| 0.5         | 611506    | 613506 | 0.93        | 611934    | —    | 1.17        | 611577    | 613577 |
| 0.51        | 611892    | —      | 0.94        | 611935    | —    | 1.18        | 611578    | 613578 |
| 0.52        | 611893    | —      | 0.95        | 611936    | —    | 1.19        | 611579    | 613579 |

| Length (mm) | Order No. |        |
|-------------|-----------|--------|
|             | Steel     | CERA   |
| 1.2         | 611580    | 613580 |
| 1.21        | 611581    | 613581 |
| 1.22        | 611582    | 613582 |
| 1.23        | 611583    | 613583 |
| 1.24        | 611584    | 613584 |
| 1.25        | 611585    | 613585 |
| 1.26        | 611586    | 613586 |
| 1.27        | 611587    | 613587 |
| 1.28        | 611588    | 613588 |
| 1.29        | 611589    | 613589 |
| 1.3         | 611590    | 613590 |
| 1.31        | 611591    | 613591 |
| 1.32        | 611592    | 613592 |
| 1.33        | 611593    | 613593 |
| 1.34        | 611594    | 613594 |
| 1.35        | 611595    | 613595 |
| 1.36        | 611596    | 613596 |
| 1.37        | 611597    | 613597 |
| 1.38        | 611598    | 613598 |
| 1.39        | 611599    | 613599 |
| 1.4         | 611600    | 613600 |
| 1.41        | 611601    | 613601 |
| 1.42        | 611602    | 613602 |
| 1.43        | 611603    | 613603 |
| 1.44        | 611604    | 613604 |
| 1.45        | 611605    | 613605 |
| 1.46        | 611606    | 613606 |
| 1.47        | 611607    | 613607 |
| 1.48        | 611608    | 613608 |
| 1.49        | 611609    | 613609 |
| 1.5         | 611641    | 613641 |
| 1.6         | 611516    | 613516 |
| 1.7         | 611517    | 613517 |
| 1.8         | 611518    | 613518 |
| 1.9         | 611519    | 613519 |
| 2           | 611612    | 613612 |
| 2.0005      | 611690    | —      |
| 2.001       | 611691    | —      |
| 2.002       | 611692    | —      |
| 2.003       | 611693    | —      |
| 2.004       | 611694    | —      |
| 2.005       | 611695    | —      |
| 2.006       | 611696    | —      |
| 2.007       | 611697    | —      |
| 2.008       | 611698    | —      |
| 2.009       | 611699    | —      |
| 2.01        | 611701    | —      |
| 2.02        | 611702    | —      |
| 2.03        | 611703    | —      |
| 2.04        | 611704    | —      |
| 2.05        | 611705    | —      |
| 2.06        | 611706    | —      |
| 2.07        | 611707    | —      |
| 2.08        | 611708    | —      |
| 2.09        | 611709    | —      |
| 2.1         | 611710    | —      |
| 2.11        | 611711    | —      |
| 2.12        | 611712    | —      |
| 2.13        | 611713    | —      |
| 2.14        | 611714    | —      |
| 2.15        | 611715    | —      |
| 2.16        | 611716    | —      |

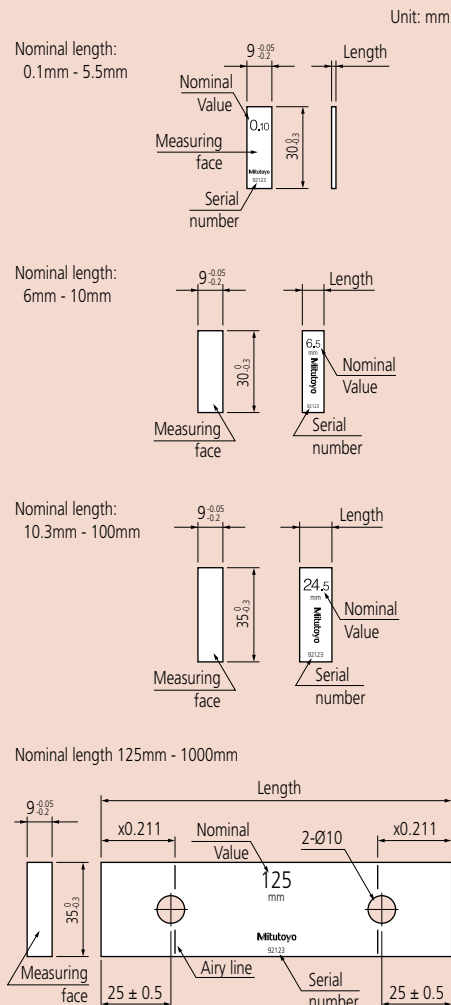
| Length (mm) | Order No. |        |
|-------------|-----------|--------|
|             | Steel     | CERA   |
| 2.17        | 611717    | —      |
| 2.18        | 611718    | —      |
| 2.19        | 611719    | —      |
| 2.2         | 611720    | —      |
| 2.21        | 611721    | —      |
| 2.22        | 611722    | —      |
| 2.23        | 611723    | —      |
| 2.24        | 611724    | —      |
| 2.25        | 611725    | —      |
| 2.26        | 611726    | —      |
| 2.27        | 611727    | —      |
| 2.28        | 611728    | —      |
| 2.29        | 611729    | —      |
| 2.3         | 611730    | —      |
| 2.31        | 611731    | —      |
| 2.32        | 611732    | —      |
| 2.33        | 611733    | —      |
| 2.34        | 611734    | —      |
| 2.35        | 611735    | —      |
| 2.36        | 611736    | —      |
| 2.37        | 611737    | —      |
| 2.38        | 611738    | —      |
| 2.39        | 611739    | —      |
| 2.4         | 611740    | —      |
| 2.41        | 611741    | —      |
| 2.42        | 611742    | —      |
| 2.43        | 611743    | —      |
| 2.44        | 611744    | —      |
| 2.45        | 611745    | —      |
| 2.46        | 611746    | —      |
| 2.47        | 611747    | —      |
| 2.48        | 611748    | —      |
| 2.49        | 611749    | —      |
| 2.5         | 611642    | 613642 |
| 2.6         | 611750    | —      |
| 2.7         | 611751    | —      |
| 2.8         | 611752    | —      |
| 2.9         | 611753    | —      |
| 3           | 611613    | 613613 |
| 3.5         | 611643    | 613643 |
| 4           | 611614    | 613614 |
| 4.5         | 611644    | 613644 |
| 5           | 611615    | 613615 |
| 5.1         | 611850    | 613850 |
| 5.5         | 611645    | 613645 |
| 6           | 611616    | 613616 |
| 6.5         | 611646    | 613646 |
| 7           | 611617    | 613617 |
| 7.5         | 611647    | 613647 |
| 7.7         | 611851    | 613851 |
| 8           | 611618    | 613618 |
| 8.5         | 611648    | 613648 |
| 9           | 611619    | 613619 |
| 9.5         | 611649    | 613649 |
| 10          | 611671    | 613671 |
| 10.3        | 611852    | 613852 |
| 10.5        | 611650    | 613650 |
| 11          | 611621    | 613621 |
| 11.5        | 611651    | 613651 |
| 12          | 611622    | 613622 |
| 12.5        | 611652    | 613652 |
| 12.9        | 611853    | 613853 |

| Length (mm) | Order No. |        |
|-------------|-----------|--------|
|             | Steel     | CERA   |
| 13          | 611623    | 613623 |
| 13.5        | 611653    | 613653 |
| 14          | 611624    | 613624 |
| 14.5        | 611654    | 613654 |
| 15          | 611625    | 613625 |
| 15.5        | 611655    | 613655 |
| 16          | 611626    | 613626 |
| 16.5        | 611656    | 613656 |
| 17          | 611627    | 613627 |
| 17.5        | 611657    | 613657 |
| 17.6        | 611854    | 613854 |
| 18          | 611628    | 613628 |
| 18.5        | 611658    | 613658 |
| 19          | 611629    | 613629 |
| 19.5        | 611659    | 613659 |
| 20          | 611672    | 613672 |
| 20.2        | 611855    | 613855 |
| 20.5        | 611660    | 613660 |
| 21          | 611631    | 613631 |
| 21.5        | 611661    | 613661 |
| 22          | 611632    | 613632 |
| 22.5        | 611662    | 613662 |
| 22.8        | 611856    | 613856 |
| 23          | 611633    | 613633 |
| 23.5        | 611663    | 613663 |
| 24          | 611634    | 613634 |
| 24.5        | 611664    | 613664 |
| 25          | 611635    | 613635 |
| 25.25       | 611754    | 613754 |
| 30          | 611673    | 613673 |
| 35          | 611755    | 613755 |
| 40          | 611674    | 613674 |
| 41.3        | 611857    | 613857 |
| 45          | 611756    | 613756 |
| 50          | 611675    | 613675 |
| 60          | 611676    | 613676 |
| 70          | 611677    | 613677 |
| 75          | 611801    | 613801 |
| 80          | 611678    | 613678 |
| 90          | 611679    | 613679 |
| 100         | 611681    | 613681 |
| 125         | 611802    | 613802 |
| 131.4       | 611858    | 613858 |
| 150         | 611803    | 613803 |
| 175         | 611804    | 613804 |
| 200         | 611682    | 613682 |
| 250         | 611805    | 613805 |
| 300         | 611683    | 613683 |
| 400         | 611684    | 613684 |
| 500         | 611685    | 613685 |
| 600         | 611840    | —      |
| 700         | 611841    | —      |
| 750         | 611842    | —      |
| 800         | 611843    | —      |
| 900         | 611844    | —      |
| 1000        | 611845    | —      |

#### Metric Wear Block

| Length (mm) | Order No.        |
|-------------|------------------|
|             | Tungsten carbide |
| 1           | 612611           |
| 2           | 612612           |

## DIMENSIONS



## Suffix Number for Selecting Standard and Certificate Provided

| ASME  |             |
|-------|-------------|
| Grade | Steel, CERA |
| K     | -516**      |
| 00    | -521*       |
| 0     | -531*       |
| AS-1  | -541*       |
| AS-2  | -551*       |

\* provided with Inspection Certificate  
 \*\* provided with Calibration Certificate and Inspection Certificate

Example: 611310-521

.1" gage block in grade 00.

We make custom length gage blocks:

.004 - 20"

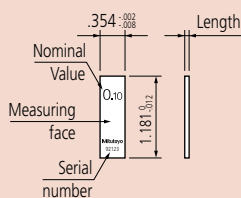


Inspection Certificate

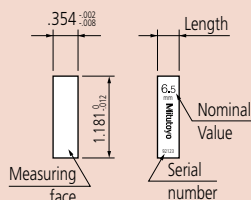
## DIMENSIONS

Unit: Inch

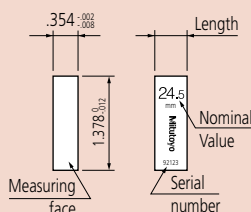
Nominal length:  
.004 - .25"



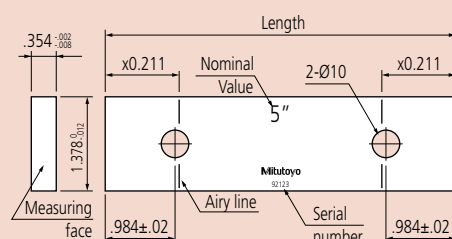
Nominal length:  
.3 - 4"



Nominal length:  
.45 - 4"



Nominal length 5 - 20"



# Individual Inch Rectangular Gage Block

## SPECIFICATIONS

### Inch Block

| Length (inch)  | Order No. |        |
|----------------|-----------|--------|
|                | Steel     | CERA   |
| .004           | 611304    | —      |
| .005           | 611305    | —      |
| .006           | 611306    | —      |
| .007           | 611307    | —      |
| .008           | 611308    | —      |
| .009           | 611309    | —      |
| .01            | 611310    | —      |
| .011           | 611311    | —      |
| .012           | 611312    | —      |
| .013           | 611313    | —      |
| .014           | 611314    | —      |
| .015           | 611315    | —      |
| .016           | 611316    | —      |
| .017           | 611317    | —      |
| .018           | 611318    | —      |
| .019           | 611319    | —      |
| .02            | 611320    | —      |
| .02005         | 611240    | —      |
| .0201          | 611231    | —      |
| .0202          | 611232    | —      |
| .0203          | 611233    | —      |
| .0204          | 611234    | —      |
| .0205          | 611235    | —      |
| .0206          | 611236    | —      |
| .0207          | 611237    | —      |
| .0208          | 611238    | —      |
| .0209          | 611239    | —      |
| .021           | 611321    | —      |
| .022           | 611322    | —      |
| .023           | 611323    | —      |
| .024           | 611324    | —      |
| .025           | 611325    | —      |
| .026           | 611326    | —      |
| .027           | 611327    | —      |
| .028           | 611328    | —      |
| .029           | 611329    | —      |
| .03            | 611330    | —      |
| .031           | 611331    | —      |
| .03125 (1/32)  | 611101    | 613103 |
| .032           | 611332    | —      |
| .033           | 611333    | —      |
| .034           | 611334    | —      |
| .035           | 611335    | —      |
| .036           | 611336    | —      |
| .037           | 611337    | —      |
| .038           | 611338    | —      |
| .039           | 611339    | —      |
| .04            | 611340    | —      |
| .041           | 611341    | —      |
| .042           | 611342    | —      |
| .043           | 611343    | —      |
| .044           | 611344    | —      |
| .045           | 611345    | —      |
| .046           | 611346    | —      |
| .046875 (3/64) | 611102    | 613104 |
| .047           | 611347    | —      |
| .048           | 611348    | —      |
| .049           | 611349    | —      |
| .05            | 611105    | 613105 |

| Length (inch)  | Order No. |        |
|----------------|-----------|--------|
|                | Steel     | CERA   |
| .06            | 611106    | —      |
| .0625          | 611303    | 613303 |
| .07            | 611107    | —      |
| .078125 (5/64) | 611103    | 613100 |
| .08            | 611108    | —      |
| .09            | 611109    | —      |
| .09375 (3/32)  | 611104    | 613101 |
| .1             | 611191    | 613191 |
| .100025        | 611111    | 613110 |
| .10005         | 611135    | 613135 |
| .100075        | 611112    | 613111 |
| .1001          | 611121    | 613121 |
| .1002          | 611122    | 613122 |
| .1003          | 611123    | 613123 |
| .1004          | 611124    | 613124 |
| .1005          | 611125    | 613125 |
| .1006          | 611126    | 613126 |
| .1007          | 611127    | 613127 |
| .1008          | 611128    | 613128 |
| .1009          | 611129    | 613129 |
| .101           | 611141    | 613141 |
| .102           | 611142    | 613142 |
| .103           | 611143    | 613143 |
| .104           | 611144    | 613144 |
| .105           | 611145    | 613145 |
| .106           | 611146    | 613146 |
| .107           | 611147    | 613147 |
| .108           | 611148    | 613148 |
| .109           | 611149    | 613149 |
| .109375 (7/64) | 611110    | 613102 |
| .11            | 611150    | 613150 |
| .111           | 611151    | 613151 |
| .112           | 611152    | 613152 |
| .113           | 611153    | 613153 |
| .114           | 611154    | 613154 |
| .115           | 611155    | 613155 |
| .116           | 611156    | 613156 |
| .117           | 611157    | 613157 |
| .118           | 611158    | 613158 |
| .119           | 611159    | 613159 |
| .12            | 611160    | 613160 |
| .121           | 611161    | 613161 |
| .122           | 611162    | 613162 |
| .123           | 611163    | 613163 |
| .124           | 611164    | 613164 |
| .125           | 611165    | 613165 |
| .126           | 611166    | 613166 |
| .127           | 611167    | 613167 |
| .128           | 611168    | 613168 |
| .129           | 611169    | 613169 |
| .13            | 611170    | 613170 |
| .131           | 611171    | 613171 |
| .132           | 611172    | 613172 |
| .133           | 611173    | 613173 |
| .134           | 611174    | 613174 |
| .135           | 611175    | 613175 |
| .136           | 611176    | 613176 |
| .137           | 611177    | 613177 |
| .138           | 611178    | 613178 |

| Length (inch) | Order No. |        |
|---------------|-----------|--------|
|               | Steel     | CERA   |
| .139          | 611179    | 613179 |
| .14           | 611180    | 613180 |
| .141          | 611181    | 613181 |
| .142          | 611182    | 613182 |
| .143          | 611183    | 613183 |
| .144          | 611184    | 613184 |
| .145          | 611185    | 613185 |
| .146          | 611186    | 613186 |
| .147          | 611187    | 613187 |
| .148          | 611188    | 613188 |
| .149          | 611189    | 613189 |
| .15           | 611115    | 613115 |
| .16           | 611116    | 613116 |
| .17           | 611117    | 613117 |
| .18           | 611118    | 613118 |
| .19           | 611119    | 613119 |
| .2            | 611192    | 613192 |
| .21           | 611221    | 613221 |
| .25           | 611212    | 613212 |
| .3            | 611193    | 613193 |
| .315          | 611209    | 613209 |
| .35           | 611213    | 613213 |
| .375 (3/8)    | 611113    | 613112 |
| .4            | 611194    | 613194 |
| .420          | 611210    | 613210 |
| .45           | 611214    | 613214 |
| .5            | 611195    | 613195 |
| .55           | 611215    | 613215 |
| .6            | 611196    | 613196 |
| .605          | 611211    | 613211 |
| .65           | 611216    | 613216 |
| .7            | 611197    | 613197 |
| .710          | 611220    | 613220 |
| .75           | 611217    | 613217 |
| .8            | 611198    | 613198 |
| .815          | 611226    | 613226 |
| .85           | 611218    | 613218 |
| .9            | 611199    | 613199 |
| .920          | 611227    | 613227 |
| .95           | 611219    | 613219 |
| 1             | 611201    | 613201 |
| 2             | 611202    | 613202 |
| 3             | 611203    | 613203 |
| 4             | 611204    | 613204 |
| 5             | 611205    | 613205 |
| 6             | 611206    | 613206 |
| 7             | 611207    | 613207 |
| 8             | 611208    | 613208 |
| 10            | 611222    | 613222 |
| 12            | 611223    | 613223 |
| 16            | 611224    | 613224 |
| 20            | 611225    | 613225 |

### Inch Wear Block

| Length (inch) | Order No.        |
|---------------|------------------|
|               | Tungsten carbide |
| .05           | 612105           |
| .1            | 612191           |

# Rectangular Gage Block with CTE

## Gage Blocks with Thermal Expansion Coefficient Data

### FEATURES

- Mitutoyo offers top-level gage blocks (steel and ceramic) which are superior to K class blocks.
- Comes with a highly accurate thermal expansion coefficient measured with a high-accuracy double-faced interferometer (DFI).
- The high-accuracy gage block interferometer (GBI) guarantees high dimensional accuracy.
- Mitutoyo offers rectangular gage blocks, having nominal values from 100 to 500mm Grade: K class in ASME  
Uncertainty of thermal expansion coefficient:  $0.035 \times 10^{-6}/K$  ( $k = 2$ )  
Uncertainty of dimension measurement: 30nm ( $k = 2$ ), for 100mm block



Double-faced interferometer (DFI)

### SPECIFICATIONS

| Metric Block with CTE |                 |                |
|-----------------------|-----------------|----------------|
| Length (mm)           | Order No. Steel | Order No. CERA |
| 100                   | 611681-51B      | 613681-51B     |
| 125                   | 611802-51B      | 613802-51B     |
| 150                   | 611803-51B      | 613803-51B     |
| 175                   | 611804-51B      | 613804-51B     |
| 200                   | 611682-51B      | 613682-51B     |
| 250                   | 611805-51B      | 613805-51B     |
| 300                   | 611683-51B      | 613683-51B     |
| 400                   | 611684-51B      | 613684-51B     |
| 500                   | 611685-51B      | 613685-51B     |

| Inch Block with CTE |                 |                |
|---------------------|-----------------|----------------|
| Length (inch)       | Order No. Steel | Order No. CERA |
| 4                   | 611204-51B      | 613204-51B     |
| 5                   | 611205-51B      | 613205-51B     |
| 6                   | 611206-51B      | 613206-51B     |
| 7                   | 611207-51B      | 613207-51B     |
| 8                   | 611208-51B      | 613208-51B     |
| 10                  | 611222-51B      | 613222-51B     |
| 12                  | 611223-51B      | 613223-51B     |
| 16                  | 611224-51B      | 613224-51B     |
| 20                  | 611225-51B      | 613225-51B     |

### Suffix Number for Selecting Standard and Certificate Provided

| ASME    |             |
|---------|-------------|
|         | Steel, CERA |
| Grade K | -51B        |

-51B: provided with JCSS Calibration Certificate and Inspection Certificate



Inspection Certificate

### ZERO CERA Blocks

- Thermal expansion in the temperature range  $20 \pm 1^\circ C$  less than  $1/500$  that of steel ( $0 \pm 0.02 \times 10^{-6}/K (20^\circ C)$ )
- Almost no secular change both in dimension and coefficient of thermal expansion
- Complementary ultra-low thermal expansion and high specific rigidity (Young's Modulus/specific gravity)



### SPECIFICATIONS

| Metric Blocks |            |            |             |
|---------------|------------|------------|-------------|
| Order No.     |            |            | Length (mm) |
| JIS/ISO/DIN   | BS         | ASME       |             |
| 617673-016    | 617673-116 | 617673-516 | 30          |
| 617675-016    | 617675-116 | 617675-516 | 50          |
| 617681-016    | 617681-116 | 617681-516 | 100         |
| 617682-016    | 617682-116 | 617682-516 | 200         |
| 617683-016    | 617683-116 | 617683-516 | 300         |
| 617684-016    | 617684-116 | 617684-516 | 400         |
| 617685-016    | 617685-116 | 617685-516 | 500         |
| 617840-016    | 617840-116 | 617840-516 | 600         |
| 617841-016    | 617841-116 | 617841-516 | 700         |
| 617843-016    | 617843-116 | 617843-516 | 800         |
| 617844-016    | 617844-116 | 617844-516 | 900         |
| 617845-016    | 617845-116 | 617845-516 | 1000        |
| 516-771-60    | 516-771-61 | 516-771-66 | Above set   |



# Rectangular Gage Block Accessories

## SERIES 516 – For Gage Blocks over 100mm

Specially designed for long gage blocks over 100mm, which have two holes on the body for coupling.



516-605

### SPECIFICATIONS

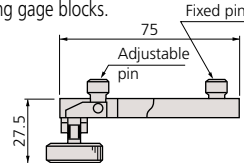
#### Accessories for gage blocks over 100mm

| Order No. 516-605 | Included in set                |
|-------------------|--------------------------------|
| 1 pc.             | Holder A (619031)              |
| 1 pc.             | Holder B (619032)              |
| 1 pc.             | Holder C (619033)              |
| 1 pc.             | Holder D (619034)              |
| 1 pc.             | Holder E (619035)              |
| 3 pcs.            | Adaptor (619036)               |
| 1 pc.             | Holder base 35mm (619009)      |
| 2 pcs.            | Half round jaw 12mm (619013)   |
| 1 pc.             | Plain jaw (2 pc. set) (619018) |
| 1 pc.             | Scriber point (619019)         |

Note: These accessories can be used for inch rectangular gage blocks.

#### Holder A: 619031

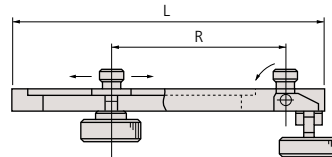
Used for coupling two long gage blocks.



#### Holder B and C:

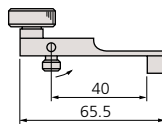
Used for coupling two long gage blocks together with other gage blocks up to 35mm (Holder B) or 140mm (Holder C). Also used for attaching jaws with two adaptors.

|          | Order No. | R (max.) | L     |
|----------|-----------|----------|-------|
| Holder B | 619032    | 90mm     | 126mm |
| Holder C | 619033    | 200mm    | 236mm |



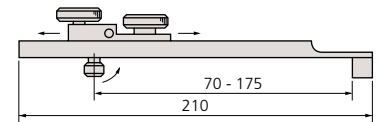
#### Holder D: 619034

Used for attaching to the holder base.



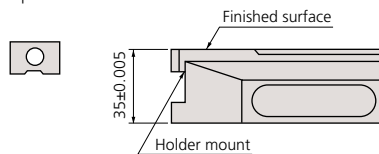
#### Holder E: 619035

Used for attaching to the holder base together with other gage blocks up to 125mm. Used for attaching jaws with one adaptor.

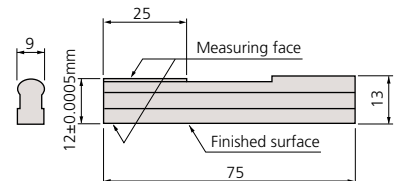


#### Holder base: 619009

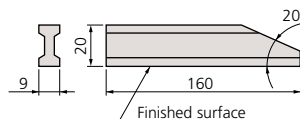
Adaptor: 619036



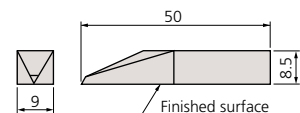
#### Half-round jaw: 619013



#### Plain jaw: 619018 (2 pc. set)



#### Scriber point: 619019





# Rectangular Gage Block Accessories

## SERIES 516

To expand the variety of rectangular gage block (steel and CERA) applications, Mitutoyo offers the gage block accessories set. By assembling the items in the set, you can easily and quickly build up a precision measuring instrument.



516-601



516-602

## SPECIFICATIONS

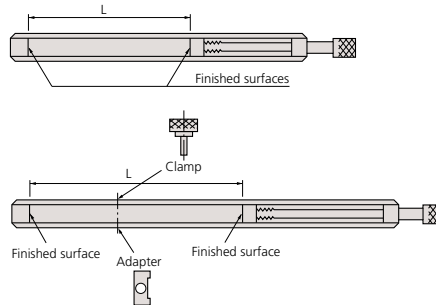
### Assortment of Accessories

| Order No. | Accessories                        | Metric Set Order No. |         | Accessory (s)<br>included in a set |
|-----------|------------------------------------|----------------------|---------|------------------------------------|
|           |                                    | 516-601              | 516-602 |                                    |
| 619002    | Holder 60mm                        |                      | •       | 1 pc.                              |
| 619003    | Holder 100mm                       | •                    | •       | 1 pc.                              |
| 619004    | Holder 160mm                       | •                    | •       | 1 pc.                              |
| 619005    | Holder 250mm                       | •                    | •       | 1 pc.                              |
| 619009    | Holder Base 35mm                   | •                    | •       | 1 pc.                              |
| 619010    | Half round jaw 2mm                 | •                    | •       | 2 pcs.                             |
| 619011    | Half round jaw 5mm                 | •                    | •       | 2 pcs.                             |
| 619012    | Half round jaw 8mm                 | •                    | •       | 2 pcs.                             |
| 619013    | Half round jaw 12mm                | •                    |         | 2 pcs.                             |
| 619014    | Half round jaw 20mm                | •                    |         | 2 pcs.                             |
| 619018    | Plain jaw (2 pc. set) 160mm        | •                    |         | 1 pc.                              |
| 619019    | Scriber point                      | •                    | •       | 1 pc.                              |
| 619020    | Center point                       | •                    | •       | 1 pc.                              |
| 619021    | Tram point                         | •                    |         | 2 pcs.                             |
| 619022    | Triangular straightness edge 100mm | •                    | •       | 1 pc.                              |
| 619023    | Triangular straight edge 160mm     | •                    |         | 1 pc.                              |
|           | <b>Total Qty. in set</b>           | 22 pcs.              | 14 pcs. |                                    |



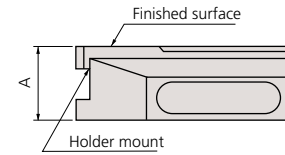
# Rectangular Gage Block Accessories

Holder:  
Used as a clamp if using plain jaws, scriber point, etc.



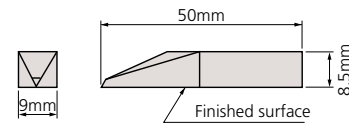
| Order No. | L           |
|-----------|-------------|
| 619002    | 15 - 61mm   |
| 619003    | 4 - 106mm   |
| 619004    | 62 - 165mm  |
| 619005    | 153 - 256mm |

Holder base 35mm: **619009**  
Measures a height on the surface plate and scribes a workpiece if used with the holder.

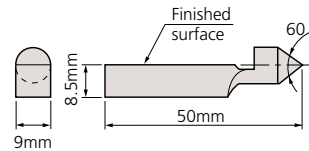


| Order No. | A          |
|-----------|------------|
| 619009    | 35±0.005mm |

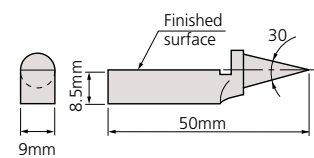
Scriber point: **619019**  
Scribes a workpiece if used with the holder and holder base.



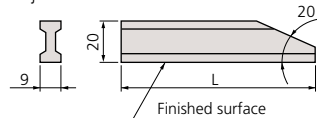
Center point: **619020**  
Scribes a workpiece if used with the holder and holder base.



Tram point: **619021**  
Inspects the scale of the height gage, etc., if used with the holder and holder base.



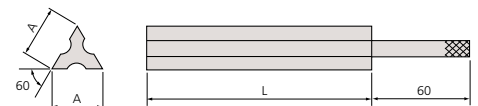
Plain jaw: **619018**  
Measures an outside or inside diameter if used with a pair of jaws and the holder.



| Order No. | L     |
|-----------|-------|
| 619018*   | 160mm |

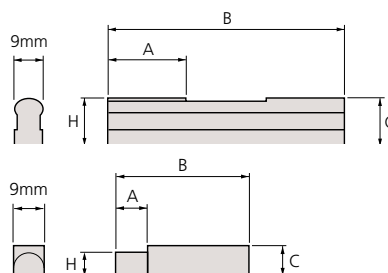
\* 2 pc. set

Triangular straight edge: Measures parallelism.



| Order No. | L     |
|-----------|-------|
| 619022    | 100mm |
| 619023    | 160mm |

Half-round jaw:  
Measures an outside or inside diameter if used with a pair of jaws and the holder.



| Order No. | H           | A    | B     | C      |
|-----------|-------------|------|-------|--------|
| 619010    | 2±0.0005mm  | 6mm  | 40mm  | 8mm    |
| 619011    | 5±0.0005mm  | 6mm  | 50mm  | 8mm    |
| 619012    | 8±0.0005mm  | 12mm | 60mm  | 8mm    |
| 619013    | 12±0.0005mm | 25mm | 75mm  | 13mm   |
| 619014    | 20±0.0005mm | 25mm | 125mm | 20.5mm |

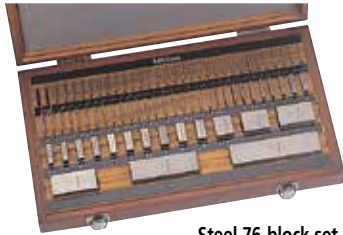
# Metric Square Gage Block Set

## SERIES 516 — Metric Block Set, Long Block Set, Wear Block Set

A square gage block can retain stable orientation both longitudinally and laterally. A wide range of application measurements can be made, including cutting tool positioning, angle measurement with a sine bar, taper measurement with a roller, and inspection of depth micrometers.



Steel 32-block set



Steel 76-block set



Steel 103-block set



Steel 112-block set

## SPECIFICATIONS

### Metric Block Set

| Blocks per set | Order No.  |      | Grade | Blocks included in set |       |      |
|----------------|------------|------|-------|------------------------|-------|------|
|                | Steel      | CERA |       | Size                   | Step  | Qty. |
| 112            | 516-437-26 | —    | 00    | 1.0005                 |       | 1    |
|                | 516-438-26 | —    | 0     | 1.001 - 1.009          | 0.001 | 9    |
|                | 516-439-26 | —    | AS-1  | 1.01 - 1.49            | 0.01  | 49   |
|                | 516-440-26 | —    | AS-2  | 0.5 - 24.5             | 0.5   | 49   |
|                | —          | —    | —     | 25 - 100               | 25    | 4    |
| 103            | 516-441-26 | —    | 00    | 1.005                  |       | 1    |
|                | 516-442-26 | —    | 0     | 1.01 - 1.49            | 0.01  | 49   |
|                | 516-443-26 | —    | AS-1  | 0.5 - 24.5             | 0.5   | 49   |
|                | 516-444-26 | —    | AS-2  | 25 - 100               | 25    | 4    |
|                | —          | —    | —     | —                      | —     | —    |
| 76             | 516-449-26 | —    | 00    | 1.005                  |       | 1    |
|                | 516-450-26 | —    | 0     | 1.01 - 1.49            | 0.01  | 49   |
|                | 516-451-26 | —    | AS-1  | 0.5 - 9.5              | 0.5   | 19   |
|                | 516-452-26 | —    | AS-2  | 10 - 40                | 10    | 4    |
|                | —          | —    | —     | 50 - 100               | 25    | 3    |
| 47             | 516-457-26 | —    | 00    | 1.005                  |       | 1    |
|                | 516-458-26 | —    | 0     | 1.01 - 1.09            | 0.01  | 9    |
|                | 516-459-26 | —    | AS-1  | 1.1 - 1.9              | 0.1   | 9    |
|                | 516-460-26 | —    | AS-2  | 1 - 24                 | 1     | 24   |
|                | —          | —    | —     | 25 - 100               | 25    | 4    |
| 32             | 516-465-26 | —    | 00    | 1.005                  |       | 1    |
|                | 516-466-26 | —    | 0     | 1.01 - 1.09            | 0.01  | 9    |
|                | 516-467-26 | —    | AS-1  | 1.1 - 1.9              | 0.1   | 9    |
|                | 516-468-26 | —    | AS-2  | 1 - 9                  | 1     | 9    |
|                | —          | —    | —     | 10 - 30                | 10    | 3    |
| —              | —          | —    | —     | 60                     |       | 1    |

### Metric Long Block Set

| Blocks per set | Order No.  |      | Grade | Blocks included in set |      |      |
|----------------|------------|------|-------|------------------------|------|------|
|                | Steel      | CERA |       | Size                   | Step | Qty. |
| 8              | 516-751-26 | —    | 00    | 125, 150, 175          | 25   | 3    |
|                | 516-752-26 | —    | 0     | 200, 250               | 50   | 2    |
|                | 516-753-26 | —    | AS-1  | 300, 400, 500          | 100  | 3    |
|                | 516-754-26 | —    | AS-2  |                        |      |      |

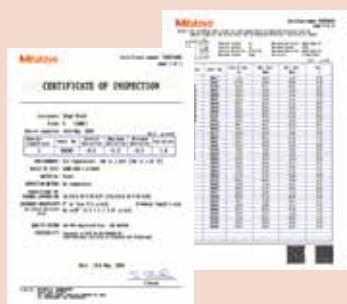
### Metric Wear Block Set

| Blocks per set | Order No.  |      | Grade | Blocks included in set |      |      |
|----------------|------------|------|-------|------------------------|------|------|
|                | Carbide    | CERA |       | Size                   | Step | Qty. |
| 2              | 516-820-26 | —    | 0     | 1                      | —    | 2    |
|                | 516-821-26 | —    | AS-1  |                        |      |      |

Provided with Inspection Certificate



Provided with Inspection Certificate



Steel 47-block set



Steel 8-block set



Carbide 2-block set

# Inch Square Gage Block Set

**SERIES 516 — Inch Block Set, Long Block Set, Wear Block Set**

## SPECIFICATIONS

### Inch Block Set

| Blocks per set | Order No.  |            | Grade | Blocks included in set |       |      |
|----------------|------------|------------|-------|------------------------|-------|------|
|                | Steel      | CERA       |       | Size                   | Step  | Qty. |
| <b>81</b>      | 516-401-26 | 516-201-26 | 00    | .1001 - .1009          | .0001 | 9    |
|                | 516-402-26 | 516-202-26 | 0     | .101 - .149            | .001  | 49   |
|                | 516-403-26 | 516-203-26 | AS-1  | .05 - .95              | .05   | 19   |
|                | 516-404-26 | 516-204-26 | AS-2  | 1 - 4                  | 1     | 4    |
| <b>36</b>      | 516-421-26 | 516-221-26 | 00    | .05"                   |       | 1    |
|                | 516-422-26 | 516-222-26 | 0     | .1001 - .1009          | .0001 | 10   |
|                | 516-423-26 | 516-223-26 | AS-1  | .101 - .109            | .001  | 9    |
|                | 516-424-26 | 516-224-26 | AS-2  | .11 - .19              | .01   | 9    |
|                |            |            |       | .1 - .5                | .1    | 5    |
|                |            |            |       | 1, 2, 4                | 1     | 3    |
| <b>28</b>      | 516-417-26 | —          | 00    | .02005"                |       | 1    |
|                | 516-418-26 | —          | 0     | .0201 - .0209"         | .0001 | 9    |
|                | 516-419-26 | —          | AS-1  | .021 - .029"           | .001  | 9    |
|                | 516-420-26 | —          | AS-2  | .021 - .029"           | .01   | 9    |
|                |            |            |       | .10 - .090"            |       |      |

### Inch Long Block Set

| Blocks per set | Order No.  |      | Grade | Blocks included in set |      |      |
|----------------|------------|------|-------|------------------------|------|------|
|                | Steel      | CERA |       | Size                   | Step | Qty. |
| <b>8</b>       | 516-762-26 | —    | 0     | 5 - 7                  | 1    | 3    |
|                | 516-763-26 | —    | AS-1  | 8, 10, 12              | 2    | 3    |
|                |            |      |       | 16, 20                 | 4    | 2    |

### Inch Wear Block Set

| Blocks per set | Order No.  |            | Grade | Blocks included in set |      |      |
|----------------|------------|------------|-------|------------------------|------|------|
|                | Carbide    | CERA       |       | Size                   | Step | Qty. |
| <b>2</b>       | 516-824-26 | 516-846-26 | 0     | .05                    | —    | 2    |
|                | 516-825-26 | 516-847-26 | AS-1  |                        |      |      |
| <b>2</b>       | 516-826-26 | 516-844-26 | 0     | .1                     | —    | 2    |
|                | 516-827-26 | 516-845-26 | AS-1  |                        |      |      |

## 92 pcs. Gage Blocks with accessories set in wooden box

| Blocks in set | Order No.  |   | Grade | Blocks included in set |       |     | Individual No. | Description            | Qty. |
|---------------|------------|---|-------|------------------------|-------|-----|----------------|------------------------|------|
|               | Steel      |   |       | Size                   | Step  | Qty |                |                        |      |
| <b>92</b>     | 516-405-26 | 0 |       | .0625                  |       | 1   | 619052         | Plain Jaw .500"        | 2    |
|               |            |   |       | .078125                |       | 1   | 619051         | Half round jaw .250"   | 2    |
|               |            |   |       | .09375                 |       | 1   | 619055         | Holder base .500"      | 1    |
|               |            |   |       | .100025                |       | 1   | 619057         | Flat head screw 1 1/4" | 2    |
|               |            |   |       | .10005                 |       | 1   | 619058         | Flat head screw 5/8"   | 2    |
|               |            |   |       | .100075                |       | 1   | 619056         | Stud                   | 2    |
|               |            |   |       | .109375                |       | 1   | 619066         | Knurled head screw     | 2    |
|               |            |   |       | .1001 - .1009          | .0001 | 9   | 619059         | Slotted head nut       | 2    |
|               |            |   |       | .101 - .149            | .001  | 49  | 619062         | Tie rod 3"             | 1    |
|               |            |   |       | .05 - .95              | .05   | 4   | 619063         | Tie rod 2 1/4"         | 1    |
|               |            |   |       | .16 - .19              | .01   | 19  | 619064         | Tie rod 1 1/2"         | 1    |
|               |            |   |       | 1 - 4                  | 1     | 4   | 619065         | 3/4"                   | 1    |

# Individual Metric Square Gage Block



## SPECIFICATIONS

### Metric Block

| Length (mm) | Order No. |      |
|-------------|-----------|------|
|             | Steel     | CERA |
| 0.5         | 614506    | —    |
| 1           | 614611    | —    |
| 1.0005      | 614520    | —    |
| 1.001       | 614521    | —    |
| 1.002       | 614522    | —    |
| 1.003       | 614523    | —    |
| 1.004       | 614524    | —    |
| 1.005       | 614525    | —    |
| 1.006       | 614526    | —    |
| 1.007       | 614527    | —    |
| 1.008       | 614528    | —    |
| 1.009       | 614529    | —    |
| 1.01        | 614561    | —    |
| 1.02        | 614562    | —    |
| 1.03        | 614563    | —    |
| 1.04        | 614564    | —    |
| 1.05        | 614565    | —    |
| 1.06        | 614566    | —    |
| 1.07        | 614567    | —    |
| 1.08        | 614568    | —    |
| 1.09        | 614569    | —    |
| 1.1         | 614570    | —    |
| 1.11        | 614571    | —    |
| 1.12        | 614572    | —    |
| 1.13        | 614573    | —    |
| 1.14        | 614574    | —    |
| 1.15        | 614575    | —    |
| 1.16        | 614576    | —    |
| 1.17        | 614577    | —    |
| 1.18        | 614578    | —    |
| 1.19        | 614579    | —    |
| 1.2         | 614580    | —    |
| 1.21        | 614581    | —    |
| 1.22        | 614582    | —    |
| 1.23        | 614583    | —    |
| 1.24        | 614584    | —    |
| 1.25        | 614585    | —    |
| 1.26        | 614586    | —    |
| 1.27        | 614587    | —    |
| 1.28        | 614588    | —    |
| 1.29        | 614589    | —    |
| 1.3         | 614590    | —    |
| 1.31        | 614591    | —    |
| 1.32        | 614592    | —    |

| Length (mm) | Order No. |      |
|-------------|-----------|------|
|             | Steel     | CERA |
| 1.33        | 614593    | —    |
| 1.34        | 614594    | —    |
| 1.35        | 614595    | —    |
| 1.36        | 614596    | —    |
| 1.37        | 614597    | —    |
| 1.38        | 614598    | —    |
| 1.39        | 614599    | —    |
| 1.4         | 614600    | —    |
| 1.41        | 614601    | —    |
| 1.42        | 614602    | —    |
| 1.43        | 614603    | —    |
| 1.44        | 614604    | —    |
| 1.45        | 614605    | —    |
| 1.46        | 614606    | —    |
| 1.47        | 614607    | —    |
| 1.48        | 614608    | —    |
| 1.49        | 614609    | —    |
| 1.5         | 614641    | —    |
| 1.6         | 614516    | —    |
| 1.7         | 614517    | —    |
| 1.8         | 614518    | —    |
| 1.9         | 614519    | —    |
| 2           | 614612    | —    |
| 2.5         | 614642    | —    |
| 3           | 614613    | —    |
| 3.5         | 614643    | —    |
| 4           | 614614    | —    |
| 4.5         | 614644    | —    |
| 5           | 614615    | —    |
| 5.5         | 614645    | —    |
| 6           | 614616    | —    |
| 6.5         | 614646    | —    |
| 7           | 614617    | —    |
| 7.5         | 614647    | —    |
| 8           | 614618    | —    |
| 8.5         | 614648    | —    |
| 9           | 614619    | —    |
| 9.5         | 614649    | —    |
| 10          | 614671    | —    |
| 10.5        | 614650    | —    |
| 11          | 614621    | —    |
| 11.5        | 614651    | —    |
| 12          | 614622    | —    |
| 12.5        | 614652    | —    |

| Length (mm) | Order No. |      |
|-------------|-----------|------|
|             | Steel     | CERA |
| 13          | 614623    | —    |
| 13.5        | 614653    | —    |
| 14          | 614624    | —    |
| 14.5        | 614654    | —    |
| 15          | 614625    | —    |
| 15.5        | 614655    | —    |
| 16          | 614626    | —    |
| 16.5        | 614656    | —    |
| 17          | 614627    | —    |
| 17.5        | 614657    | —    |
| 18          | 614628    | —    |
| 18.5        | 614658    | —    |
| 19          | 614629    | —    |
| 19.5        | 614659    | —    |
| 20          | 614672    | —    |
| 20.5        | 614660    | —    |
| 21          | 614631    | —    |
| 21.5        | 614661    | —    |
| 22          | 614632    | —    |
| 22.5        | 614662    | —    |
| 23          | 614633    | —    |
| 23.5        | 614663    | —    |
| 24          | 614634    | —    |
| 24.5        | 614664    | —    |
| 25          | 614635    | —    |
| 30          | 614673    | —    |
| 40          | 614674    | —    |
| 50          | 614675    | —    |
| 60          | 614676    | —    |
| 75          | 614801    | —    |
| 100         | 614681    | —    |
| 125         | 614802    | —    |
| 150         | 614803    | —    |
| 175         | 614804    | —    |
| 200         | 614682    | —    |
| 250         | 614805    | —    |
| 300         | 614683    | —    |
| 400         | 614684    | —    |
| 500         | 614685    | —    |

### Metric Wear Block

| Length (mm) | Order No. |
|-------------|-----------|
| 1           | 615611    |
| 2           | 615612    |

Suffix Number for Selecting Standard and Certificate Provided

| ASME  |       |
|-------|-------|
| Grade | Steel |
| K     | —     |
| 00    | -521* |
| 0     | -531* |
| AS-1  | -541* |
| AS-2  | -551* |

\* provided with Inspection Certificate

Example: 614611-521  
1mm gage block in grade 00.

We make custom length gage blocks:  
0.5 - 500mm.



Inspection Certificate



# Individual Inch Square Gage Block

## Suffix Number for Selecting Standard and Certificate Provided

| ASME  |             |
|-------|-------------|
| Grade | Steel, CERA |
| K     | —           |
| 00    | -521*       |
| 0     | -531*       |
| AS-1  | -541*       |
| AS-2  | -551*       |

\* provided with Inspection Certificate

Example: 614310-521

.01" gage block in grade 00.

We make custom length gage blocks:  
.01 - 20"

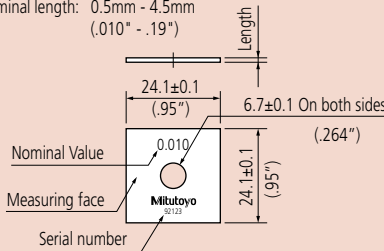


Inspection Certificate

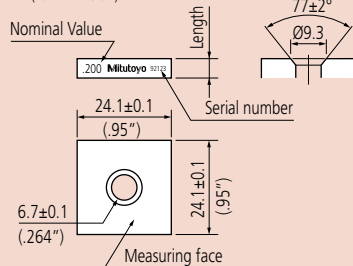
## DIMENSIONS

Nominal length: 0.5mm - 4.5mm  
(.010" - .19")

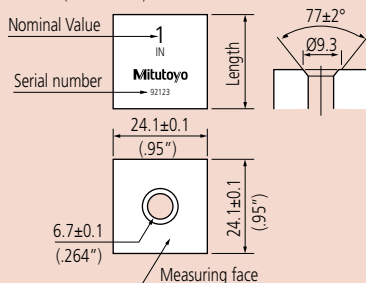
Unit: mm



Nominal length: 5mm - 14.5mm  
(.02" - .450")



Nominal length: 15mm - 500mm  
(.500" - 20")



## SPECIFICATIONS

### Inch Block

| Length (inch)  | Order No. |        |
|----------------|-----------|--------|
|                | Steel     | CERA   |
| .01            | 614310    | —      |
| .02005         | 614240    | —      |
| .0201          | 614231    | —      |
| .0202          | 614232    | —      |
| .0203          | 614233    | —      |
| .0204          | 614234    | —      |
| .0205          | 614235    | —      |
| .0206          | 614236    | —      |
| .0207          | 614237    | —      |
| .0208          | 614238    | —      |
| .0209          | 614239    | —      |
| .02            | 614320    | —      |
| .021           | 614321    | —      |
| .022           | 614322    | —      |
| .023           | 614323    | —      |
| .024           | 614324    | —      |
| .025           | 614325    | —      |
| .026           | 614326    | —      |
| .027           | 614327    | —      |
| .028           | 614328    | —      |
| .029           | 614329    | —      |
| .03            | 614330    | —      |
| .03125 (1/32)  | 614301    | —      |
| .04            | 614340    | —      |
| .046875 (3/64) | 614302    | —      |
| .05            | 614105    | 616105 |
| .06            | 614106    | —      |
| .0625          | 614303    | 616303 |
| .07            | 614107    | —      |
| .078125 (5/64) | 614304    | —      |
| .08            | 614108    | —      |
| .09            | 614109    | —      |
| .09375 (3/32)  | 614305    | —      |
| .1             | 614191    | 616191 |
| .100025        | 614307    | —      |
| .10005         | 614135    | 616135 |
| .100075        | 614308    | —      |
| .1001          | 614121    | 616121 |
| .1002          | 614122    | 616122 |
| .1003          | 614123    | 616123 |
| .1004          | 614124    | 616124 |
| .1005          | 614125    | 616125 |
| .1006          | 614126    | 616126 |
| .1007          | 614127    | 616127 |
| .1008          | 614128    | 616128 |
| .1009          | 614129    | 616129 |
| .101           | 614141    | 616141 |
| .102           | 614142    | 616142 |
| .103           | 614143    | 616143 |
| .104           | 614144    | 616144 |
| .105           | 614145    | 616145 |

| Length (inch)  | Order No. |        |
|----------------|-----------|--------|
|                | Steel     | CERA   |
| .106           | 614146    | 616146 |
| .107           | 614147    | 616147 |
| .108           | 614148    | 616148 |
| .109           | 614149    | 616149 |
| .109375 (7/64) | 614306    | —      |
| .11            | 614150    | 616150 |
| .111           | 614151    | 616151 |
| .112           | 614152    | 616152 |
| .113           | 614153    | 616153 |
| .114           | 614154    | 616154 |
| .115           | 614155    | 616155 |
| .116           | 614156    | 616156 |
| .117           | 614157    | 616157 |
| .118           | 614158    | 616158 |
| .119           | 614159    | 616159 |
| .12            | 614160    | 616160 |
| .121           | 614161    | 616161 |
| .122           | 614162    | 616162 |
| .123           | 614163    | 616163 |
| .124           | 614164    | 616164 |
| .125           | 614165    | 616165 |
| .126           | 614166    | 616166 |
| .127           | 614167    | 616167 |
| .128           | 614168    | 616168 |
| .129           | 614169    | 616169 |
| .13            | 614170    | 616170 |
| .131           | 614171    | 616171 |
| .132           | 614172    | 616172 |
| .133           | 614173    | 616173 |
| .134           | 614174    | 616174 |
| .135           | 614175    | 616175 |
| .136           | 614176    | 616176 |
| .137           | 614177    | 616177 |
| .138           | 614178    | 616178 |
| .139           | 614179    | 616179 |
| .14            | 614180    | 616180 |
| .141           | 614181    | 616181 |
| .142           | 614182    | 616182 |
| .143           | 614183    | 616183 |
| .144           | 614184    | 616184 |
| .145           | 614185    | 616185 |
| .146           | 614186    | 616186 |
| .147           | 614187    | 616187 |
| .148           | 614188    | 616188 |
| .149           | 614189    | 616189 |
| .15            | 614115    | 616115 |
| .16            | 614116    | 616116 |
| .17            | 614117    | 616117 |
| .18            | 614118    | 616118 |
| .19            | 614119    | 616119 |
| .2             | 614192    | 616192 |

| Length (inch) | Order No. |        |
|---------------|-----------|--------|
|               | Steel     | CERA   |
| .25           | 614212    | 616212 |
| .3            | 614193    | 616193 |
| .35           | 614213    | 616213 |
| .375 (3/8)    | 614309    | —      |
| .4            | 614194    | 616194 |
| .45           | 614214    | 616214 |
| .5            | 614195    | 616195 |
| .55           | 614215    | 616215 |
| .6            | 614196    | 616196 |
| .65           | 614216    | 616216 |
| .7            | 614197    | 616197 |
| .75           | 614217    | 616217 |
| .8            | 614198    | 616198 |
| .85           | 614218    | 616218 |
| .9            | 614199    | 616199 |
| .95           | 614219    | 616219 |
| 1             | 614201    | 616201 |
| 2             | 614202    | 616202 |
| 3             | 614203    | 616203 |
| 4             | 614204    | 616204 |
| 5             | 614205    | —      |
| 6             | 614206    | —      |
| 7             | 614207    | —      |
| 8             | 614208    | —      |
| 10            | 614222    | —      |
| 12            | 614223    | —      |
| 16            | 614224    | —      |
| 20            | 614225    | —      |

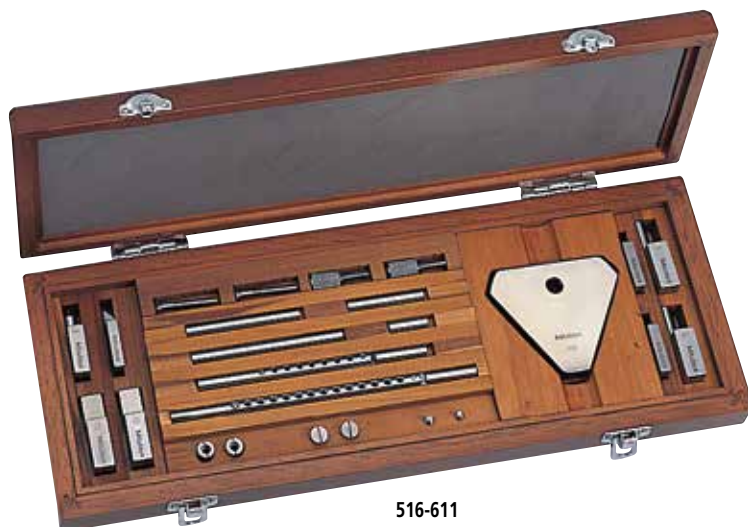
### Inch Wear Block

| Length (inch) | Order No.<br>Tungsten carbide |
|---------------|-------------------------------|
| .05           | 615105                        |
| .1            | 615191                        |

# Square Gage Block Accessories

## SERIES 516

To expand the variety of square gage block applications, Mitutoyo offers the gage block accessories set. By assembling the items in the set, you can easily and quickly build up a precision measuring instrument.



516-611

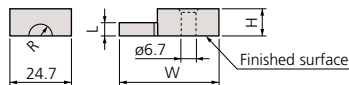
## SPECIFICATIONS

| Metric            |                                    |
|-------------------|------------------------------------|
| Order No. 516-611 | Included in set                    |
| 2 pcs.            | Half round jaw 2mm (619070)        |
| 2 pcs.            | Half round jaw 5mm (619071)        |
| 2 pcs.            | Plain jaw (619072)                 |
| 1 pc.             | Center point (619073)              |
| 1 pc.             | Scriber point (619054)             |
| 1 pc.             | Block base (619074)                |
| 2 pcs.            | Flat head screw 1-1/4" (619057)    |
| 2 pcs.            | Flat head screw 5/8" (619058)      |
| 2 pcs.            | Slotted head nut (619059)          |
| 2 pcs.            | Adjustable tie rod 6" (619060)     |
| 2 pcs.            | Adjustable tie rod 4-1/2" (619061) |
| 1 pc.             | Tie rod 3" (619062)                |
| 1 pc.             | Tie rod 2-1/4" (619063)            |
| 1 pc.             | Tie rod 1-1/2" (619064)            |
| 1 pc.             | Tie rod 3/4" (619065)              |
| 2 pcs.            | Stud (619056)                      |
| 2 pcs.            | Knurled head screw (619066)        |

| Inch              |                                    |
|-------------------|------------------------------------|
| Order No. 516-612 | Included in set                    |
| 2 pcs.            | Half round jaw .125" (619050)      |
| 2 pcs.            | Half round jaw .25" (619051)       |
| 2 pcs.            | Plain jaw (619052)                 |
| 1 pc.             | Center point (619053)              |
| 1 pc.             | Scriber point (619054)             |
| 1 pc.             | Block base (619055)                |
| 2 pcs.            | Flat head screw 1-1/4" (619057)    |
| 2 pcs.            | Flat head screw 5/8" (619058)      |
| 2 pcs.            | Slotted head nut (619059)          |
| 2 pcs.            | Adjustable tie rod 6" (619060)     |
| 2 pcs.            | Adjustable tie rod 4-1/2" (619061) |
| 1 pc.             | Tie rod 3" (619062)                |
| 1 pc.             | Tie rod 2-1/4" (619063)            |
| 1 pc.             | Tie rod 1-1/2" (619064)            |
| 1 pc.             | Tie rod 3/4" (619065)              |
| 2 pcs.            | Stud (619056)                      |
| 2 pcs.            | Knurled head screw (619066)        |

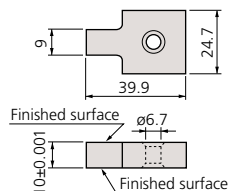


Half round jaw:  
Used to measure an inside or outside diameter.

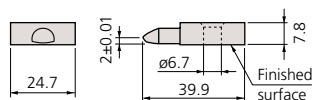


| Order No.     | R      | L     | W      | H      |
|---------------|--------|-------|--------|--------|
| <b>619070</b> | 1.95mm | 2mm   | 33.6mm | 5.3mm  |
| <b>619071</b> | 4.95mm | 5mm   | 39.9mm | 10.3mm |
| <b>619050</b> | .123"  | .125" | 33.6mm | 5.3mm  |
| <b>619051</b> | .248"  | .25"  | 39.9mm | 10.3mm |

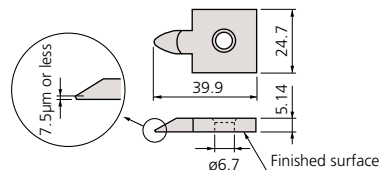
Plain jaw: **619072** (10mm), **619052** (.5")  
Used to measure an inside or outside diameter.



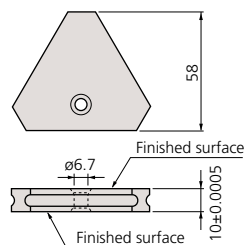
Center point: **619073** (2mm), **619053** (.1")  
Used to scribe a workpiece.



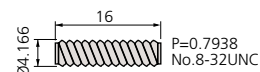
Scriber point: **619054**  
Used to scribe a workpiece.



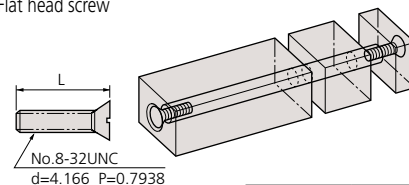
Base: **619074** (10mm), **619055** (.5")  
Used as clamps by inserting them into the center hole of a square gage block.



Stud: **619056**

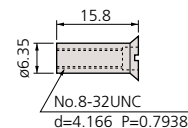


Flat head screw

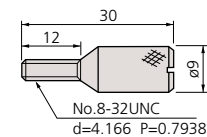


| Order No.     | L      |
|---------------|--------|
| <b>619057</b> | 31.6mm |
| <b>619058</b> | 15.8mm |

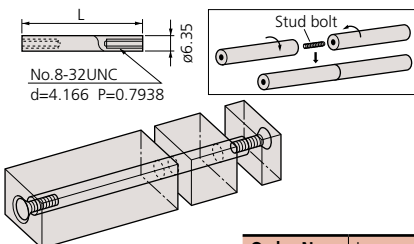
Slotted head nut: **619059**



Knurled head screw: **619066**

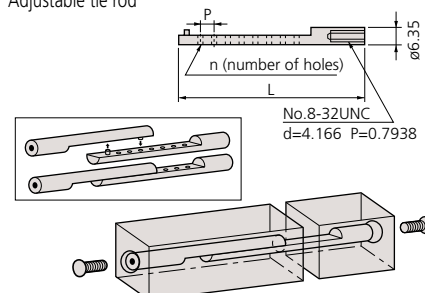


Tie rod



| Order No.     | L    |
|---------------|------|
| <b>619065</b> | 19mm |
| <b>619064</b> | 38mm |
| <b>619063</b> | 57mm |
| <b>619062</b> | 76mm |

Adjustable tie rod



| Order No.     | L       | P      | n  |
|---------------|---------|--------|----|
| <b>619060</b> | 124.5mm | 6.35mm | 14 |
| <b>619061</b> | 86.5mm  | 6.35mm | 8  |

# Ceraston

## Accessory for Gage Blocks

### FEATURES

- Alumina-ceramic grinding stone for removing burrs from hard materials such as ceramics that ordinary grinding stones cannot handle.
- Can be used both for steel gage blocks and CERA Blocks.



### SPECIFICATIONS

| Order No. | Dimensions (W x D x H) | Mass |
|-----------|------------------------|------|
| 601645    | 100 x 25 x 12mm        | 110g |
| 601644    | 150 x 50 x 20mm        | 530g |

# Maintenance Kit for Gage Blocks

## SERIES 516

### FEATURES

- Includes all necessary maintenance tools for daily care and storage of gage blocks.
- Supplied in a fitted wooden case for portable use.



516-650E

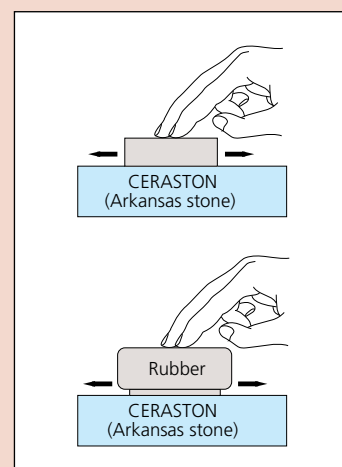
### SPECIFICATIONS

| Order No. | Assortment of tools and accessories                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 516-650E  | <p>Ceraston (601645): Used for removing burrs on the measuring surface.</p> <p>Optical flat (158-117): Used for checking whether burrs exist.</p> <p>Tweezers (600004): Used for handling thin gage blocks.</p> <p>Blower brush (600005): Used for blowing out dust on the measuring surface.</p> <p>Cleaning paper (600006): Used for wiping off rust preventive oil and contamination.</p> <p>Artificial leather mat (600007): Used as a gage block mat.</p> <p>Reagent bottle (600008): Bottle of wiping solution (100mL)</p> <p>Gloves</p> |



### Removing burrs

- (1) Wipe any dust and oil films from the gage block and the Ceraston (or Arkansas stone) using a solvent.
- (2) Place the gage block on the Ceraston so that the measuring face that has burrs is on the abrasive surface of the stone. While applying light pressure, move the gage block to and fro about ten times (Fig. 1). Use a block rubber for thin gage blocks to apply even pressure (Fig. 2).
- (3) Check the measuring face for burrs with an optical flat. If the burrs have not been removed, repeat step (2). If burrs are too large, they may not be removed with a grinding stone. If so, discard the gage block.



Note: The abrasive surface of a Ceraston must be made flat by lapping it from time to time. After lapping the Ceraston, the lapping powder must be completely removed from the surface to prevent the surface of the gage block from being scratched. Mitutoyo does not carry the Arkansas stone.



# Step Master

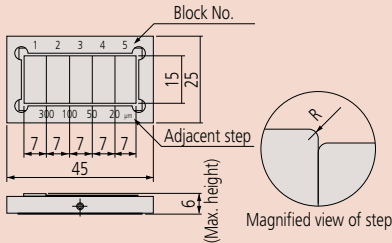
## SERIES 516

### FEATURES

Step master is a master gage used for the z-axis (vertical direction) calibration of optical instruments.

- Each adjacent step is measured down to 0.01μm by using an interferometer within ±0.20μm allowance.
- Steel and ceramic types are available.

### Dimension



**516-498**  
Ceramic type



**516-199**  
Steel type



### SPECIFICATIONS

#### Metric

| Order No.      | Step value between adjacent blocks |               |               |               | Remarks      |
|----------------|------------------------------------|---------------|---------------|---------------|--------------|
|                | No. 1 - No. 2                      | No. 2 - No. 3 | No. 3 - No. 4 | No. 4 - No. 5 |              |
| <b>516-198</b> | 10μm                               | 5μm           | 2μm           | 1μm           | Steel type   |
| <b>516-199</b> | 300μm                              | 100μm         | 50μm          | 20μm          | Steel type   |
| <b>516-498</b> | 10μm                               | 5μm           | 2μm           | 1μm           | Ceramic type |
| <b>516-499</b> | 300μm                              | 100μm         | 50μm          | 20μm          | Ceramic type |

# Made-to-order Block & Reference

### Available Dimension

Nominal size: .004 to 20" / 0.1 to 1000mm (steel)  
.1 to 20" / 0.5 to 500mm (ceramic)

Nominal pitch: 0.0005mm (up to 100mm)  
0.001mm (over 100mm)

Minimum section dimension:  
Approx. .24 x .24" / 6 x 6mm

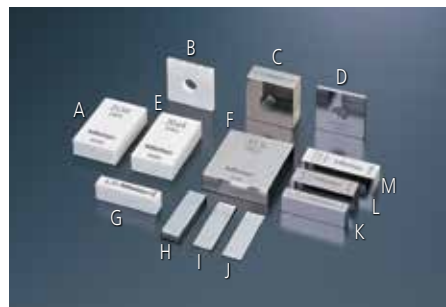
Maximum section dimension:  
Approx. 5.5 x 5.5" / 140 x 140mm (steel)  
Approx. 6.3" Dia. / ø160mm (steel, cylindrical)  
Approx. 3.94 x 1.97" / 100 x 50mm (ceramic)  
Approx. .24" Dia. / ø60mm (ceramic, cylindrical)

Accuracy: Gage Block Grade level

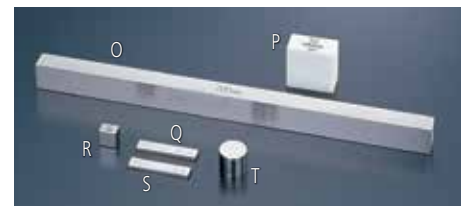
Special materials of low expansion glass and low expansion ceramic are available.

### FEATURES

- Mitutoyo can provide gage blocks and reference gages to your size and design.



- A: Ceramic rectangular gage block (21.94mm)
- B: Ceramic square gage block (2.1005mm)
- C: Steel square gage block (10.72mm)
- D: Steel square gage block (2.2065mm)
- E: Ceramic rectangular gage block (20.64mm)
- F: Steel rectangular gage block (31.5mm)
- G: Ceramic rectangular gage block (6.34mm)
- H: Steel rectangular gage block (3.603mm)
- I: Steel rectangular gage block (1.1505mm)
- J: Steel rectangular gage block (0.555mm)
- K: Steel rectangular gage block (6.156mm)
- L: Steel rectangular gage block (9.694mm)
- M: Steel rectangular gage block (10.02mm)



- O: Steel long rectangular block (15 x 10 x 200mm)
- P: Ceramic square block (24.1 x 24.1 x 12.3mm)
- Q: Steel thin rectangular block (30 x 6 x 1.9mm)
- R: Steel square block (9 x 9 x 6mm)
- S: Steel thin rectangular block (30 x 6 x 2.1mm)
- T: Steel cylindrical block (ø13.08 x 12mm)



- U: Cylindrical reference block for depth micrometer (ø60 x 150mm)
- V: Ceramic reference plate (50 x 50 x 50mm, flatness 0.3μm)
- W: Ceramic stepped block (30 x 18 x 5mm, step: 0.15mm)



# Gage Block Comparator GBCD-250

## SERIES 565 — Manual Comparator with Dual Gage Heads

### FEATURES

- Gage blocks between 0.1mm and 250mm easily can be compared with the standard gage block on the GBCD-250.
- The differential dual gaging heads assure the operator of a high-accuracy measurement with ease of use.

### SPECIFICATIONS

| Inch/Metric                     |                                                                  |
|---------------------------------|------------------------------------------------------------------|
| Model No.                       | GBCD-250                                                         |
| Order No.                       | 565-151A                                                         |
| Range                           | 0.1mm - 250mm / .004 - 10"                                       |
| Resolution                      | 0.00001mm(0.01μm)/.000001in(.1μin)                               |
| Accuracy in narrow range (20°C) | $\pm(0.03+0.3L/1000)\mu\text{m}^*$<br>L = Gage block length (mm) |
| Measuring units                 | Laser Hologage (upper and lower)                                 |
| Operating condition             | Temperature: 20°C $\pm$ 1°C<br>Humidity: 30% RH to 60% RH        |
| Data output                     | Via SPC output port                                              |
| Dimensions (W x D x H)          | Main unit: 455 x 318 x 691mm    Display unit: 345 x 397 x 187mm  |
| Mass                            | Main unit: Approx. 52kg<br>Display unit: Approx. 9kg             |

\* 95% confidence interval (not including the calibration error of the standard gage block).



### Optional Accessories

- 962723: Gage head calibration kit  
 02ASD130: Square gage block holder kit  
 02ASF040: Heat protection shield  
 02ASQ953: GBPAK-M  
 Supporting OS: Windows XP, Vista, 7, or 10  
 937179T: Foot Switch  
 936937: Connecting cable

# Gage Block Comparator GBCD-100A

## SERIES 565 — Automatic-Type Comparator with Dual Gage Heads

### SPECIFICATIONS

|                                 |                                                                    |
|---------------------------------|--------------------------------------------------------------------|
| Model No.                       | GBCD-100A                                                          |
| Order No.                       | 565-160A                                                           |
| Resolution                      | 0.00001mm (0.01μm) / .000001"                                      |
| Range                           | 0.5mm - 100mm / .02 - 4"                                           |
| Measuring unit                  | Differential (dual-head) type Mu-Checker                           |
| Accuracy in narrow range (20°C) | $\pm(0.03+0.3L/1000)\mu\text{m}^*$<br>L = Gage block length (mm)   |
| Measuring force                 | Upper gage head: 1N (100gf)<br>Lower gage head: 0.6N (60gf)        |
| Air requirement                 | 400kPa (4kgf/cm <sup>2</sup> )                                     |
| Operating condition             | Temperature: 20°C $\pm$ 1°C<br>Humidity: 58%RH $\pm$ 15%RH         |
| Dimensions (W x D x H)          | Main unit: 710 x 366 x 783mm<br>Electronic unit: 160 x 410 x 382mm |
| Mass                            | Main unit: 120kg<br>Electronic unit: 14kg                          |

\* 95% confidence interval (not including the calibration error of the standard gage block).



The GBCD-100A Automatic Gage Block Comparator is an easy-to-operate dual-head gage block inspecting system. It automatically compares workpieces with a standard gage block and determines accuracies such as central length, maximum length, minimum length and parallelism through the operation of an optional personal computer.

### Standard Accessories

GBPAK-A (software)

### Optional Accessories

- 516-146-E1: Gage block set for GBCD calibration



### Technical Data

Graduation: .00001" or 0.001mm  
 Counter Resolution: .001" or 0.01mm  
 Character Height: .16" / 4mm  
 Micrometer Head  
 Travel stroke: 1" or 20mm  
 Pitch: .025"/rev or 0.5mm/rev  
 Hysteresis: .00004" or 1µm  
 Provided with inspection certificate.

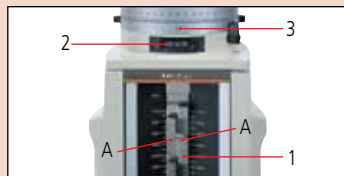
### Standard Accessories

Reference Block: 11mm for 515-322  
 Reference Block: .3" for 515-310, 515-311

### Optional Accessories

515-112: Auxiliary block kit for bore gage (mm)  
 515-119: Auxiliary block kit for bore gage (for 515-310)  
 515-121: Auxiliary block kit for bore gage (for 515-311)  
 ———: Riser block

### Reading



#### Height A

|            |       |            |
|------------|-------|------------|
| 1. Scale   | 280.  | mm         |
| 2. Counter | 5.67  | mm         |
| 3. Thimble | 0.000 | mm         |
|            |       | 285.670 mm |



# Height Master

## SERIES 515

### FEATURES

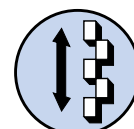
- Models with staggered arrangement of block stack have two measuring faces on the same level, one facing up and the other down (except for 515-310).
- Each height master is supplied with a gage block for zero-setting.
- Supplied in fitted wooden case.



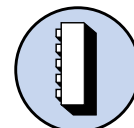
515-322



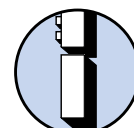
515-310



Staggered 20mm blocks (movable)



Vertical orientation



Riser block

### SPECIFICATIONS

#### Metric

| Range (H)     | Order No. | Block step       | Graduation | Block Pitch Accuracy | Parallelism of Block | Micrometer Head Accuracy | Mass (kg) |
|---------------|-----------|------------------|------------|----------------------|----------------------|--------------------------|-----------|
| 5 < H ≤ 310mm | 515-322   | 20mm (staggered) | 0.001mm    | ±1.5µm               | 1µm                  | ±1µm                     | 23        |

#### Inch

| Range (H)       | Order No. | Block step     | Graduation | Block Pitch Accuracy | Parallelism of Block | Micrometer Head Accuracy | Mass (kg) |
|-----------------|-----------|----------------|------------|----------------------|----------------------|--------------------------|-----------|
| .2" < H ≤ 12.2" | 515-310   | .5" (straight) | .00001"    | ±.00005"             | .00004"              | ±.00005"                 | 23        |
| .2" < H ≤ 12.2" | 515-311   | 1" (staggered) | .00001"    | ±.00005"             | .00004"              | ±.00005"                 | 23        |

# Digital Height Master

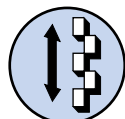
## SERIES 515

### FEATURES

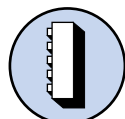
- Standard model with a digital display, featuring all essential specifications required for versatile height standard.
- With SPC output.
- Each height master is supplied with a gage block for zero setting.



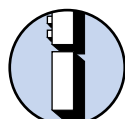
515-374



Staggered 20mm blocks (movable)



Vertical orientation



Riser block



### Technical Data

Resolution (LCD): .0001" or 0.001mm  
 Graduation: .0001" or 0.002mm  
 Character Height .21" / 5.4mm

#### Micrometer Head

Travel Stroke: 1" or 20mm  
 Pitch: .025"/rev or 0.5mm/rev  
 Hysteresis: .0001" for all inch models  
 0.002mm for 300mm models  
 0.0025mm for 450 & 600mm models  
 Battery: SR44 (2 pcs.), **938882**  
 Battery life: Approx. 1.8 years under normal use

### Function

Zero-setting, Presetting, ABS/INC switching, Data hold, Data output, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

### Standard Accessories

Reference Block: 11mm for Metric Height Master **611621-031**  
 Reference Block: .6" for for Inch Height Master **611196-531**  
 Provided with inspection certificate.

### Optional Accessories

**515-111:** Auxiliary block kit for bore gage (mm)  
**515-120:** Auxiliary block kit for bore gage (inch)  
 —: Riser block (see page E-27.)  
**959149:** SPC cable (40" / 1m)  
**959150:** SPC cable (80" / 2m)  
**050019:** Fitted mahogany case for 12" / 300mm model  
**050059:** Fitted mahogany case for 18" / 450mm model  
 24" / 600mm model

## SPECIFICATIONS

### Metric

| Range (H)      | Order No.      | Block step       | Resolution | Block Pitch Accuracy | Parallelism | Micrometer Head Accuracy | Mass (kg) |
|----------------|----------------|------------------|------------|----------------------|-------------|--------------------------|-----------|
| 10 < H ≤ 310mm | <b>515-374</b> | 20mm (staggered) | 0.001mm    | ±1.5μm               | 2μm         | ±2μm                     | 9.5       |
| 10 < H ≤ 460mm | <b>515-376</b> | 20mm (staggered) | 0.001mm    | ±2.5μm               | 2.5μm       | ±2μm                     | 13.6      |
| 10 < H ≤ 610mm | <b>515-378</b> | 20mm (staggered) | 0.001mm    | ±3.5μm               | 2.5μm       | ±2.5μm                   | 16.0      |

### Inch/Metric

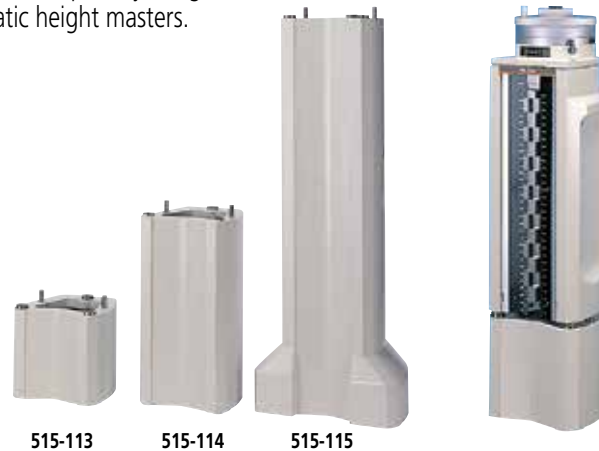
| Range (H)     | Order No.      | Block step     | Resolution       | Block Pitch Accuracy | Parallelism | Micrometer Head Accuracy | Mass (kg) |
|---------------|----------------|----------------|------------------|----------------------|-------------|--------------------------|-----------|
| .5" < H ≤ 12" | <b>515-375</b> | 1" (staggered) | .0001" / 0.001mm | ±.0001"              | .00005"     | ±.0001"                  | 9.5       |
| .5" < H ≤ 18" | <b>515-377</b> | 1" (staggered) | .0001" / 0.001mm | ±.0001"              | .0001"      | ±.0001"                  | 13.6      |
| .5" < H ≤ 24" | <b>515-379</b> | 1" (staggered) | .0001" / 0.001mm | ±.0001"              | .0001"      | ±.0001"                  | 16.0      |

# Riser Blocks

## SERIES 515

### FEATURES

- These riser blocks are specially designed for standard/digimatic height masters.



515-113

515-114

515-115

### SPECIFICATIONS

| Metric |           |                      |           |
|--------|-----------|----------------------|-----------|
| Height | Order No. | Accuracy of height   | Mass (kg) |
| 150mm  | 515-113   | $\pm 0.6\mu\text{m}$ | 5.7       |
| 300mm  | 515-114   | $\pm 1.0\mu\text{m}$ | 11.3      |
| 600mm  | 515-115   | $\pm 2.0\mu\text{m}$ | 31        |

| Inch   |           |                      |           |
|--------|-----------|----------------------|-----------|
| Height | Order No. | Accuracy of height   | Mass (kg) |
| 6"     | 515-116   | $\pm 20\mu\text{in}$ | 5.7       |
| 12"    | 515-117   | $\pm 40\mu\text{in}$ | 11.3      |
| 24"    | 515-118   | $\pm 80\mu\text{in}$ | 31        |

# Auxiliary Block Kit

## SERIES 515 — for Bore Gage

### FEATURES

- Used for efficient zero-setting of dial bore gages and tubular inside micrometers (18 - 150mm) on a Height Master.



515-112

Bore gage zero-setting



### SPECIFICATIONS

| Metric    |                          |
|-----------|--------------------------|
| Order No. | Applicable height master |
| 515-110   | Universal Height Master  |
| 515-111   | Digimatic Height Master  |
| 515-112   | Height Master            |

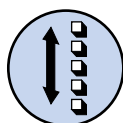
| Inch      |                                                  |
|-----------|--------------------------------------------------|
| Order No. | Applicable height master                         |
| 515-119   | Universal Height Master, Height Master (515-310) |
| 515-120   | Digimatic Height Master                          |
| 515-121   | Height Master (515-311)                          |

# Universal Height Master

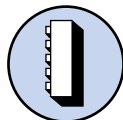
## SERIES 515 — Use in Vertical and Horizontal Orientation

### FEATURES

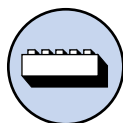
- The Universal Height Master is designed for both vertical and horizontal orientations, providing a wide range of applications, such as accuracy checking of machine tool table movements.
- Fitted wooden case supplied.



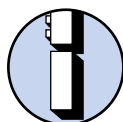
Single-row 10mm blocks (movable)



Vertical orientation



Horizontal orientation



Riser block

515-520

### SPECIFICATIONS

#### Metric

| Range (R)                  | Order No.      | Block step      | Graduation | Block Pitch Accuracy | Parallelism of Block | Micrometer Head Accuracy | Mass (kg) |
|----------------------------|----------------|-----------------|------------|----------------------|----------------------|--------------------------|-----------|
| $5 < R \leq 610\text{mm}$  | <b>515-520</b> | 10mm (straight) | 0.001mm    | $\pm 1.5\mu\text{m}$ | $1.0\mu\text{m}$     | $\pm 1.2\mu\text{m}$     | 42        |
| $5 < R \leq 1010\text{mm}$ | <b>515-523</b> | 10mm (straight) | 0.001mm    | $\pm 3.5\mu\text{m}$ | $2.5\mu\text{m}$     | $\pm 1.5\mu\text{m}$     | 63.5      |

#### Inch

| Range (R)            | Order No.      | Block step     | Graduation | Block Pitch Accuracy | Parallelism of Block | Micrometer Head Accuracy | Mass (kg) |
|----------------------|----------------|----------------|------------|----------------------|----------------------|--------------------------|-----------|
| $.2" < R \leq 18.2"$ | <b>515-512</b> | .5" (straight) | .00001"    | $\pm .00005"$        | .00006"              | $\pm .00004"$            | 42        |
| $.2" < R \leq 24.2"$ | <b>515-510</b> | .5" (straight) | .00001"    | $\pm .0001"$         | .00006"              | $\pm .00004"$            | 50        |
| $.2" < R \leq 40.2"$ | <b>515-513</b> | .5" (straight) | .00001"    | $\pm .00015"$        | .00008"              | $\pm .00006"$            | 63.5      |



### Technical Data

Graduation: 0.001mm or .00001"  
 Counter Resolution: .001" or 0.01mm  
 Character Height: .16" / 4mm  
 Block arrangement: Straight arrangement

#### Micrometer Head

Travel stroke: 1" or 20mm  
 Pitch: .025"/rev or 0.5mm/rev  
 Hysteresis: .00004" / 1.2μm up to 24.2" / 610mm  
 .00006" / 1.5μm for 40.2" / 1010mm

Block pitch accuracy:  $\pm 1.5\mu\text{m}$  ( $0 < R \leq 310\text{mm}$ )  
 $\pm 2.5\mu\text{m}$  ( $310 < R \leq 610\text{mm}$ )  
 $\pm 3.5\mu\text{m}$  ( $610 < R \leq 1010\text{mm}$ )

Parallelism of blocks:  $1.0\mu\text{m}$  ( $0 < R \leq 310\text{mm}$ )  
 $2.5\mu\text{m}$  ( $310 < R \leq 1010\text{mm}$ )

Provided with inspection certificate.

### Optional Accessories

- 900574\***: Supporting base for vertical operation  
 Mass: 3kg  
 (\*supplied as a standard for **515-523** and **515-513**)
- 515-112**: Auxiliary block kit for bore gage (mm)  
**515-119**: Auxiliary block kit for bore gage (inch)



Using in horizontal orientation



Supporting base





## Technical Data

Measuring range (R): Refer to the list of specifications.  
 Block pitch accuracy:  
 $\pm 1.2\mu\text{m}$  ( $0 < R \leq 310\text{mm}$ )  
 $\pm 1.8\mu\text{m}$  ( $310 < R \leq 610\text{mm}$ )  
 $\pm 2.5\mu\text{m}$  ( $610 < R \leq 1010\text{mm}$ )  
 $\pm 4.0\mu\text{m}$  ( $1010 < R \leq 1510\text{mm}$ )  
 Parallelism of blocks:  
 $1.0\mu\text{m}$  ( $0 < R \leq 450\text{mm}$ )  
 $1.5\mu\text{m}$  ( $450 < R \leq 1010\text{mm}$ )  
 $2.0\mu\text{m}$  ( $1010 < R \leq 1510\text{mm}$ )  
 Provided with inspection certificate.

# High-Accuracy Check Master HMC-H

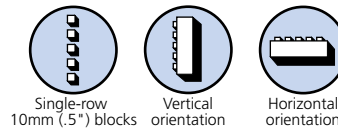
## SERIES 515

### FEATURES

- Designed to check the accuracy of table movements of machine tools and calibrate CMMs. Permanently wrung stack of gage blocks is housed in a rigid frame.
- Can be used in either vertical and horizontal orientation.
- Fitted wooden case supplied.

### Specifications for Ceramic Check Master:

- Each measuring block is made of zirconia-based ceramic that requires no anti-corrosion treatment for measuring faces.
- Free from deterioration and dimensional changes over time.



### SPECIFICATIONS

#### Metric

| Range (R) | Order No. |         | Pitch |      | Accuracy of block pitch for the range shown below as measured from the bottom block |                      |                      |                      | Length | Parallelism      | Mass (kg) |
|-----------|-----------|---------|-------|------|-------------------------------------------------------------------------------------|----------------------|----------------------|----------------------|--------|------------------|-----------|
|           | Steel     | Ceramic | P     | P    | up to 300mm                                                                         | 300-600mm            | 600-1000mm           | 1000-1500mm          |        |                  |           |
| 300mm     | 515-740   | 515-760 | 20mm  | 10mm | $\pm 1.2\mu\text{m}$                                                                | —                    | —                    | —                    | 331mm  | $1\mu\text{m}$   | 3.6       |
| 450mm     | 515-741   | 515-761 | 20mm  | 10mm | $\pm 1.2\mu\text{m}$                                                                | $\pm 1.8\mu\text{m}$ | —                    | —                    | 482mm  | $1\mu\text{m}$   | 5.4       |
| 600mm     | 515-742   | 515-762 | 20mm  | 10mm | $\pm 1.2\mu\text{m}$                                                                | $\pm 1.8\mu\text{m}$ | —                    | —                    | 631mm  | $1.5\mu\text{m}$ | 7.2       |
| 1000mm    | 515-743   | 515-763 | 20mm  | 10mm | $\pm 1.2\mu\text{m}$                                                                | $\pm 1.8\mu\text{m}$ | $\pm 2.5\mu\text{m}$ | —                    | 1037mm | $1.5\mu\text{m}$ | 12.0      |
| 1500mm    | 515-744   | 515-764 | 20mm  | 10mm | $\pm 1.2\mu\text{m}$                                                                | $\pm 1.8\mu\text{m}$ | $\pm 2.5\mu\text{m}$ | $\pm 4.0\mu\text{m}$ | 1546mm | $2\mu\text{m}$   | 18.0      |

#### Inch

| Range (R) | Order No. |         | Pitch |     | Accuracy of block pitch for the range shown below as measured from the bottom block |                      |                       |                       | Length | Parallelism      | Mass (kg) |
|-----------|-----------|---------|-------|-----|-------------------------------------------------------------------------------------|----------------------|-----------------------|-----------------------|--------|------------------|-----------|
|           | Steel     | Ceramic | P     | P   | up to 12"                                                                           | 12-24"               | 24-40"                | 40-60"                |        |                  |           |
| 12"       | 515-730   | 515-750 | 1"    | .5" | $\pm 50\mu\text{in}$                                                                | —                    | —                     | —                     | 13.0"  | $40\mu\text{in}$ | 3.4       |
| 18"       | 515-731   | 515-751 | 1"    | .5" | $\pm 50\mu\text{in}$                                                                | $\pm 70\mu\text{in}$ | —                     | —                     | 19.0"  | $40\mu\text{in}$ | 5.2       |
| 24"       | 515-732   | 515-752 | 1"    | .5" | $\pm 50\mu\text{in}$                                                                | $\pm 70\mu\text{in}$ | —                     | —                     | 25.0"  | $60\mu\text{in}$ | 6.9       |
| 40"       | 515-733   | 515-753 | 1"    | .5" | $\pm 50\mu\text{in}$                                                                | $\pm 70\mu\text{in}$ | $\pm 100\mu\text{in}$ | —                     | 41.0"  | $60\mu\text{in}$ | 11.5      |
| 60"       | 515-734   | 515-754 | 1"    | .5" | $\pm 50\mu\text{in}$                                                                | $\pm 70\mu\text{in}$ | $\pm 100\mu\text{in}$ | $\pm 158\mu\text{in}$ | 61.5"  | $80\mu\text{in}$ | 17.3      |

### Optional Accessories

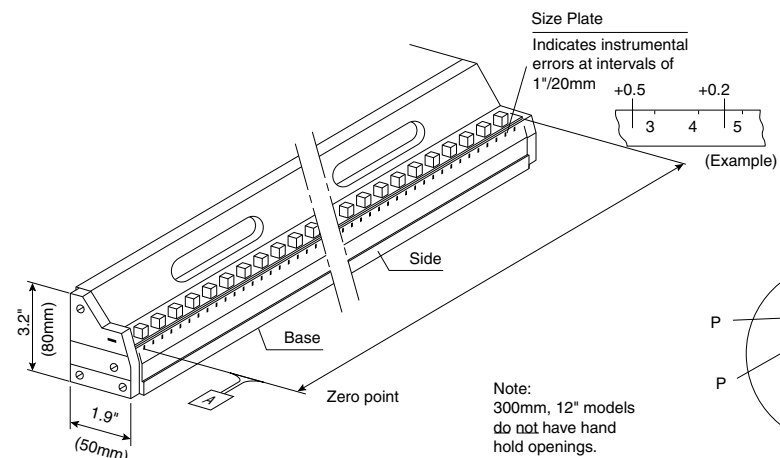
**601167:** Supporting base for vertical operation

Dimensions: 14.2" (W) x 8.7" (D) x 8.3" (H)  
 360mm (W) x 220mm (D) x 210mm (H)

Mass: 3kg



Supporting base



# CERA Straight Master SM-C

## SERIES 311 — Straightness Measuring Instrument

### FEATURES

CERA Straight master is a master gage used for the straightness inspection of each axis movement such as a CMM, machine tool, semiconductor-related equipment and form measuring machine.

- Made from Alumina-ceramic
- 50mm/2" pitch gradation scales
- Precision-lapped measuring surface
- Double-faced type is lapping the double face, which can be used for straightness in horizontal and vertical as a reference square.
- Lightweight
- Supplied with fitted wooden case.



### SPECIFICATIONS

| Metric         |            | Inch           |            | High-accuracy model |                  |       |
|----------------|------------|----------------|------------|---------------------|------------------|-------|
| Nominal length | Order No.* | Nominal length | Order No.* | Straightness        | Size (L x H x W) | Mass  |
| 400mm          | 311-302-33 | 16"            | 311-322-33 | 0.3μm               | 440 x 35 x 50mm  | 1.8kg |
| 700mm          | 311-305-33 | 28"            | 311-325-33 | 0.5μm               | 740 x 35 x 50mm  | 3kg   |
| 1000mm         | 311-307-33 | 40"            | 311-327-33 | 1.0μm               | 1040 x 45 x 80mm | 8kg   |
| 1300mm         | 311-309-33 | 52"            | 311-329-33 | 1.5μm               | 1340 x 45 x 80mm | 10kg  |

| Metric         |            | Inch           |            | Ultra-high accuracy model |                  |       |
|----------------|------------|----------------|------------|---------------------------|------------------|-------|
| Nominal length | Order No.* | Nominal length | Order No.* | Straightness              | Size (L x H x W) | Mass  |
| 400mm          | 311-332-33 | 16"            | 311-342-33 | 0.2μm                     | 440 x 35 x 50mm  | 1.8kg |
| 700mm          | 311-335-33 | 28"            | 311-345-33 | 0.4μm                     | 740 x 35 x 50mm  | 3kg   |
| 1000mm         | 311-337-33 | 40"            | 311-347-33 | 0.5μm                     | 1040 x 45 x 80mm | 8kg   |
| 1300mm         | 311-339-33 | 52"            | 311-349-33 | 0.7μm                     | 1340 x 45 x 80mm | 10kg  |

Double-faced type



### SPECIFICATIONS

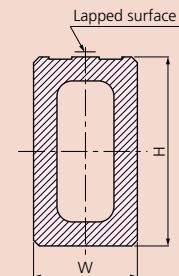
| Metric         |            | Inch           |            | Double-faced model |                  |       |
|----------------|------------|----------------|------------|--------------------|------------------|-------|
| Nominal length | Order No.* | Nominal length | Order No.* | Straightness       | Size (L x H x W) | Mass  |
| 400mm          | 311-352-33 | 16"            | 311-362-33 | 0.3μm              | 440 x 45 x 80mm  | 3.2kg |
| 700mm          | 311-355-33 | 28"            | 311-365-33 | 0.5μm              | 740 x 45 x 80mm  | 5.5kg |
| 1000mm         | 311-357-33 | 40"            | 311-367-33 | 1.0μm              | 1040 x 45 x 80mm | 8kg   |
| 1300mm         | 311-359-33 | 52"            | 311-369-33 | 1.5μm              | 1340 x 45 x 80mm | 10kg  |



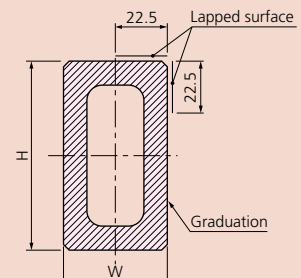
### Technical Data

Provided with inspection certificate.

### Cross section



### Double-faced type



# Square Master

## SERIES 311 — Squareness / Straightness Measuring Instrument

### Technical Data

Squareness: Refer to the list of specifications  
 Straightness: Refer to the list of specifications  
 Dial test indicator provided  
 Range: 0.2mm  
 Graduation: 0.002mm  
 Accuracy: 3μm

### Optional Accessory

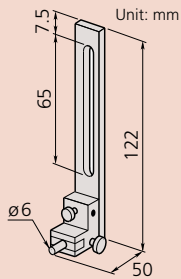
—: Riser blocks (see page E-27.)  
**900571:** Adjustable holder  
**900551:** Extension holder  
**900565:** Feeler\*\*

\*Not available for 450mm model.

\*\*Adapter (**902803**) is required for metric model.

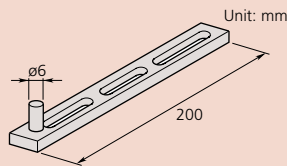
### Adjustable holder

No.900571



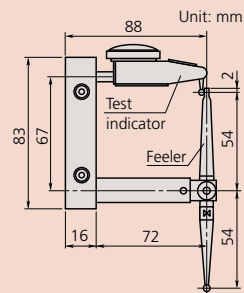
### Extension holder

No.900551



### Feeler

No.900565



### FEATURES

- Squareness (perpendicularity) and straightness measurements can be performed accurately and efficiently by moving a lever.
- With a dial test indicator for reading displacements.
- Its own squareness is adjustable for high-accuracy measurement.



311-215



311-225

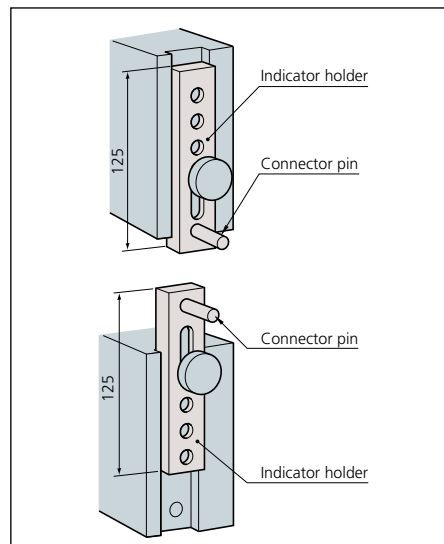


311-245

### SPECIFICATIONS

#### Metric

| Vertical travel | Order No.      | Squareness | Straightness | Mass (kg) |
|-----------------|----------------|------------|--------------|-----------|
| 150mm           | <b>311-215</b> | 3μm        | 2μm          | 13.7      |
| 250mm           | <b>311-225</b> | 6μm        | 2.5μm        | 16.2      |
| 450mm           | <b>311-245</b> | 9μm        | 3.5μm        | 24        |

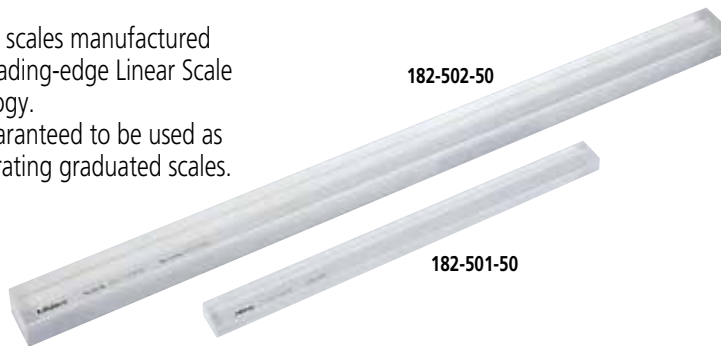


# Standard Scales

**SERIES 182 — Made of Low-Expansion Glass**

## FEATURES

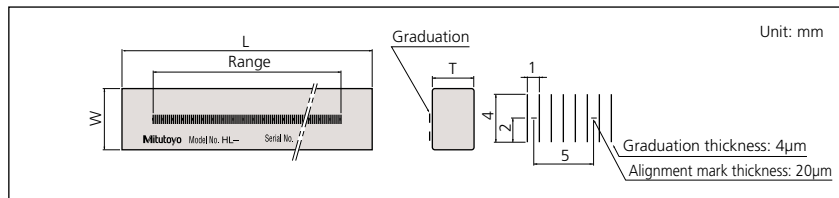
- High-precision glass scales manufactured under Mitutoyo's leading-edge Linear Scale production technology.
- High accuracy is guaranteed to be used as a standard for calibrating graduated scales.



182-502-50

182-501-50

## DIMENSIONS

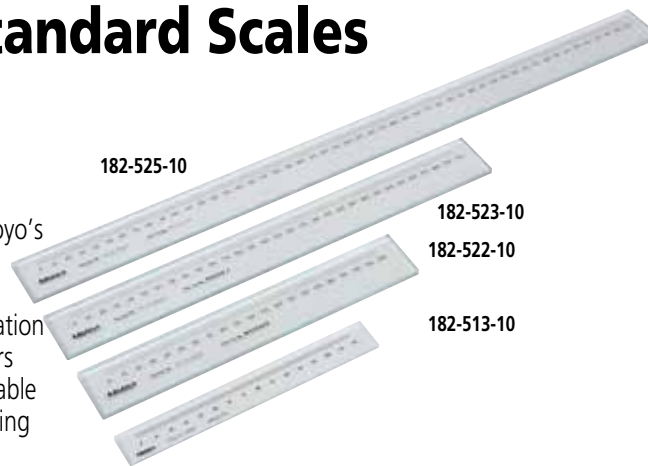


# Working Standard Scales

**SERIES 182**

## FEATURES

- High-precision glass scales manufactured under Mitutoyo's leading-edge linear scale production technology.
- Ideal for checking magnification accuracy of profile projectors and microscopes, and the table feeding accuracy of measuring equipment.



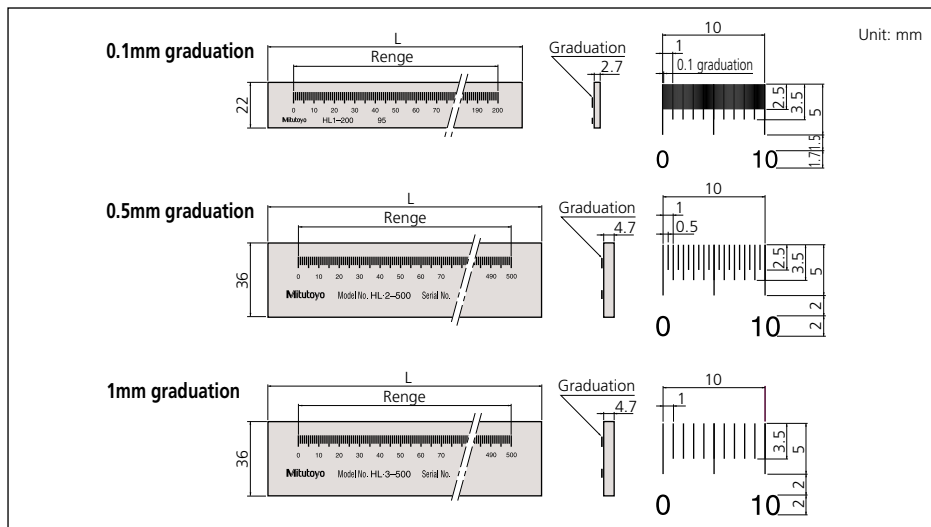
182-525-10

182-523-10

182-522-10

182-513-10

## DIMENSIONS



0.1mm graduation

0.5mm graduation

1mm graduation

Graduation 2.7

Graduation 4.7

Graduation 4.7

Unit: mm



## Technical Data

Accuracy (at 20°C):  $(0.5+L/1000)\mu\text{m}$ ,  
 $L = \text{Measured length (mm)}$   
 Glass material: Low expansion glass  
 Thermal expansion coefficient:  $8 \times 10^{-6}/\text{K}$   
 Graduation: 1mm  
 Graduation thickness: 4μm  
 Mass: 0.75kg (250mm), 1.8kg (500mm)

## SPECIFICATIONS

### Metric

| Range | Order No.   | L     | W    | T    |
|-------|-------------|-------|------|------|
| 250mm | 182-501-50  | 280mm | 20mm | 10mm |
| 250mm | 182-501-60* | 280mm | 20mm | 10mm |
| 500mm | 182-502-50  | 530mm | 30mm | 20mm |
| 500mm | 182-502-60* | 530mm | 30mm | 20mm |

\*with English JCSS certificate.



## Technical Data

Accuracy (at 20°C):  $(1.5+2L/1000)\mu\text{m}$ ,  
 $L = \text{Measured length (mm)}$   
 Glass material: Sodium glass  
 Thermal expansion coefficient:  $8.5 \times 10^{-6}/\text{K}$   
 Graduation: 0.1mm (thickness: 20μm)  
 0.5mm (thickness: 50μm)  
 1mm (thickness: 100μm)

## SPECIFICATIONS

### Metric

| Range  | Order No.  | Graduation | L      | Mass   |
|--------|------------|------------|--------|--------|
| 50mm   | 182-511-10 | 0.1mm      | 75mm   | 0.23kg |
| 100mm  | 182-512-10 | 0.1mm      | 125mm  | 0.24kg |
| 150mm  | 182-513-10 | 0.1mm      | 175mm  | 0.35kg |
| 200mm  | 182-514-10 | 0.1mm      | 225mm  | 0.36kg |
| 100mm  | 182-521-10 | 0.5mm      | 130mm  | 0.27kg |
| 200mm  | 182-522-10 | 0.5mm      | 230mm  | 0.32kg |
| 300mm  | 182-523-10 | 0.5mm      | 330mm  | 0.57kg |
| 400mm  | 182-524-10 | 0.5mm      | 430mm  | 0.71kg |
| 500mm  | 182-525-10 | 0.5mm      | 530mm  | 0.86kg |
| 250mm  | 182-531-10 | 1mm        | 280mm  | 0.55kg |
| 500mm  | 182-532-10 | 1mm        | 530mm  | 0.86kg |
| 750mm  | 182-533-10 | 1mm        | 780mm  | 1.22kg |
| 1000mm | 182-534-10 | 1mm        | 1030mm | 1.54kg |

# High-Precision Square

## SERIES 311

### FEATURES

The High-Precision Square gage is used for inspecting the travel straightness and axial perpendicularity of moving elements on equipment, such as machine tools, CMMs, form measuring machines and semiconductor-related equipment.

- Four precision-lapped reference surfaces.
- Better than 1 $\mu$ m/300mm straightness and perpendicularity.



311-111



311-112



311-113

### SPECIFICATIONS

#### Metric

| Order No. | Dimension (W x L x T) | Mass   |
|-----------|-----------------------|--------|
| 311-111   | 90 x 110 x 25mm       | 1.5kg  |
| 311-112   | 160 x 210 x 25mm      | 5.0kg  |
| 311-113   | 260 x 310 x 30mm      | 14.0kg |

\* 311-113 is supplied with a removable handle.

# Spring Dividers and Calipers

## SERIES 950

### FEATURES

- Spring Divider — Fully hardened and tempered joints, spring, washers and divider points.
- Outside Spring Caliper — Contact ends fully rounded to give accurate dimensions.
- Inside Spring Caliper — Ends fully rounded to give accurate contact with a workpiece.



Spring divider



Outside spring calipers



Inside spring calipers

### SPECIFICATIONS

| Range      | Order No.      |                         |                        |
|------------|----------------|-------------------------|------------------------|
|            | Spring divider | Outside spring calipers | Inside spring calipers |
| 6" (150mm) | 950-212        | 950-222                 | 950-232                |
| 8" (200mm) | 950-213        | 950-223                 | 950-233                |



# Steel Rules

## SERIES 182

### FEATURES

- Clear graduations on satin-chrome finish.
- Stainless tempered.



182-125

### SPECIFICATIONS

#### Wide Rigid Rules (thickness 3/64")

| Order No. | Size        | Graduations |       |      |         | Width  | Accuracy<br>(Length)                    |
|-----------|-------------|-------------|-------|------|---------|--------|-----------------------------------------|
| 182-101   | 6"(4R)      | 1/8         | 1/16  | 1/32 | 1/64th  | 3/4"   | +.004" / –.0035"<br>(+0.1mm / –0.09mm)  |
| 182-102   | 6"(16R)     | 1/32        | 1/64  | 1/50 | 1/100th | 3/4"   |                                         |
| 182-103   | 6"(5R)      | 1/32        | 1/64  | 1/10 | 1/100th | 3/4"   |                                         |
| 182-104   | 6"(3R)      | 1/32        | 1/64  | 1/10 | 1/50th  | 3/4"   |                                         |
| 182-105   | 6" x 150mm  | 1/32        | 1/64  | 1mm  | 0.5mm   | 3/4"   |                                         |
| 182-106   | 6" x 150mm  | 1/50        | 1/100 | 1mm  | 0.5mm   | 3/4"   |                                         |
| 182-107   | 6" x 150mm  | 1/10        | 1/100 | 1mm  | 0.5mm   | 3/4"   |                                         |
| 182-108   | 6" x 150mm  | 1/10        | 1/50  | 1mm  | 0.5mm   | 3/4"   |                                         |
| 182-111   | 150mm       | 1mm         | 0.5mm | 1mm  | 0.5mm   | 19mm   |                                         |
| 182-121   | 12"(4R)     | 1/8         | 1/16  | 1/32 | 1/64th  | 1"     | +.005 / –.0035"<br>(+0.13mm / –0.09mm)  |
| 182-122   | 12"(16R)    | 1/32        | 1/64  | 1/50 | 1/100th | 1"     |                                         |
| 182-123   | 12"(5R)     | 1/32        | 1/64  | 1/10 | 1/100th | 1"     |                                         |
| 182-124   | 12"(3R)     | 1/32        | 1/64  | 1/10 | 1/50th  | 1"     |                                         |
| 182-125   | 12" x 300mm | 1/32        | 1/64  | 1mm  | 0.5mm   | 1"     |                                         |
| 182-126   | 12" x 300mm | 1/50        | 1/100 | 1mm  | 0.5mm   | 1"     |                                         |
| 182-131   | 300mm       | 1mm         | 0.5mm | 1mm  | 0.5mm   | 25mm   |                                         |
| 182-241   | 18"(4R)     | 1/8         | 1/16  | 1/32 | 1/64    | 13/16" | +.006" / -.035"<br>(+0.15mm / -.09mm)   |
| 182-142   | 18"(16R)    | 1/32        | 1/64  | 1/50 | 1/100th | 13/16" |                                         |
| 182-143   | 18"(5R)     | 1/32        | 1/64  | 1/10 | 1/100th | 13/16" |                                         |
| 182-145   | 18" x 450mm | 1/32        | 1/64  | 1mm  | 0.5mm   | 13/16" |                                         |
| 182-151   | 450mm       | 1mm         | 0.5mm | 1mm  | 0.5mm   | 30mm   |                                         |
| 182-161   | 24"(4R)     | 1/8         | 1/16  | 1/32 | 1/64    | 13/16" | +.007" / –.0035"<br>(+0.18mm / –0.09mm) |
| 182-162   | 24"(16R)    | 1/32        | 1/64  | 1/50 | 1/100th | 13/16" |                                         |
| 182-163   | 24"(5R)     | 1/32        | 1/64  | 1/10 | 1/100th | 13/16" |                                         |
| 182-165   | 24" x 600mm | 1/32        | 1/64  | 1mm  | 0.5mm   | 13/16" |                                         |
| 182-171   | 600mm       | 1mm         | 0.5mm | 1mm  | 0.5mm   | 30mm   |                                         |

# Steel Rules

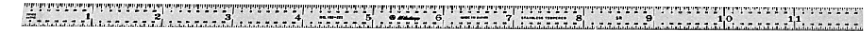
## SERIES 182

### FEATURES

- Clear graduations on satin-chrome finish.
- Stainless tempered.



182-265



182-223

### SPECIFICATIONS

#### Full-Flexible Rules (thickness 1/64")

| Order No. | Size        | Graduations |       |      |         | Width | Accuracy (Length)                         |
|-----------|-------------|-------------|-------|------|---------|-------|-------------------------------------------|
| 182-201   | 6" (4R)     | 1/8         | 1/16  | 1/32 | 1/64th  | 1/2"  | +0.004" / -0.0035"<br>(+0.1mm / -0.09mm)  |
| 182-202   | 6" (16R)    | 1/32        | 1/64  | 1/50 | 1/100th | 1/2"  |                                           |
| 182-203   | 6" (5R)     | 1/32        | 1/64  | 1/10 | 1/100th | 1/2"  |                                           |
| 182-204   | 6" (3R)     | 1/32        | 1/64  | 1/10 | 1/50th  | 1/2"  |                                           |
| 182-205   | 6" x 150mm  | 1/32        | 1/64  | 1mm  | 0.5mm   | 1/2"  |                                           |
| 182-206   | 6" x 150mm  | 1/50        | 1/100 | 1mm  | 0.5mm   | 1/2"  |                                           |
| 182-207   | 6" x 150mm  | 1/10        | 1/100 | 1mm  | 0.5mm   | 1/2"  |                                           |
| 182-208   | 6" x 150mm  | 1/10        | 1/50  | 1mm  | 0.5mm   | 1/2"  |                                           |
| 182-211   | 150mm       | 1mm         | 0.5mm | 1mm  | 0.5mm   | 12mm  | +0.005" / -0.0035"<br>(+0.13mm / -0.09mm) |
| 182-221   | 12" (4R)    | 1/8         | 1/16  | 1/32 | 1/64th  | 1/2"  |                                           |
| 182-222   | 12" (16R)   | 1/32        | 1/64  | 1/50 | 1/100th | 1/2"  |                                           |
| 182-223   | 12" (5R)    | 1/32        | 1/64  | 1/10 | 1/100th | 1/2"  |                                           |
| 182-224   | 12" (3R)    | 1/32        | 1/64  | 1/10 | 1/50th  | 1/2"  |                                           |
| 182-225   | 12" x 300mm | 1/32        | 1/64  | 1mm  | 0.5mm   | 1/2"  |                                           |
| 182-226   | 12" x 300mm | 1/50        | 1/100 | 1mm  | 0.5mm   | 1/2"  |                                           |
| 182-231   | 300mm       | 1mm         | 0.5mm | 1mm  | 0.5mm   | 12mm  |                                           |
| 182-241   | 18" (4R)    | 1/8         | 1/16  | 1/32 | 1/64    | 3/4"  | +0.006" / -0.0035"<br>(+0.15mm / -0.09mm) |
| 182-242   | 18" (16R)   | 1/32        | 1/64  | 1/50 | 1/100th | 3/4"  |                                           |
| 182-243   | 18" (5R)    | 1/32        | 1/64  | 1/10 | 1/100th | 3/4"  |                                           |
| 182-245   | 18" x 450mm | 1/32        | 1/64  | 1mm  | 0.5mm   | 3/4"  |                                           |
| 182-251   | 450mm       | 1mm         | 0.5mm | 1mm  | 0.5mm   | 18mm  | +0.007" / -0.0035"<br>(+0.18mm / -0.09mm) |
| 182-261   | 24" (4R)    | 1/8         | 1/16  | 1/32 | 1/64    | 3/4"  |                                           |
| 182-262   | 24" (16R)   | 1/32        | 1/64  | 1/50 | 1/100th | 3/4"  |                                           |
| 182-263   | 24" (5R)    | 1/32        | 1/64  | 1/10 | 1/100th | 3/4"  |                                           |
| 182-264   | 24" (3R)    | 1/32        | 1/64  | 1/10 | 1/50th  | 3/4"  |                                           |
| 182-265   | 24" x 600mm | 1/32        | 1/64  | 1mm  | 0.5mm   | 3/4"  |                                           |
| 182-271   | 600mm       | 1mm         | 0.5mm | 1mm  | 0.5mm   | 18mm  |                                           |

# Semi-Flexible Rules

## SERIES 182

### FEATURES

- Engraved on frontside only

### SPECIFICATIONS

#### Inch/Metric

| Order No. | Size         | Graduations |     |      |      | Width  | Accuracy (Length)                         |
|-----------|--------------|-------------|-----|------|------|--------|-------------------------------------------|
| 182-301   | 4" x 100mm   | 1/2mm       | 1mm | 1/32 | 1/64 | 1/16th | +0.004" / -0.0035"<br>(+0.1mm / -0.09mm)  |
| 182-302   | 6" x 150mm   | 1/2mm       | 1mm | 1/32 | 1/64 | 1/16th | +0.005" / -0.0035"<br>(+0.13mm / -0.09mm) |
| 182-303   | 8" x 200mm   | 1/2mm       | 1mm | 1/32 | 1/64 | 1/16th | +0.007" / -0.0035"<br>(+0.18mm / -0.09mm) |
| 182-305   | 12" x 300mm  | 1/2mm       | 1mm | 1/32 | 1/64 | 1/16th | +0.008" / -0.004" (+0.2mm / -0.1mm)       |
| 182-307   | 20" x 500mm  | 1/2mm       | 1mm | 1/32 | 1/64 | 1/16th | +0.007" / -0.0035" (+0.18mm / -0.09mm)    |
| 182-309   | 40" x 1000mm | 1/2mm       | 1mm | 1/32 | 1/64 | 1/16th | +0.008" / -0.004" (+0.2mm / -0.1mm)       |



# Thickness/Feeler Gages

**SERIES 950, 184**

## FEATURES

- Each leaf is marked with its thickness.
- Each leaf is detachable.



184-303S

## SPECIFICATIONS

| Inch                          |                |                              |              |                                                                                            |
|-------------------------------|----------------|------------------------------|--------------|--------------------------------------------------------------------------------------------|
| Range                         | Order No.      | Type of Blade                | Blade Length | Composition of leaves                                                                      |
| .0015" - .035"<br>(26 leaves) | <b>950-251</b> | Straight<br>1/2" width       | 3"           | .002 thru .018" by .001" step plus .0015, .020, .022, .024, .025, .028, .030, .032"        |
| .0015" - .025"<br>(26 leaves) | <b>950-252</b> | Tapered<br>1/4" width at tip | 3"           | .002 thru .025 by .001" step plus .0015, .0025"                                            |
| .0015" - .200"<br>(15 leaves) | <b>950-254</b> | Straight<br>1/2" width       | 3"           | .0015, .002, .003, .004, .006, .008, .010, .012, .015, .020, .030, .040, .075, .100, .200" |
| .0015" - .200"<br>(13 leaves) | <b>950-255</b> | Straight<br>1/2" width       | 4.5"         | .0015, .002, .003, .004, .006, .008, .010, .020, .030, .040, .075, .100, .200"             |
| .0015" - .015"<br>(9 leaves)  | <b>950-256</b> | Straight<br>1/2" width       | 6"           | .0015, .002, .003, .004, .006, .008, .010, .012, .015"                                     |

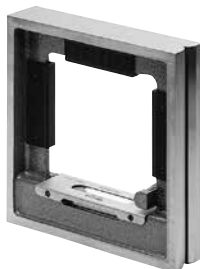
| Metric       |                 |                        |              |                                                                 |
|--------------|-----------------|------------------------|--------------|-----------------------------------------------------------------|
| Range        | Order No.       | Type of Blade          | Blade Length | Composition of leaves                                           |
| 0.05 - 1mm   | <b>184-313S</b> | Straight<br>13mm width | 100mm        | 28 leaves: 0.05 - 0.15mm by 0.01mm, 0.2 - 1mm by 0.05mm         |
|              | <b>184-303S</b> |                        | 150mm        | 28 leaves: 0.05 - 0.15mm by 0.01mm, 0.2 - 1mm by 0.05mm         |
| 0.05 - 1mm   | <b>184-304S</b> | Straight 13mm width    | 150mm        | 20 leaves: 0.05 - 1mm by 0.05mm                                 |
| 0.05 - 1mm   | <b>184-305S</b> | Straight<br>13mm width | 100mm        | 13 leaves: 0.05 - 0.3mm by 0.05mm, 0.4 - 1mm by 0.1mm           |
|              | <b>184-301S</b> |                        | 150mm        | 13 leaves: 0.05 - 0.3mm by 0.05mm, 0.4 - 1mm by 0.1mm           |
| 0.05 - 0.8mm | <b>184-306S</b> | Straight<br>13mm width | 100mm        | 10 leaves: 0.05 - 0.2mm by 0.05mm, 0.3 - 0.8mm by 0.1mm         |
|              | <b>184-308S</b> |                        | 150mm        | 10 leaves: 0.05 - 0.2mm by 0.05mm, 0.3 - 0.8mm by 0.1mm         |
| 0.03 - 0.5mm | <b>184-307S</b> | Straight<br>13mm width | 100mm        | 13 leaves: 0.03 - 0.1mm by 0.01mm, 0.2 - 0.5mm by 0.1mm, 0.15mm |
|              | <b>184-302S</b> |                        | 150mm        | 13 leaves: 0.03 - 0.1mm by 0.01mm, 0.2 - 0.5mm by 0.1mm, 0.15mm |

# Precision Levels

**SERIES 960**

## FEATURES

- High-precision longitudinal and transverse vials make it possible to check or level surfaces.
- Supplied in wooden box.



960-703



960-611

## SPECIFICATIONS

| Metric    |             |          |                           |  |  |
|-----------|-------------|----------|---------------------------|--|--|
| Order No. | Sensitivity | Accuracy | Dimensions<br>(W x D x H) |  |  |
| 960-703   | 0.02mm/m    | ±0.006mm | 200 x 44 x 200mm          |  |  |

| Inch      |             |          |            |       |       |
|-----------|-------------|----------|------------|-------|-------|
| Order No. | Sensitivity | Accuracy | Dimensions |       |       |
|           |             |          | W          | D     | H     |
| 960-611   | .0012"/12"  | ±.0006"  | 7.87"      | 1.73" | 1.50" |
| 960-612   | .0006"/12"  | ±.0003"  | 7.87"      | 1.73" | 1.50" |
| 960-613   | .00024"/12" | ±.00017" | 7.87"      | 1.73" | 1.50" |

## Technical Data

Accuracy of Leaves Thickness

| Nominal Thickness           | Tolerance |
|-----------------------------|-----------|
| Metric                      |           |
| 0.01mm to less than 0.06mm: | ±0.003mm  |
| 0.06mm to less than 0.10mm: | ±0.004mm  |
| 0.10mm to less than 0.35mm: | ±0.005mm  |
| 0.35mm to less than 0.65mm: | ±0.008mm  |
| 0.65mm to less than 3.0mm:  | ±0.01mm   |
| Inch                        |           |
| .0015 to less than .007":   | ±.0002"   |
| .007 to less than .015":    | ±.0003"   |
| .015 to less than .025":    | ±.0004"   |
| .026 to less than .030":    | ±.00045"  |
| .031 to less than .040":    | ±.0005"   |
| .041 to less than .075":    | ±.00055"  |
| .076 to less than .100":    | ±.0006"   |
| .101 to less than .200":    | ±.00065"  |
| .200" and over :            | ±.00075"  |

## Wooden Box Part No.

| Part No. | Spare          |
|----------|----------------|
| 073112   | <b>960-703</b> |
| 063413   | <b>960-611</b> |
|          | <b>960-611</b> |
|          | <b>960-613</b> |

# Digital Universal Protractor

## SERIES 187

### Technical Data

|                |                 |
|----------------|-----------------|
| Range:         | -360° to +360°  |
| Tolerance:     | ±2' (±0.03°)    |
| Repeatability: | 1'              |
| Resolution:    | 1' (0.01°)      |
| Battery:       | Lithium Battery |
| Battery life:  | 2,000 hours     |

### Function

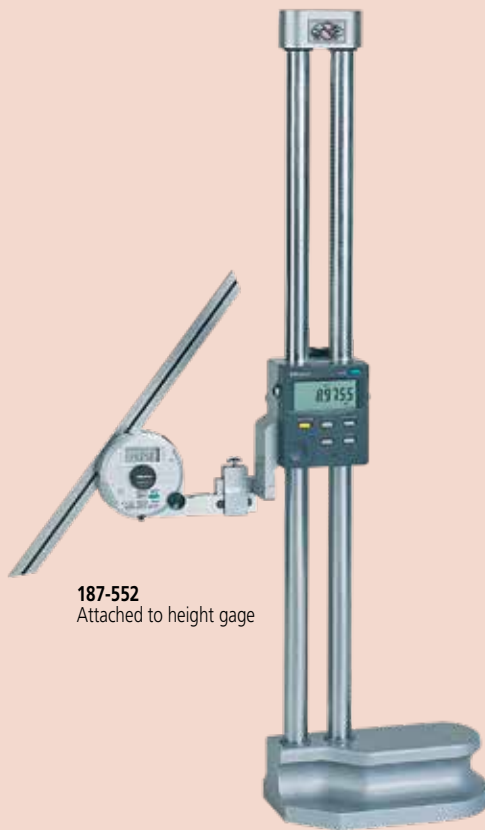
Presetting

### Standard Accessories

12" Blade (Code No. 187-103)  
 Battery (CR2032) (Part No. 05SAA217)  
 Clamp box for Inch Height Gage (Part No. 950749)  
 Plastic Case

### Optional Accessories

|                |                                  |
|----------------|----------------------------------|
| <b>187-104</b> | 6" blade                         |
| <b>187-105</b> | Acute angle attachment           |
| <b>950750</b>  | Clamp box for Metric Height Gage |
| <b>905338</b>  | Connecting cable (40" / 1m)      |
| <b>905409</b>  | Connecting cable (80" / 2m)      |



### FEATURES

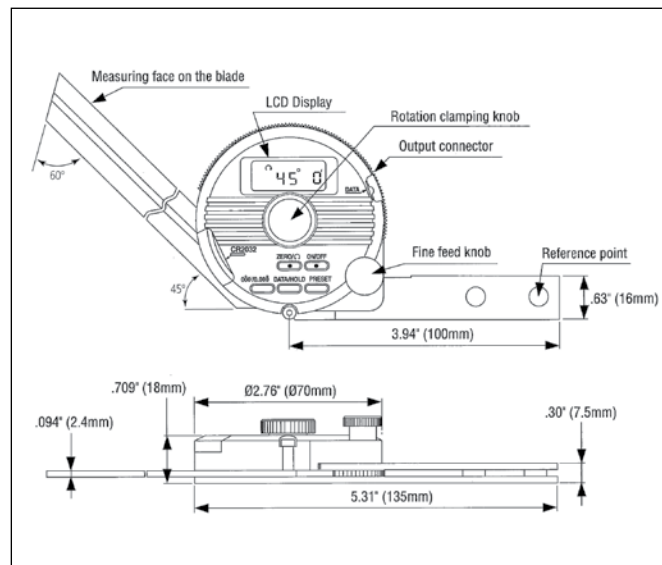
- Data output function make it easy to see the statistical data.
- Can be attached to height gages. gage holder (950750, metric)
- Setting preset value.
- Removable blade.



### SPECIFICATIONS

| Code No.                      | 187-552                                                                                            |
|-------------------------------|----------------------------------------------------------------------------------------------------|
| Model                         | BP-D300E                                                                                           |
| Blade                         | 12" (187-103)                                                                                      |
| Display                       | LCD - 5 digit, (-) sign, character height 6.5mm                                                    |
| Measuring range               | -360° ~ +360°                                                                                      |
| Resolution                    | 1' (0.01°)                                                                                         |
| Accuracy                      | ± 2' (±0.03°)                                                                                      |
| Repeatability                 | 1' (0.01°)                                                                                         |
| Mass                          | 1.45 lbs (659g)                                                                                    |
| Dust / Water protection level | IP40                                                                                               |
| Function                      | Zero, Direction select, Data output / Data hold, Preset, Switchable Seagesimal or Decimal Notation |
| Max. response speed           | 3 rps                                                                                              |
| Battery                       | Lithium battery (CR2032) 1 pc. (Part No. 05SAA217)                                                 |
| Battery life                  | 2,000 hours                                                                                        |
| Alarm                         | Battery voltage low, Over speed error (Err)                                                        |
| Temperature                   | Operation temperature: 0 to 40°C<br>Storage temperature: -10 to 60°C                               |

### DIMENSIONS

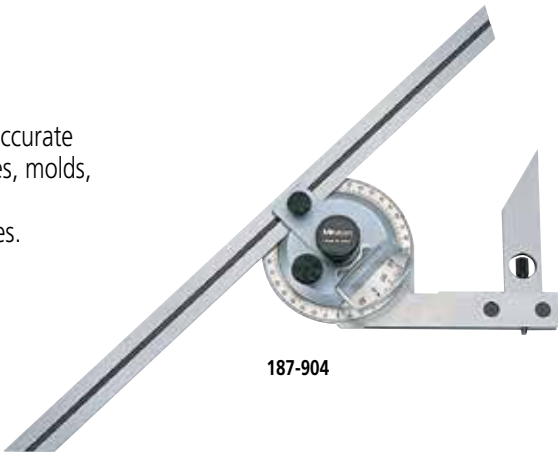


# Universal Bevel Protractor

## SERIES 187

### FEATURES

- High-precision angle gage for accurate angle measurement of machines, molds, and jigs.
- Can be attached to height gages.



187-904

### SPECIFICATIONS

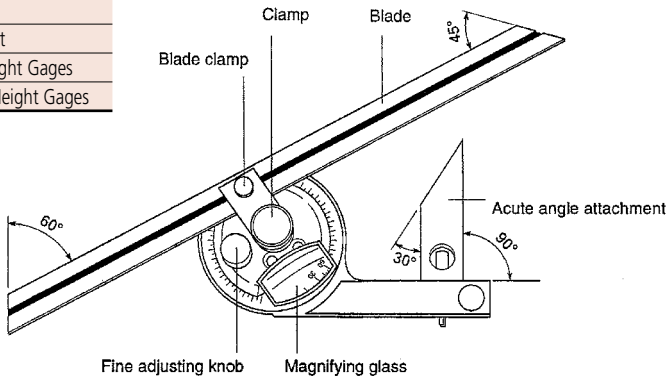
#### Universal Bevel Protractors

| Graduation |      |         |                                                                       |
|------------|------|---------|-----------------------------------------------------------------------|
| Order No.  | Dial | Vernier | Remarks                                                               |
| 187-904    | 1°   | 5 min   | with 6" blade (187-104) and Clamp box for Inch Height Gages (950749)  |
| 187-906    | 1°   | 5min    | with 12" blade (187-103) and Clamp box for Inch Height Gages (950749) |

#### Universal Bevel Protractor Accessories and Parts

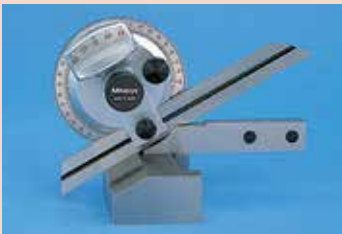
| Order No. | Remarks                           |
|-----------|-----------------------------------|
| 187-103   | 12" Blade                         |
| 187-104   | 6" Blade                          |
| 187-105   | Acute angle attachment            |
| 950749    | Clamp box for Inch Height Gages   |
| 950750    | Clamp box for Metric Height Gages |

### DIMENSIONS



### Technical Data

|                    |                           |
|--------------------|---------------------------|
| Graduation:        | 5min. (0° - 90° - 0°)     |
| Accuracy           |                           |
| Vernier            | ±5'                       |
| Straightness       | [.00016" + (.00005xL/2)]" |
| Parallelism        | [.00016" + (.00005xL/2)]" |
| L = Length in inch |                           |
| Diameter:          | 2.56" / 70mm              |



# Bevel Protractor

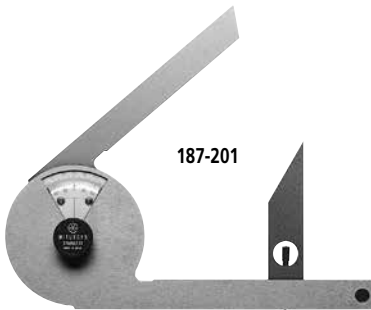
## SERIES 187

### FEATURES

- Consists of three sheets of stainless steel, the middle one of which is made for angle measurements.

### SPECIFICATIONS

| Order No. | Graduation | Remarks                                                                             |
|-----------|------------|-------------------------------------------------------------------------------------|
| 187-201   | 1° / 5 min | Center black knob locks the blade position<br>Protractor Graduation: 0°-90°, 90°-0° |



187-201

### Technical Data

|                   |                        |
|-------------------|------------------------|
| Graduation:       | 5 min. (0° - 90° - 0°) |
| Blade edge angle: | 30° and 60°            |
| Diameter:         | 2.56" / 70mm           |

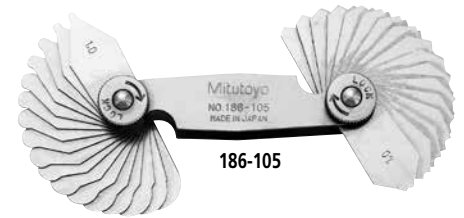


# Radius Gages

## SERIES 186

### FEATURES

- Radius size is stamped on each gage.
- Both concave and convex radius gages become a pair.
- With a locking clamp.



### Technical Data

Accuracy:  $\pm 0.02''$



### SPECIFICATIONS

#### Metric

| Range       | Order No.      | Composition of leaves                                                             | Remarks  |
|-------------|----------------|-----------------------------------------------------------------------------------|----------|
| 0.4 - 6mm   | <b>186-110</b> | 18 leaves: 0.4, 0.8, 1, 1.2, 1.5, 1.6mm, 1.75 - 3mm by 0.25mm, 3.5 - 6mm by 0.5mm | 90° arc  |
| 1 - 7mm     | <b>186-105</b> | 34 pairs: 1 - 3mm by 0.25mm 3.5 - 7mm by 0.5mm                                    | 180° arc |
| 7.5 - 15mm  | <b>186-106</b> | 32 pairs: 7.5 - 15mm by 0.5mm                                                     | 180° arc |
| 15.5 - 25mm | <b>186-107</b> | 15 pairs: 15.5 - 20mm by 0.5mm, 21 - 25mm by 1mm                                  | 180° arc |

#### Inch

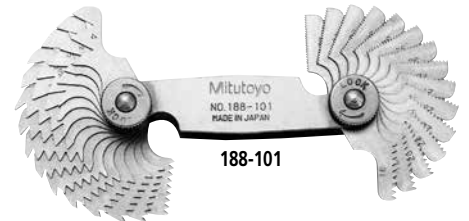
| Range          | Order No.      | Composition of leaves              | Remarks  |
|----------------|----------------|------------------------------------|----------|
| 1/32" - 17/64" | <b>186-103</b> | 16 leaves: 1/32" - 17/64" by 64ths | 90° arc  |
| 1/32" - 1/4"   | <b>186-101</b> | 15 pairs: 1/32" - 1/4" by 64ths    | 180° arc |
| 17/64" - 1/2"  | <b>186-102</b> | 16 pairs: 17/64" - 1/2" by 64ths   | 180° arc |
| 9/32" - 33/64" | <b>186-104</b> | 16 leaves: 9/32" - 33/64" by 64ths | 90° arc  |

# Pitch Gages

## SERIES 188, 950

### FEATURES

- Thread pitch size is stamped on each gage.
- Metric, Unified, and Whitworth screw pitch gages.



### Technical Data

| TPI   | Metric    | Accuracy   |                   |
|-------|-----------|------------|-------------------|
|       |           | Pitch (mm) | Angular (minutes) |
| 4-6   | 6.35-4.23 | $\pm 0.05$ | $\pm 35$          |
| 7-12  | 3.63-2.12 | $\pm 0.05$ | $\pm 40$          |
| 13-25 | 1.95-1.02 | $\pm 0.05$ | $\pm 45$          |
| 26-48 | 0.98-0.53 | $\pm 0.05$ | $\pm 50$          |
| 60    | 0.42      | $\pm 0.05$ | $\pm 60$          |

### SPECIFICATIONS

#### Metric Screw Pitch Gages (60°)

| Range        | Order No.      | Composition of leaves                                                                                                                                                                |
|--------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0.25 - 2.5mm | <b>188-153</b> | 28 leaves: 0.25, 0.30, 0.35, 0.40, 0.45, 0.50, 0.55, 0.60, 0.65, 0.70, 0.75, 0.80, 0.85, 0.90, 1.00, 1.10, 1.20, 1.25, 1.30, 1.40, 1.50, 1.60, 1.70, 1.75, 1.80, 1.90, 2.00, 2.50 mm |
| 0.35 - 6mm   | <b>188-130</b> | 22 leaves: 0.35, 0.4, 0.45, 0.5, 0.6, 0.7, 0.75, 0.8, 1, 1.25, 1.5, 1.75, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6mm and 60° angle gage                                                     |
| 0.4 - 7mm    | <b>188-122</b> | 21 leaves: 0.4, 0.5, 0.7, 0.75, 0.8, 0.9, 1, 1.25, 1.5, 1.75, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7mm                                                                            |
| 0.4 - 7mm    | <b>188-121</b> | 18 leaves: 0.4, 0.5, 0.75, 1, 1.25, 1.5, 1.75, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7mm                                                                                           |

#### Unified Screw Pitch Gages (60°)

| Range      | Order No.      | Composition of leaves                                                                                                                                                                                                         |
|------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 - 42 TPI | <b>188-111</b> | 30 leaves: 4, 4 1/2, 5, 5 1/2, 6, 7, 8, 9, 10, 11, 11 1/2, 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30, 32, 34, 36, 38, 40, 42 TPI                                                                                     |
| 4 - 84 TPI | <b>950-253</b> | 51 leaves: 4, 4 1/2, 5, 5 1/2, 6, 7, 8, 9, 10, 11, 11 1/2, 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84 TPI |

Note: Metric and Unified Pitch Gage Set (**188-151**) is available. It consists of **188-122** (Metric) and **188-111** (Unified).

#### Metric and Unified Screw Pitch Gage Set (60°)

| Range                  | Order No.      | Composition of leaves                                                                                                                                           |
|------------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0.4 - 7mm / 4 - 42 TPI | <b>188-151</b> | 51 leaves: Set of 188-122 and 188-111                                                                                                                           |
| 0.5 - 6mm / 4 - 56 TPI | <b>188-152</b> | 28 leaves: 4, 6, 8, 10, 11, 11 1/2, 12, 13, 16, 20, 28, 32, 40, 56 TPI<br>0.50, 0.75, 1.00, 1.25, 1.50, 1.75, 2.00, 2.50, 3.00, 3.50, 4.00, 4.50, 5.00, 6.00 mm |

#### Whitworth Screw Pitch Gages (55°)

| Range      | Order No.      | Composition of leaves                                                                                                                     |
|------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| 4 - 42 TPI | <b>188-101</b> | 30 leaves: 4, 4 1/2, 5, 5 1/2, 6, 7, 8, 9, 10, 11, 11 1/2, 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30, 32, 34, 36, 38, 40, 42 TPI |
| 4 - 60 TPI | <b>188-102</b> | 28 leaves: 4, 4 1/2, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 18, 19, 20, 22, 24, 25, 26, 28, 30, 32, 34, 36, 40, 48, 60 TPI                |

# Radius Gages-Sets

## SERIES 186

### FEATURES

Radius Gages are recommended for checking or laying out concave or convex radii. An individual gage for each dimension makes it possible to verify radius or fillet dimensions easier, faster and more accurately in machining, layout, inspection and pattern-making work. The measuring surfaces are precisely finished with smooth, accurate edges. Radius gages are available separately or in six sets. Each radius gage has five measuring locations, and it is identified with its particular radius dimensions. The gages have a satin or dull-chrome finish.

The holding cases, provided to protect the sets of radius gages, have indexed pockets to facilitate the selection of the proper size gage. A 4" long holder is furnished with Set No. 186-901 to make it possible to check radii in confined or hard-to-reach locations.



186-901

### SPECIFICATIONS

#### Metric

| Order No. | No. of Leaves | Sizes               | Remarks |
|-----------|---------------|---------------------|---------|
| 186-902   | 26            | 0.5 - 13mm by 0.5mm | 90° arc |

#### Inch

| Order No. | No. of Leaves | Sizes                                                                                    | Remarks |
|-----------|---------------|------------------------------------------------------------------------------------------|---------|
| 186-901   | 25            | 1/64"-17/64" by 64ths and 9/32"-1/2" by 32nds                                            | Holder  |
| 186-903   | 17            | 1/64"-17/64" by 64ths                                                                    |         |
| 186-904   | 8             | 9/32"-1/2" by 32nds                                                                      |         |
| 186-905   | 8             | 9/16"-1" by 16ths                                                                        | Holder  |
| 186-906   | 26            | .010-.030" by .005"<br>.040-.100" by .010"<br>.120-.300" by .020"<br>.350-.500" by .050" | Holder  |
| 186-907   | 10            | .550-1" by .050"                                                                         |         |

Replacement handle: 950753

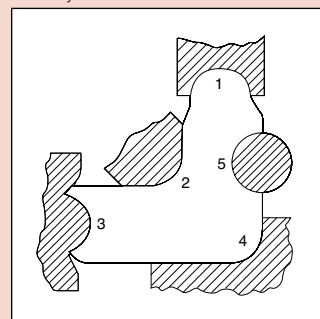
#### Decimal

| Radius | Part No. | Radius | Part No. |
|--------|----------|--------|----------|
| .010"  | 211798   | .240"  | 211816   |
| .015"  | 211799   | .260"  | 211817   |
| .020"  | 211800   | .280"  | 211818   |
| .025"  | 211801   | .300"  | 211819   |
| .030"  | 211802   | .350"  | 211820   |
| .040"  | 211803   | .400"  | 211821   |
| .050"  | 211804   | .450"  | 211822   |
| .060"  | 211805   | .500"  | 211823   |
| .070"  | 211806   | .550"  | 211824   |
| .080"  | 211807   | .600"  | 211825   |
| .090"  | 211808   | .650"  | 211826   |
| .100"  | 211809   | .700"  | 211827   |
| .120"  | 211810   | .750"  | 211828   |
| .140"  | 211811   | .800"  | 211829   |
| .160"  | 211812   | .850"  | 211830   |
| .180"  | 211813   | .900"  | 211831   |
| .200"  | 211814   | .950"  | 211832   |
| .220"  | 211815   | 1.000" | 211833   |

#### Fraction

| Radius | Part No. | Radius | Part No. |
|--------|----------|--------|----------|
| 1/64"  | 201441   | 5/16"  | 201459   |
| 1/32"  | 201442   | 11/32" | 201460   |
| 3/64"  | 201443   | 3/8"   | 201461   |
| 1/16"  | 201444   | 13/32" | 201462   |
| 5/64"  | 201445   | 7/16"  | 201463   |
| 3/32"  | 201446   | 15/32" | 201464   |
| 7/64"  | 201447   | 1/2"   | 201465   |
| 1/8"   | 201448   | 9/16"  | 211790   |
| 9/64"  | 201449   | 5/8"   | 211791   |
| 5/32"  | 201450   | 11/16" | 211792   |
| 11/64" | 201451   | 3/4"   | 211793   |
| 3/16"  | 201452   | 13/16" | 211794   |
| 13/64" | 201453   | 7/8"   | 211795   |
| 7/32"  | 201454   | 15/16" | 211796   |
| 15/64" | 201455   | 1"     | 211797   |
| 1/4"   | 201456   |        |          |
| 17/64" | 201457   |        |          |
| 9/32"  | 201458   |        |          |

Accuracy:  $\pm 0.0016"$  / 0.04mm



5 concave and convex radii per leaf.

# Digital Protractor

## SERIES 950

### FEATURES

These digital protractors present inclination values on an easy-to-read LCD. The measurements are generated by an electronic gravity sensor and processed by the latest low-power electronic circuit technology.

- Full 360° range (90° x 4).
- Machined aluminum frame.
- Alternate reference (zero).
- Reading hold.
- Simple calibration requiring no special fixtures.
- Display remains upright to view at all angles. (950-317, Pro 360 Model).
- RS232C output. (950-318 Pro 3600 Model).
- Supplied in fitted carrying case.



Front View



950-317 Back View



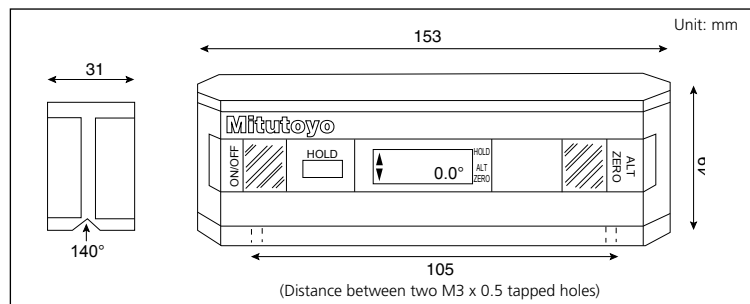
950-318 Back View

### SPECIFICATIONS

| Order No.             | 950-317                                             | 950-318                                                        |
|-----------------------|-----------------------------------------------------|----------------------------------------------------------------|
| Model                 | Pro 360                                             | Pro 3600                                                       |
| Range                 | 360° (90°x4)                                        | 360° (90°x4)                                                   |
| Resolution            | 0.1°                                                | 0.01° (0° to 9.99°)<br>0.1° (10° to 90°)                       |
| Accuracy              | ±0.1° Level ±10°, Plumb ±10°<br>±0.2° Maximum error | ±0.05° (0° to 10°)<br>±0.1° (80° to 90°)<br>±0.2° (10° to 80°) |
| Repeatability         | ±0.1°                                               | ±0.05°                                                         |
| Cross Axis Error      | Minimal                                             | Minimal                                                        |
| Battery Life          | 500 Hrs. Standard 9-Volt Battery                    | 500 Hrs. Standard 9-Volt Battery                               |
| Temperature Operation | -5°C to 50°C (23° to 122°F)                         | -5°C to 50°C (23° to 122°F)                                    |
| Storage               | -20°C to 65°C (-4°F to 149°F)                       | -20°C to 65°C (-4°F to 149°F)                                  |
| Weight                | 289g (10.2oz.)                                      | 295g (10.4oz.)                                                 |
| Output                | N/A                                                 | RS-232C Compatible                                             |
| Standard Accessories  | Plastic Case                                        | Plastic Case                                                   |

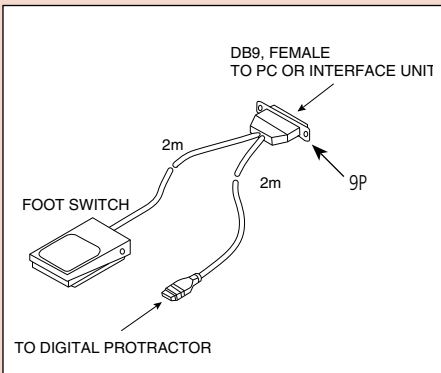
±Represents clockwise or counter-clockwise slope.

### DIMENSIONS



### Optional Accessories

50AAA983A RS-232C Output cable w/foot switch



50AAA983A RS-232C Output cable w/foot switch 10P-9P

# Digital Hand Tachometers

## SERIES 982

### FEATURES

- New digital hand tachometers are compact and easy to handle.
- NIST certification is supplied with each digital hand tachometer.
- Model PH-200LC (982-552) has laser diode detection and a combination of contact and non-contact measurement.
- Supplied with plastic carrying case.



982-551



982-552

### SPECIFICATIONS

| Order No.             | 982-551                                                                                                         | 982-552                                                                                                                |
|-----------------------|-----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| Model No.             | PH-100A                                                                                                         | PH-200LC                                                                                                               |
| Revolution per minute | 1.0 – 25,000 rpm                                                                                                | —                                                                                                                      |
| Rotation speed        | —                                                                                                               | Non-contact: 6.0 – 99,999 rpm;<br>Contact: 6.0 – 25,000 rpm                                                            |
| Measuring accuracy    | 1.0 – 599.9rpm: $\pm 1$ rpm, 600.0 – 25,000 rpm:<br>$\pm 0.006\%$ and $\pm 0.5$ digit<br>Surface, Speed, Length | 6.0 – 599.9 rpm: $\pm 1$ rpm, 600.0 – 99,999 rpm<br>$\pm 0.006\%$ and $\pm 0.5$ digit<br>$\pm 0.4\%$ and $\pm 1$ digit |
| Detection             | Optical coupler, 20 pulses per revolution                                                                       | Laser diode                                                                                                            |
| Outside dimensions    | 4.83" L x 2.52" W x 1.24" H<br>(122.5mm x 64mm x 31.5mm)                                                        | 4.55" L x 2.52" W x 1.24" H<br>Overall length with contact adapter: 149mm                                              |
| Mass                  | 170 g                                                                                                           | 160 g                                                                                                                  |
| Power                 | Battery: AA 3 pcs.                                                                                              | Battery: AA 3 pcs.                                                                                                     |

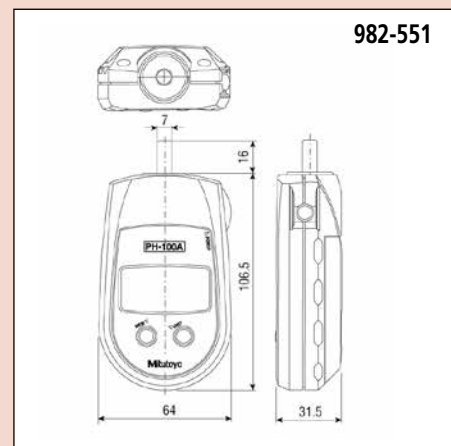
### Optional Accessories for Digital Hand Tachometers

| Order No. | Description                            | Dimension              | Drawing |
|-----------|----------------------------------------|------------------------|---------|
| 010049    | Cone Adapter, Standard                 | D = 1/2"               |         |
| 010051    | Cone Adapter, 3/4"                     | D = 3/4"               |         |
| 010052    | Cone Adapter, 1-1/4"                   | D = 1-1/4"<br>d = 1/2" |         |
| 010053    | Funnel Adapter, Standard               | D = 1/2"               |         |
| 010054    | Funnel Adapter, 3/4"                   | D = 3/4"               |         |
| 010055    | Measuring Wheel FPM (6" cir), Standard | D = 1.91"              |         |
| 010056    | Measuring Wheel FPM (12" cir)          | D = 3.82"              |         |
| 010057    | Measuring Wheel YPM (0.1 yard cir)     | D = 1.15"              |         |
| 010058    | Measuring Wheel MPM (0.1 meter cir)    | D = 1.25"              |         |
| 010059    | Reflective Tabs 1/2" square (35 pcs)   |                        |         |
| 010060    | Extension Shaft (3" length)            |                        |         |

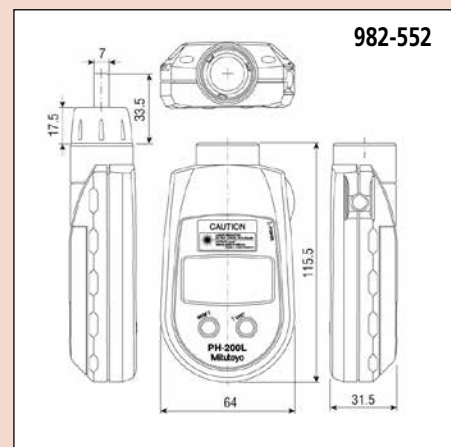
## CAUTION

**LASER RADIATION**  
DO NOT STARE INTO BEAM  
OUTPUT <1mW  
WAVELENGTH 650nm  
CLASS II LASER PRODUCT

### DIMENSIONS



982-551



982-552

# Bench Center

## SERIES 967

### Technical Data

Spindle tip material: Hardened Steel

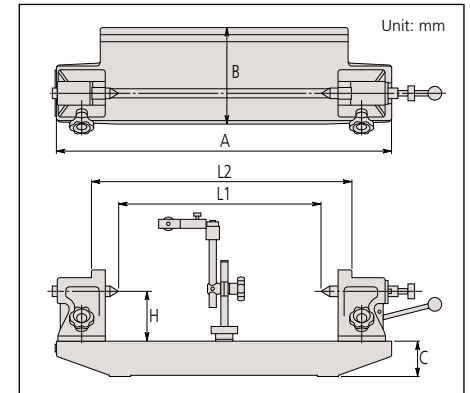
### FEATURES

- Used with a dial test indicator (optional), the bench center provides precision measurement of concentricity verification on cylindrical workpieces.
- With an indicator clamp. (Holding stem diameter: 9.53mm / .375")

967-201-10



### DIMENSIONS



| Order No.  | A   | B   | C   | H   | L1  | L2  |
|------------|-----|-----|-----|-----|-----|-----|
| 967-203-10 | 310 | 113 | 40  | 50  | 150 | 220 |
| 967-201-10 | 500 | 144 | 55  | 75  | 300 | 400 |
| 967-204-10 | 700 | 202 | 80  | 100 | 450 | 590 |
| 967-202-10 | 900 | 222 | 100 | 125 | 600 | 730 |

### Standard Accessories:

**56AAK066** Indicator rod assembly  
967-201-10  
967-203-10

**56AAK961R** Indicator rod assembly  
967-202-10  
967-204-10

### Optional Accessories:

**56AAJ988** Special attachment for mounting 967-201-10 in vertical position.

**56AAJ987** Special attachment for mounting 967-203-10 in vertical position.

### SPECIFICATIONS

| Order No.  | Center-to-Center | Workpiece Capacity Diameter | Max. Weight Hold | Parallelism of Centers | Flatness of Surface | Attachment Diameter | Mass (kg) |
|------------|------------------|-----------------------------|------------------|------------------------|---------------------|---------------------|-----------|
| 967-203-10 | 5.9" / 150mm     | 3.8"                        | 15.5lbs.(7kg)    | .00024"                | .0005"              | 3/8", 8mm           | 7         |
| 967-201-10 | 11.8" / 300mm    | 5.8"                        | 35 lbs. (16kg)   | .0004"                 | .0006"              | 3/8", 8mm           | 13        |
| 967-204-10 | 17.7" / 450mm    | 7.8"                        | 44 lbs. (20kg)   | .0004"                 | .0007"              | 3/8", 8mm           | 60        |
| 967-202-10 | 23.6" / 600mm    | 9.8"                        | 66 lbs. (30kg)   | .00047"                | .00075"             | 3/8", 8mm           | 70        |

# Granite Surface Plate Accessories

## SERIES 517

These accessories are made from the same high-quality black granite as Mitutoyo surface plates, allowing flexibility in work holding and positioning.

### SPECIFICATIONS

**Angle Blocks** with or without inserts

| Grade      | Laboratory* |            |            | Master** |            |            |
|------------|-------------|------------|------------|----------|------------|------------|
| Size       | 2 Face      | 4 Face     |            | 2 Face   | 4 Face     |            |
|            |             | no inserts | w/ inserts |          | no inserts | w/ inserts |
| 4 x 4 x 4" | 517-767     | 517-761    | 517-773    | 517-867  | 517-861    | 517-873    |
| 6 x 6 x 6" | 517-768     | 517-762    | 517-774    | 517-868  | 517-862    | 517-874    |

\*Laboratory overall accuracy: .000025" per 6".

\*\*Master overall accuracy: .000050" per 6".

### Parallels

| Grade          | Laboratory    |            |         | Master        |         |         |
|----------------|---------------|------------|---------|---------------|---------|---------|
| Size           | Pair Accuracy | Laboratory |         | Pair Accuracy | Master  |         |
|                |               | 2 Face     | 4 Face  |               | 2 Face  | 4 Face  |
| .75 x 1 x 6"   | .00003"       | 517-755    | 517-750 | .00006"       | 517-855 | 517-850 |
| .75 x 1.5 x 9" | .00004"       | 517-756    | 517-751 | .00008"       | 517-856 | 517-851 |
| 1 x 2 x 12"    | .00006"       | 517-757    | 517-752 | .0001"        | 517-857 | 517-852 |

### V-Blocks Matching Pair

V-1 type have matching accuracy on "V" from the bottom face only.  
V-5 type have four face matching accuracy plus "V".

| Grade        | Laboratory* |         | Master** |         |
|--------------|-------------|---------|----------|---------|
| Size         | V-1         | V-5     | V-1      | V-5     |
| 2 x 2 x 2.5" | 517-787     | 517-783 | 517-887  | 517-883 |
| 3 x 3 x 3"   | 517-788     | 517-784 | 517-888  | 517-884 |
| 6 x 6 x 6"   | 517-789     | 517-785 | 517-889  | 517-885 |

\*Laboratory overall accuracy: .00005" per 6".

\*\*Master overall accuracy: .0001" per 6"

Angle Blocks



517-862  
(without inserts)

517-884 V-Blocks (matching pair)



517-852  
Parallels  
(in pairs)

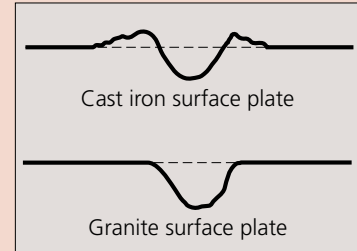
**Mitutoyo**

# Black Granite Surface Plate

## SERIES 517

### FEATURES

- Natural granite seasoned for thousands of years is free from deterioration or dimensional change over time.
- Granite surface plate has many advantages over cast iron surface plates: Twice as hard as cast iron. Minimal changes in dimension due to temperature changes. Free from wringing, so there is no interruption of work. Free from burrs or protrusions because of the fine grain structure and insignificant stickiness; this ensures a high degree of flatness over a long service life and causes no damage to other parts or instruments.
- Trouble-free operation for use with magnetic materials.
- Long life and rust-free, resulting in low maintenance costs.
- Mitutoyo granite surface plates meet or exceed federal specification GGG-P-463c. Each surface plate is shipped with a Certificate of Accuracy which guarantees its accuracy and verifies its traceability to NIST.
- All plates from 48"x108" and larger are machine base gray granite. Smaller plates are black granite.
- Surface plates, to size of specifications other than standard, available by special order.
- Surface plates, with the bolt screws, available by special order.
- All Mitutoyo surface plates shipped F.O.B. Escondido, CA.



### SPECIFICATIONS

Inch 100 lbs.-Load / sq. ft. no ledge

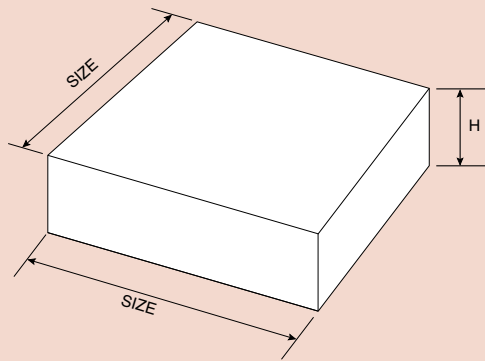
| Size      | AA Laboratory Grade |        |                |           | A Inspection Grade |        |                |           | B Shop Grade |        |                |           |
|-----------|---------------------|--------|----------------|-----------|--------------------|--------|----------------|-----------|--------------|--------|----------------|-----------|
|           | H                   | Acc. * | Order No.      | Wt. (lbs) | H                  | Acc. * | Order No.      | Wt. (lbs) | H            | Acc. * | Order No.      | Wt. (lbs) |
| 8 x 12"   | 3"                  | 50     | <b>517-700</b> | 30        | 2"                 | 100    | <b>517-800</b> | 25        | 2"           | 200    | <b>517-900</b> | 25        |
| 9 x 12"   | 3"                  | 50     | <b>517-701</b> | 40        | 3"                 | 100    | <b>517-801</b> | 40        | 2"           | 200    | <b>517-901</b> | 30        |
| 12 x 12"  | 3"                  | 50     | <b>517-702</b> | 50        | 3"                 | 100    | <b>517-802</b> | 50        | 3"           | 200    | <b>517-902</b> | 50        |
| 12 x 18"  | 4"                  | 50     | <b>517-703</b> | 100       | 4"                 | 100    | <b>517-803</b> | 100       | 4"           | 200    | <b>517-903</b> | 100       |
| 18 x 18"  | 4"                  | 50     | <b>517-704</b> | 150       | 4"                 | 100    | <b>517-804</b> | 150       | 3"           | 200    | <b>517-904</b> | 100       |
| 18 x 24"  | 4"                  | 65     | <b>517-705</b> | 200       | 4"                 | 130    | <b>517-805</b> | 200       | 4"           | 260    | <b>517-905</b> | 200       |
| 24 x 24"  | 5"                  | 70     | <b>517-706</b> | 310       | 4"                 | 140    | <b>517-806</b> | 259       | 3"           | 280    | <b>517-906</b> | 200       |
| 24 x 30"  | 5"                  | 75     | <b>517-707</b> | 400       | 5"                 | 150    | <b>517-807</b> | 400       | 4"           | 300    | <b>517-907</b> | 300       |
| 24 x 36"  | 6"                  | 85     | <b>517-708</b> | 600       | 5"                 | 170    | <b>517-808</b> | 500       | 4"           | 340    | <b>517-908</b> | 400       |
| 24 x 48"  | 8"                  | 150    | <b>517-709</b> | 1000      | 6"                 | 300    | <b>517-809</b> | 800       | 5"           | 600    | <b>517-909</b> | 650       |
| 30 x 36"  | 6"                  | 100    | <b>517-710</b> | 800       | 5"                 | 200    | <b>517-810</b> | 600       | 5"           | 400    | <b>517-910</b> | 600       |
| 30 x 48"  | 8"                  | 150    | <b>517-711</b> | 1300      | 6"                 | 300    | <b>517-811</b> | 1000      | 6"           | 600    | <b>517-911</b> | 1000      |
| 30 x 60"  | 12"                 | 200    | <b>517-712</b> | 1900      | 10"                | 500    | <b>517-812</b> | 1535      | 8"           | 1000   | <b>517-912</b> | 1150      |
| 36 x 36"  | 6"                  | 100    | <b>517-713</b> | 900       | 5"                 | 200    | <b>517-813</b> | 780       | 5"           | 400    | <b>517-913</b> | 700       |
| 36 x 48"  | 8"                  | 150    | <b>517-714</b> | 1500      | 6"                 | 300    | <b>517-814</b> | 1200      | 6"           | 600    | <b>517-914</b> | 1200      |
| 36 x 60"  | 12"                 | 200    | <b>517-715</b> | 2850      | 10"                | 400    | <b>517-815</b> | 2350      | 8"           | 800    | <b>517-915</b> | 1900      |
| 36 x 72"  | 12"                 | 250    | <b>517-716</b> | 3400      | 10"                | 500    | <b>517-816</b> | 2850      | 8"           | 1000   | <b>517-916</b> | 2300      |
| 48 x 48"  | 8"                  | 200    | <b>517-717</b> | 2025      | 6"                 | 400    | <b>517-817</b> | 1525      | 6"           | 800    | <b>517-917</b> | 1500      |
| 48 x 60"  | 12"                 | 250    | <b>517-718</b> | 3800      | 10"                | 500    | <b>517-818</b> | 3150      | 8"           | 1000   | <b>517-918</b> | 2525      |
| 48 x 72"  | 12"                 | 300    | <b>517-719</b> | 4500      | 10"                | 600    | <b>517-819</b> | 3800      | 8"           | 1200   | <b>517-919</b> | 3050      |
| 48 x 84"  | 14"                 | 350    | <b>517-720</b> | 6150      | 12"                | 700    | <b>517-820</b> | 5325      | 10"          | 1400   | <b>517-920</b> | 4450      |
| 48 x 96"  | 14"                 | 400    | <b>517-721</b> | 7000      | 12"                | 800    | <b>517-821</b> | 6050      | 10"          | 1600   | <b>517-921</b> | 5150      |
| 48 x 108" | 14"                 | 500    | <b>517-722</b> | 7900      | 12"                | 1000   | <b>517-822</b> | 6830      | 10"          | 2000   | <b>517-922</b> | 5700      |
| 48 x 120" | 18"                 | 700    | <b>517-723</b> | 11300     | 16"                | 1400   | <b>517-823</b> | 10160     | 14"          | 2800   | <b>517-923</b> | 8800      |
| 48 x 144" | 18"                 | 800    | <b>517-724</b> | 13500     | 16"                | 1600   | <b>517-824</b> | 12200     | 14"          | 3200   | <b>517-924</b> | 10500     |
| 60 x 60"  | 14"                 | 250    | <b>517-725</b> | 5500      | 12"                | 500    | <b>517-825</b> | 4800      | 10"          | 1000   | <b>517-925</b> | 4000      |
| 60 x 72"  | 14"                 | 350    | <b>517-726</b> | 6600      | 12"                | 700    | <b>517-826</b> | 5750      | 10"          | 1400   | <b>517-926</b> | 4900      |
| 60 x 96"  | 14"                 | 500    | <b>517-727</b> | 8800      | 12"                | 1000   | <b>517-827</b> | 7600      | 10"          | 2000   | <b>517-927</b> | 6500      |
| 60 x 120" | 16"                 | 700    | <b>517-728</b> | 11050     | 14"                | 1400   | <b>517-828</b> | 11100     | 12"          | 2800   | <b>517-928</b> | 9800      |
| 60 x 144" | 18"                 | 900    | <b>517-729</b> | 16950     | 16"                | 1800   | <b>517-829</b> | 15100     | 14"          | 3600   | <b>517-929</b> | 14200     |
| 72 x 72"  | 14"                 | 400    | <b>517-730</b> | 8000      | 12"                | 800    | <b>517-830</b> | 7000      | 10"          | 1600   | <b>517-930</b> | 5700      |
| 72 x 96"  | 16"                 | 500    | <b>517-731</b> | 12025     | 14"                | 1000   | <b>517-831</b> | 10800     | 12"          | 2000   | <b>517-931</b> | 9200      |
| 72 x 120" | 16"                 | 700    | <b>517-732</b> | 15070     | 14"                | 1400   | <b>517-832</b> | 13400     | 12"          | 2800   | <b>517-932</b> | 11400     |
| 72 x 144" | 18"                 | 1000   | <b>517-733</b> | 20300     | 16"                | 2000   | <b>517-833</b> | 18100     | 14"          | 4000   | <b>517-933</b> | 15900     |

\* Accuracies shown in microinches (µin)



# Black Granite Surface Plate

## SERIES 517



**Inch** 50 lbs.-Load / sq. ft. no ledge

| Size     | AA Laboratory Grade |      |                |      | A Inspection Grade |      |                |      | B Shop Grade |      |                |     |
|----------|---------------------|------|----------------|------|--------------------|------|----------------|------|--------------|------|----------------|-----|
|          | H                   | Acc. | Order No.      | Wt.  | H                  | Acc. | Order No.      | Wt.  | H            | Acc. | Order No.      | Wt. |
| 8 x 12"  | 2"                  | 50   | <b>517-740</b> | 25   | 2"                 | 100  | <b>517-840</b> | 25   | 2"           | 200  | <b>517-940</b> | 25  |
| 12 x 18" | 3"                  | 50   | <b>517-741</b> | 80   | 3"                 | 100  | <b>517-841</b> | 80   | 2"           | 200  | <b>517-941</b> | 60  |
| 18 x 24" | 4"                  | 65   | <b>517-742</b> | 200  | 3"                 | 130  | <b>517-842</b> | 165  | 2"           | 260  | <b>517-942</b> | 100 |
| 24 x 36" | 5"                  | 85   | <b>517-743</b> | 500  | 4"                 | 170  | <b>517-843</b> | 400  | 3"           | 340  | <b>517-943</b> | 300 |
| 36 x 48" | 6"                  | 150  | <b>517-746</b> | 1200 | 5"                 | 300  | <b>517-846</b> | 1000 | 4"           | 600  | <b>517-946</b> | 800 |

## Steel Stands

### SERIES 517

Steel stands for supporting black granite surface plates, at working levels, are available either stationary or with casters. Sizes and weights are given below.

### SPECIFICATIONS

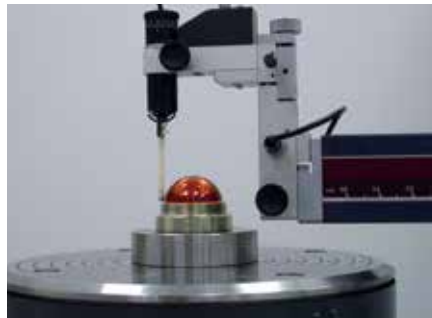
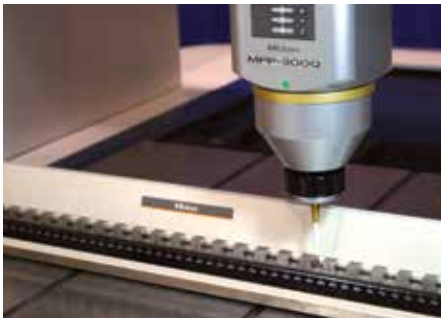
| Size      | Stationary     |        | With Casters     |        |
|-----------|----------------|--------|------------------|--------|
|           | Order No.      | Wt.    | Order No.        | Wt.    |
| 12 x 18"  | <b>517-950</b> | 42lbs  | <b>517-950-1</b> | 46lbs  |
| 18 x 18"  | <b>517-951</b> | 46lbs  | <b>517-951-1</b> | 50lbs  |
| 18 x 24"  | <b>517-952</b> | 50lbs  | <b>517-952-1</b> | 56lbs  |
| 24 x 24"  | <b>517-954</b> | 65lbs  | <b>517-954-1</b> | 69lbs  |
| 24 x 30"  | <b>517-955</b> | 70lbs  | <b>517-955-1</b> | 74lbs  |
| 24 x 36"  | <b>517-956</b> | 73lbs  | <b>517-956-1</b> | 77lbs  |
| 24 x 48"  | <b>517-957</b> | 90lbs  | <b>517-957-1</b> | 94lbs  |
| 30 x 36"  | <b>517-960</b> | 85lbs  | <b>517-960-1</b> | 89lbs  |
| 30 x 48"  | <b>517-961</b> | 95lbs  | <b>517-961-1</b> | 99lbs  |
| 30 x 60"  | <b>517-962</b> | 105lbs | <b>517-962-1</b> | 109lbs |
| 36 x 36"  | <b>517-963</b> | 95lbs  | <b>517-963-1</b> | 99lbs  |
| 36 x 48"  | <b>517-964</b> | 105lbs | <b>517-964-1</b> | 109lbs |
| 36 x 60"  | <b>517-965</b> | 160lbs | <b>517-965-1</b> | 164lbs |
| 36 x 72"  | <b>517-966</b> | 180lbs | <b>517-966-1</b> | 184lbs |
| 48 x 48"  | <b>517-967</b> | 190lbs | <b>517-967-1</b> | 194lbs |
| 48 x 60"  | <b>517-968</b> | 200lbs | <b>517-968-1</b> | 204lbs |
| 48 x 72"  | <b>517-969</b> | 205lbs | <b>517-969-1</b> | 209lbs |
| 48 x 84"  | <b>517-970</b> | 320lbs | <b>517-970-1</b> | 324lbs |
| 48 x 96"  | <b>517-971</b> | 335lbs | <b>517-971-1</b> | 339lbs |
| 48 x 108" | <b>517-972</b> | 350lbs | <b>517-972-1</b> | 354lbs |
| 48 x 120" | <b>517-973</b> | 365lbs | <b>517-973-1</b> | 369lbs |
| 48 x 144" | <b>517-974</b> | 430lbs | <b>517-974-1</b> | 434lbs |
| 60 x 60"  | <b>517-975</b> | 245lbs |                  |        |
| 60 x 72"  | <b>517-976</b> | 340lbs |                  |        |
| 60 x 96"  | <b>517-977</b> | 375lbs |                  |        |
| 60 x 120" | <b>517-978</b> | 455lbs |                  |        |
| 60 x 144" | <b>517-979</b> | 480lbs |                  |        |
| 72 x 72"  | <b>517-980</b> | 380lbs |                  |        |
| 72 x 96"  | <b>517-981</b> | 465lbs |                  |        |
| 72 x 120" | <b>517-982</b> | 510lbs |                  |        |
| 72 x 144" | <b>517-983</b> | 530lbs |                  |        |

48x72 and smaller include keepers to prevent the surface plate from being pushed off the stand.

Note: Stands can only be purchased with granite surface plates. Working height is 36" unless otherwise specified.



# MITUTOYO CALIBRATION SERVICES



Mitutoyo America has expanded three-dimensional calibration and inspection services at our new precision measurement facility located in our corporate headquarters in Aurora, IL. Equipped with multiple Mitutoyo Legex CMMs, along with high-accuracy vision and form measuring instruments, our laboratory offers accredited dimensional measurement services with uncertainty as low as  $0.25\text{ }\mu\text{m}$  (10 pinches). And for form measurement, our uncertainty goes as low as 5 nanometers (0.2 pinches).

Our experienced staff is ready for your challenges – we specialize in specialty gage calibration, complex prototype or master parts, specialty and custom-built 3D gages, and long length standards such as ball bars, step gages and gage blocks. We can also assist you in the validation of your measurement processes by providing accredited reference values on your parts.

Mitutoyo America calibration and inspection services are accredited to ISO/IEC 17025 by A2LA (Certificate 0750.01). We welcome customer tours of our laboratory.

If you have any questions or would like more information regarding Mitutoyo Calibration Services, contact: [mim@mitutoyo.com](mailto:mim@mitutoyo.com)

