



## Series 647 Side-Loading Hydraulic Wedge Grips

Precision, easy-to-load grips for a wide range of tensile and fatigue applications

### Benefits

#### EASY SPECIMEN INSERTION

- » Side-loading lets you quickly and easily insert specimens.

#### EXCELLENT REPEATABILITY

- » These grips clamp onto your specimen in the same position, test after test, to minimize the bending strains that can invalidate your test results.

#### TENSION & FATIGUE CAPABILITY

- » You can use the 647s for both tensile and fatigue tests.

#### ADJUSTABLE PRESSURE

- » Hydraulic pressure can be adjusted, allowing these grips to be used for testing a variety of materials.

#### MULTIPLE WEDGE SELECTION

- » A wide variety of wedges are available to meet your requirements.

Test after test, MTS Series 647 Side-Loading Hydraulic Wedge Grips clamp your specimen in exactly the same way for consistent, repeatable testing results. Their superior alignment and constant, lateral gripping force minimize the bending strains, vertical loading forces and slippage that can invalidate test results and cost you time.

The hydraulic pressure to these grips is supplied by an external grip supply and is adjustable. This allows the grips to be used for testing a variety of materials, including plastics and ceramics. An adjustable gripping force prevents damage to your specimens from grip or specimen slippage during your tests.

Your specimens are also protected by the 647's preload chamber which locks all moving grip parts in position, eliminating backlash when cycling between tension and compression.

These grips can be mounted on non-hydraulic frames when used with an optional, stand-alone hydraulic pump and valve assembly. They can also be mounted in environmental chambers when equipped with optional, high-temperature hydraulic fluid and seals.

A variety of wedges are available for the Series 647 grips and are sold separately. These grips are also available in axial-torsional models.

## Options

### SPIRAL WASHERS

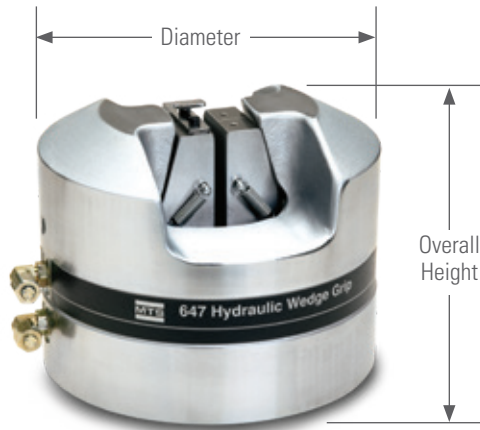
- » Use anywhere you need a backlash free connection to your load frame.

### WEDGE VARIETY

- » Flat, round or vee-shaped wedges with surfaces available for brittle or soft specimens. Water cooled wedges also available in certain sizes.

### HIGH TEMPERATURE OPTIONS

- » Model 602 extension rods and a hardline supply can be purchased for high temperature testing.



## Axial Model 647 Grip Specifications

| Model           | Dynamic Force     | Static Force         | Pressure            | Temperature* Min/Max         | Overall Height   | Diameter         |
|-----------------|-------------------|----------------------|---------------------|------------------------------|------------------|------------------|
| <b>647.02B</b>  | 25 kN (5.5 kip)   | 31 kN (7,000 lb)     | 21 MPa (3000 psi)   | -40°C/177°C (-40°F/350°F)    | 131 mm (5.2 in)  | 150 mm (6.0 in)  |
| <b>647.10A</b>  | 100 kN (22 kip)   | 120 kN (27,000 lb)   | 21 MPa (3000 psi)   | -40°C/177°C (-40°F/350°F)    | 188 mm (7.4 in)  | 203 mm (8.0 in)  |
| <b>647.25A</b>  | 250 kN (55 kip)   | 333 kN (75,000 lb)   | 69 MPa (10,000 psi) | -40°C/177°C (-40°F/350°F)    | 249 mm (9.8 in)  | 266 mm (10.5 in) |
| <b>647.50A</b>  | 500 kN (110 kip)  | 550 kN (120,000 lb)  | 69 MPa (10,000 psi) | -18°C to 65°C (0°F to 150°F) | 291 mm (11.5 in) | 330 mm (13.0 in) |
| <b>647.100A</b> | 1000 kN (220 kip) | 1200 kN (264,000 lb) | 69 MPa (10,000 psi) | -18°C to 65°C (0°F to 150°F) | 414 mm (16.2 in) | 444 mm (17.5 in) |
| <b>647.250</b>  | 2500 kN (550 kip) | 2750 kN (610 kip)    | 69 MPa (10,000 psi) | -18°C to 65°C (0°F to 150°F) | 819 mm (32.3 in) | 737 mm (29.0 in) |

\*Temperatures above 77°C/150°F require a stand-alone grip supply and extension rods.

| Model           | Weight            | Metric/US Customary Stud Size | Part Number |
|-----------------|-------------------|-------------------------------|-------------|
| <b>647.02B</b>  | 7 kg (15 lb)      | M12 x 1.25 (1/2"-20)          | 056-078-605 |
| <b>647.10A</b>  | 30 kg (67 lb)     | M27 x 2 (1"-14)               | 047-080-605 |
| <b>647.25A</b>  | 77 kg (170 lb)    | M36 x 2 (1 1/2"-12)           | 047-080-905 |
| <b>647.50A</b>  | 148 kg (325 lb)   | M52 x 2 (2"-12)               | 047-595-505 |
| <b>647.100A</b> | 386 kg (850 lb)   | M76 x 2                       | 053-137-201 |
| <b>647.250</b>  | 1153 kg (3335 lb) | N/A                           | Contact MTS |

Wedges and attachment kits sold separately.

## Axial-Torsional Model 647 Grip Specifications

| Model             | Axial Force     | Torsional Force          | Pressure            | Temperature* Min/Max      | Overall Height   | Diameter         |
|-------------------|-----------------|--------------------------|---------------------|---------------------------|------------------|------------------|
| <b>647.02B-22</b> | 25 kN (5.5 kip) | 220 N.m (2000 in.lb)     | 21 MPa (3000 psi)   | -40°C/150°C (-40°F/300°F) | 135 mm (5.3 in)  | 150 mm (6.0 in)  |
| <b>647.10A-05</b> | 100 kN (22 kip) | 550 N.m (5000 in.lb)     | 21 MPa (3000 psi)   | -40°C/121°C (-40°F/250°F) | 188 mm (7.4 in)  | 203 mm (8.0 in)  |
| <b>647.10A-11</b> | 100 kN (22 kip) | 1,100 N.m (10,000 in.lb) | 21 MPa (3000 psi)   | -40°C/121°C (-40°F/250°F) | 224 mm (8.8 in)  | 203 mm (8.0 in)  |
| <b>647.25A-22</b> | 250 kN (55 kip) | 2,200 N.m (20,000 in.lb) | 69 MPa (10,000 psi) | -18°C/65°C (0°F/150°F)    | 343 mm (13.5 in) | 266 mm (10.5 in) |

\*Temperatures above 77°C/150°F require a stand-alone grip supply and extension rods.

| Model             | Weight         | Mounting     | Part Number |
|-------------------|----------------|--------------|-------------|
| <b>647.02B-22</b> | 8 kg (16 lb)   | 40 mm dia.   | 100-026-042 |
| <b>647.10A-05</b> | 27 kg (60 lb)  | M68 x 2 (LH) | 049-157-301 |
| <b>647.10A-11</b> | 34 kg (75 lb)  | M68 x 2 (LH) | 049-817-001 |
| <b>647.25A-22</b> | 95 kg (210 lb) | M92 x 3 (LH) | 056-124-001 |

## Flat Wedge Specimen Specifications

| Model Number   | Specimen           |                    | Narrow Wedge Set assembly* |         |                   |                    | Wide Wedge Set assembly* |         |                   |                    |
|----------------|--------------------|--------------------|----------------------------|---------|-------------------|--------------------|--------------------------|---------|-------------------|--------------------|
|                | Thickness (T)      |                    | Width*                     |         | Part Number       |                    | Width*                   |         | Part Number       |                    |
|                | mm                 | in                 | mm                         | in      | Diamond Serations | Surfallooy Coating | mm                       | in      | Diamond Serations | Surfallooy Coating |
| <b>647.02B</b> | 0.00 mm to 7.2 mm  | 0.00 in to 0.28 in | 25.4 mm                    | 1.00 in | 050-507-906       | 050-507-917        | 38.1 mm                  | 1.50 in | 054-585-001       | 054-585-005        |
| <b>647.02B</b> | 7.1 mm to 14.4 mm  | 0.28 in to 0.57 in | 25.4 mm                    | 1.00 in | 050-507-907       | 050-507-918        | 38.1 mm                  | 1.50 in | 054-585-002       | 054-585-006        |
| <b>647.10</b>  | 0.00 mm to 7.6 mm  | 0.0 in to 0.30 in  | 44.5 mm                    | 1.75 in | 041-842-101       | 041-842-108        | 76.2 mm                  | 3.00 in | 046-198-604       | 046-198-602        |
| <b>647.10</b>  | 7.1 mm to 14.2 mm  | 0.28 in to 0.56 in | 44.5 mm                    | 1.75 in | 041-842-102       | 041-842-111        | 76.2 mm                  | 3.00 in | 046-198-603       | 046-198-601        |
| <b>647.10</b>  | 11.7 mm to 19.1 mm | 0.46 in to 0.75 in | 44.5 mm                    | 1.75 in | 041-842-109       | 041-842-121        | 76.2 mm                  | 3.00 in | –                 | –                  |
| <b>647.25</b>  | 1.0 mm to 11.9 mm  | 0.04 in to 0.47 in | 50.8 mm                    | 2.00 in | 041-842-201       | 041-842-207        | 101.6 mm                 | 4.00 in | 046-198-804       | 046-198-817        |
| <b>647.25</b>  | 6.10 mm to 17.0 mm | 0.24 in to 0.67 in | 50.8 mm                    | 2.00 in | 041-842-202       | 041-842-208        | 101.6 mm                 | 4.00 in | 046-198-806       | 046-198-802        |
| <b>647.25</b>  | 15.0 mm to 25.9 mm | 0.59 in to 1.02 in | 50.8 mm                    | 2.00 in | 041-842-203       | 041-842-209        | 101.6 mm                 | 4.00 in | 046-198-805       | 046-198-803        |
| <b>647.50</b>  | 0.00 mm to 10.9 mm | 0.00 in to 0.43 in | 101.6 mm                   | 4.00 in | 047-641-606       | 047-641-611        | 203.2 mm                 | 8.00 in | 048-966-302       | 048-966-307        |
| <b>647.50</b>  | 10.1 mm to 21 mm   | 0.40 in to 0.83 in | 101.6 mm                   | 4.00 in | 047-641-607       | 047-641-612        | 203.2 mm                 | 8.00 in | 048-966-303       | –                  |
| <b>647.50</b>  | 20.3 mm to 31.2 mm | 0.80 in to 1.23 in | 101.6 mm                   | 4.00 in | 047-641-608       | 047-641-613        | 203.2 mm                 | 8.00 in | 048-966-304       | 048-966-301        |
| <b>647.50</b>  | 30.4 mm to 41.4 mm | 1.20 in to 1.63 in | 101.6 mm                   | 4.00 in | 047-641-609       | 047-641-614        | 203.2 mm                 | 8.00 in | 048-966-305       | –                  |
| <b>647.50</b>  | 40.6 mm to 51.5 mm | 1.60 in to 2.03 in | 101.6 mm                   | 4.00 in | 047-641-610       | 047-641-615        | 203.2 mm                 | 8.00 in | 048-966-306       | –                  |
| <b>647.100</b> | 0.00 mm to 23.0 mm | 0.00 in to 0.89 in | –                          | –       | 053-137-403       | –                  | –                        | –       | –                 | –                  |
| <b>647.100</b> | 23.0 mm to 45.0 mm | 0.89 in to 1.77 in | –                          | –       | 053-137-402       | –                  | –                        | –       | –                 | –                  |
| <b>647.100</b> | 45.0 mm to 67.0 mm | 1.77 in to 2.64 in | –                          | –       | 053-137-401       | –                  | –                        | –       | –                 | –                  |

\* The wedge set assembly consists of a matched set of four wedges, two specimen guides and socket head cap screws.

## Round Wedge Specimen Specifications

| Model Number   | Specimen Diameter | Round Wedge Part Number    |
|----------------|-------------------|----------------------------|
| <b>647.02B</b> | 10.0 mm           | 050-507-912                |
| <b>647.02B</b> | 15.0 mm           | 050-507-913                |
| <b>647.02B</b> | 0.5 in            | 050-507-915                |
| <b>647.02B</b> | 1.0 in            | 050-507-916                |
| <b>647.10</b>  | 12 mm             | 041-842-134                |
| <b>647.10</b>  | 15 mm             | 041-842-135                |
| <b>647.10</b>  | 20 mm             | 041-842-136                |
| <b>647.10</b>  | 0.5 in            | 041-842-132                |
| <b>647.10</b>  | 0.75 in           | 041-842-133                |
| <b>647.10</b>  | 1.0 in            | 041-842-149                |
| <b>647.10</b>  | 12 mm             | 046-838-716 (water cooled) |
| <b>647.10</b>  | 15 mm             | 046-838-717 (water cooled) |
| <b>647.10</b>  | 0.5 in            | 046-838-714 (water cooled) |
| <b>647.10</b>  | 0.75 in           | 046-838-715 (water cooled) |
| <b>647.25</b>  | 15 mm             | 041-842-231                |
| <b>647.25</b>  | 20 mm             | 041-842-232                |
| <b>647.25</b>  | 30 mm             | 041-842-233                |
| <b>647.25</b>  | 0.5 in            | 041-842-234                |
| <b>647.25</b>  | 1.0 in            | 041-842-235                |

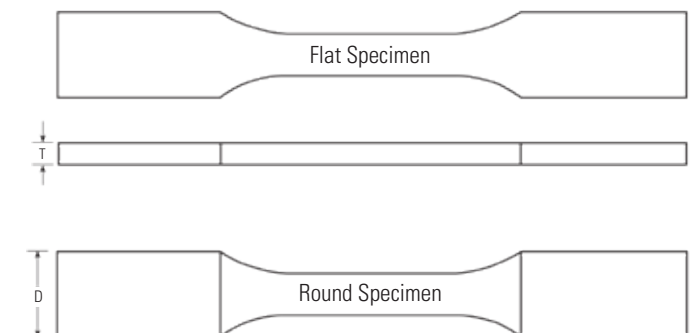
\* The wedge set assembly consists of a matched set of four wedges.

## 647.250 Wedge and Liner Sets

| Wedge Type            | Specimen Size Range   | Part Number         |
|-----------------------|---|---------------------|
| <b>Flat*</b>          | 0 – 29.5 mm   | 0 – 1.16 in         |
|                       | 26.8 – 54 mm  | 1.06 – 2.16 in      |
|                       | 51.8 – 79 mm  | 2.04 – 3.11 in      |
|                       | 76.8 – 104 mm   | 3.02 – 4.09 in      |
| <b>Vee**</b>          | 30 – 44.0/57.2 mm   | 1.18-1.73/2.25 in   |
|                       | 55.8 – 68.9/80.5 mm   | 2.20 – 2.71/3.17 in |
|                       | 78.6 – 93.7/104 mm  | 3.10 – 3.69/4.09 in |
| <b>Flat &amp; Vee</b> | Includes the flat and vee wedges described above and single set of liners | 050-507-915         |

\* Flat wedge size ranges refer to specimen thickness.

\*\* Vee wedge diameter ranges refer to top/Side-Loading.



## Vee Wedge Specimen Specifications

| Model Number    | Specimen Diameter (D)                                  | Vee Wedge Set Assembly*<br>Part Number                 |             |
|-----------------|--|--|-------------|
| <b>647.02B</b>  | 3.0 mm to 8.1 mm Side-Loading<br>9.4 mm Top-Loading    | 0.12 in to 0.32 in Side-Loading<br>0.37 in Top-Loading | 050-507-908 |
| <b>647.02B</b>  | 8.9 mm to 10.9 mm Side-Loading<br>15.2 mm Top-Loading  | 0.35 in to 0.43 in Side-Loading<br>0.60 in Top-Loading | 050-507-909 |
| <b>647.10</b>   | 5.8 mm to 10.2 mm Side-Loading<br>11.9 mm Top-Loading  | 0.23 in to 0.40 in Side-Loading<br>0.47 in Top-Loading | 041-842-103 |
| <b>647.10</b>   | 10.9 mm to 12.8 mm Side-Loading<br>16.5 mm Top-Loading | 0.43 in to 0.50 in Side-Loading<br>0.65 in Top-Loading | 041-842-104 |
| <b>647.10</b>   | No Side-Loading<br>12.7 mm to 19.0 mm Top-Loading      | No Side-Loading<br>0.50 in to 0.75 in Top-Loading      | 041-842-107 |
| <b>647.10</b>   | No Side-Loading<br>17.0 mm to 22.9 mm Top-Loading      | No Side-Loading<br>0.67 in to 0.90 in Top-Loading      | 041-842-110 |
| <b>647.25</b>   | 10.7 mm to 16.8 mm Side-Loading<br>19.9 mm Top-Loading | 0.42 in to 0.66 in Side-Loading<br>0.78 in Top-Loading | 041-842-204 |
| <b>647.25</b>   | 16.8 mm to 20.0 mm Side-Loading<br>26.2 mm Top-Loading | 0.66 in to 0.79 in Side-Loading<br>1.03 in Top-Loading | 041-842-205 |
| <b>647.25</b>   | 6.4 mm to 10.2 mm Side-Loading<br>13.5 mm Top-Loading  | 0.25 in to 0.40 in Side-Loading<br>0.53 in Top-Loading | 041-842-206 |
| <b>647.50</b>   | 6.4 mm to 12.7 mm Side-Loading<br>15.5 mm Top-Loading  | 0.25 in to 0.50 in Side-Loading<br>0.61 in Top-Loading | 047-641-601 |
| <b>647.50</b>   | 15.2 mm to 18.3 mm Side-Loading<br>24.4 mm Top-Loading | 0.60 in to 0.72 in Side-Loading<br>0.96 in Top-Loading | 047-641-602 |
| <b>647.50</b>   | 24.1 mm to 25.1 mm Side-Loading<br>33.5 mm Top-Loading | 0.95 in to 0.99 in Side-Loading<br>1.32 in Top-Loading | 047-641-602 |
| <b>6 647.50</b> | 33.0 mm to 33.0 mm Side-Loading<br>42.4 mm Top-Loading | 1.30 in to 1.30 in Side-Loading<br>1.67 in Top-Loading | 047-641-604 |
| <b>647.50</b>   | 41.9 mm to 41.9 mm Side-Loading<br>51.3 mm Top-Loading | 1.65 in to 1.65 in Side-Loading<br>2.02 in Top-Loading | 047-641-605 |
| <b>647.100</b>  | 6.0 mm to 10.0 mm Side-Loading<br>-                    | 0.24 in to 0.39 in Side-Loading<br>-                   | 053-137-407 |
| <b>647.100</b>  | 10.0 mm to 25.0 mm Side-Loading<br>-                   | 0.39 in to 0.99 in Side-Loading<br>-                   | 053-137-406 |
| <b>647.100</b>  | 25.0 mm to 44.0 mm Side-Loading<br>-                   | 0.99 in to 1.75 in Side-Loading<br>-                   | 053-137-405 |
| <b>647.100</b>  | 44.0 mm to 63.0 mm Side-Loading<br>-                   | 1.75 in to 2.5 in Side-Loading<br>-                    | 053-137-404 |

\* The wedge set assembly consists of a matched set of four wedges.



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