6.1.4 Standard Grips

Standard grips are interchangeable between 100N, 1.6kN, and 4.5kN systems. Some grips are specifically designed for accessories like temperature chambers and fluid baths. Ensure grip compatibility before attempting tests.

6.1.4.1 Tension Dogbone Grip

Using the dogbone grip (Fig. 6.4) and carefully aligning the center of the specimen to the load train allows for the best results for microscopy. The specimen will stay as in plane as possible aside from Poisson's effects.

If the specimen has a thickness less than 12mm (grip height) shims can be placed beneath the specimen on the specimen platform in order to ensure on-axis specimen placement. Shim thickness (mm) = 6-(specimen thickness/2).

Tension dogbone grips can be easily customized for any sample shape or size. Below are the external dimensions of the grip along with three standard sample sizes on the next page.

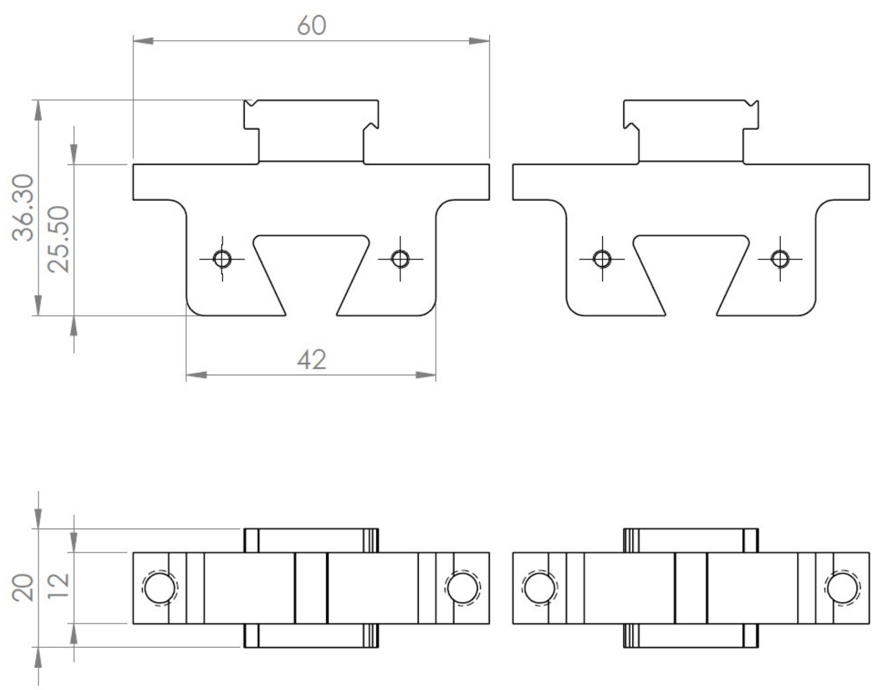

Figure 6.4 µTS Tension Dogbone Grip and Specimen Dimensions

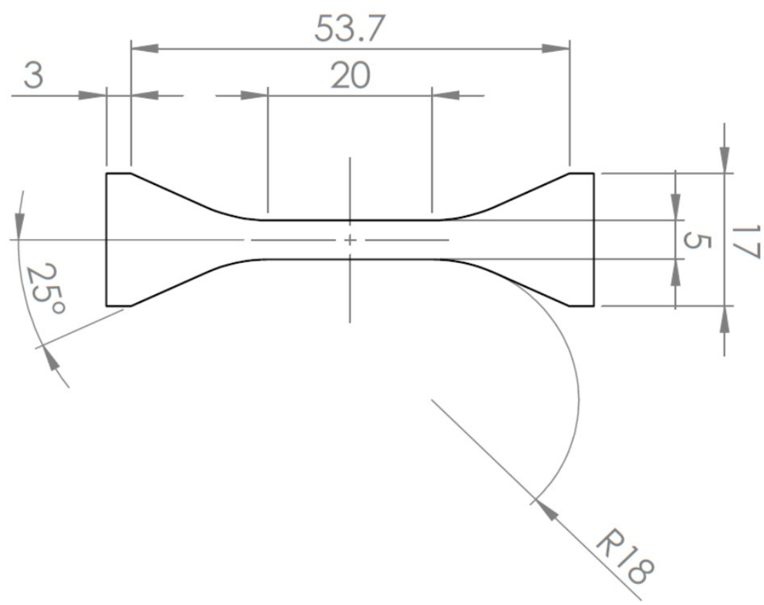

Figure 6.5 5mm Dogbone Specimen

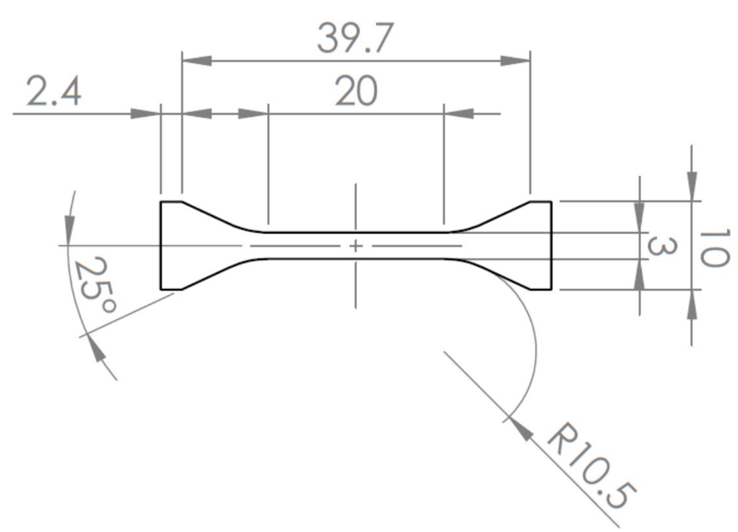

Figure 6.6 3mm Dogbone Specimen

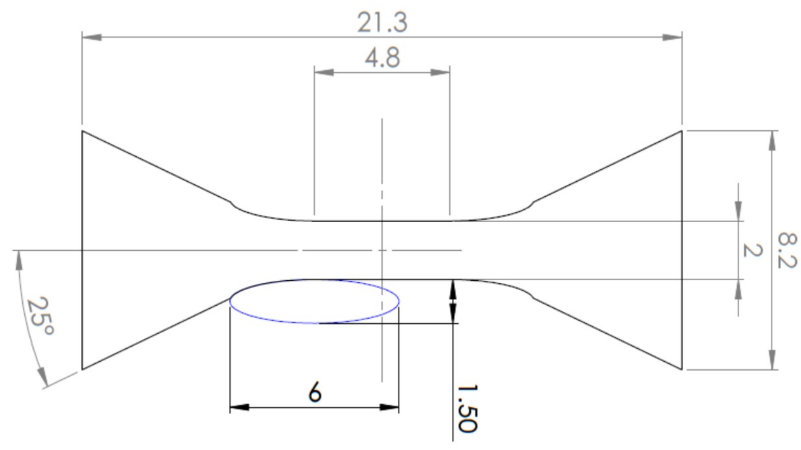

Figure 6.7 2mm Dogbone Specimen

6.1.4.2 Tension Clamp Grip

The clamp grip is meant for pulling on specimens that are not capable of being held by the dogbone grip. These may be soft specimens, thin, or ones that don't fit into the dogbone structure. These grips are more flexible for tensile tests but generally do not perform as well under high magnification.

Mounting and positioning the specimen on axis will provide more reliable and accurate data. Calipers or micrometers can be used to verify specimen placement by measuring the distance between the top surface of the crosshead and the top surface of the grip.

Distance from top of the crosshead to the top of the grip (mm) = (specimen thickness/2)

See Figure 6.8 for mounting dimensions and specimen size parameters.

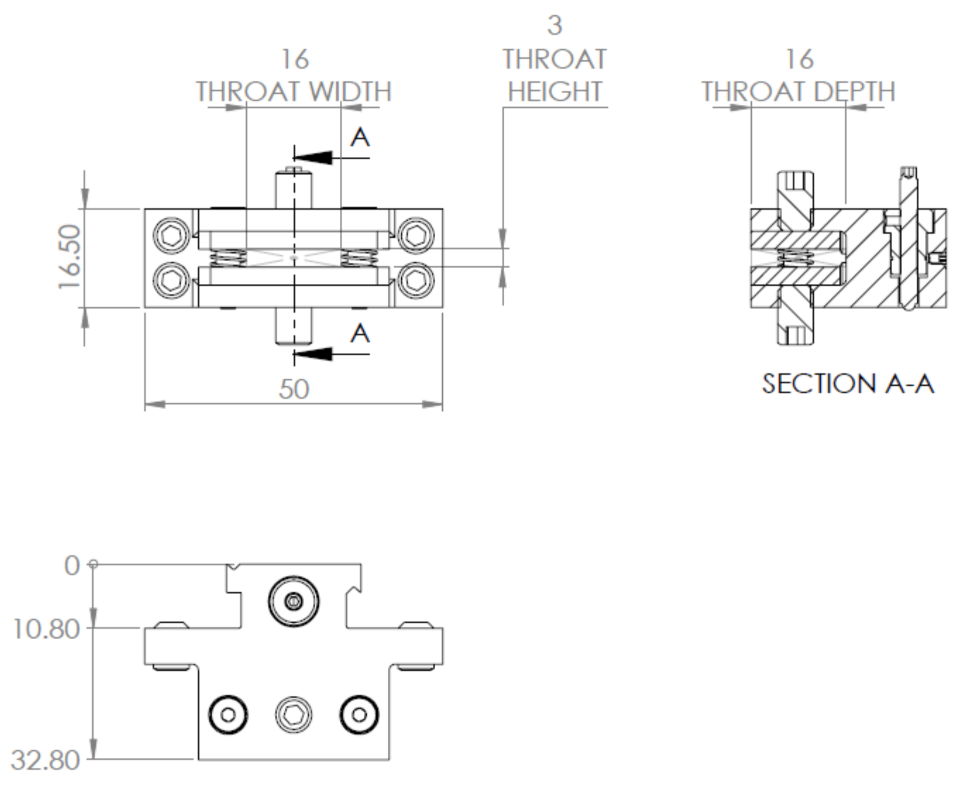

Figure 6.8 µTS Tension Clamp Grip

6.1.4.3 Compression Platen

The compression platens are meant solely for compressive loading.

Mounting and position the specimen on axis will provide more reliable and accurate data.

If the specimen has a thickness less than 4mm (platen height) shims can be placed beneath the specimen on the specimen platform in order to ensure on-axis specimen placement.

Shim thickness (mm) = 2 – (specimen thickness/2)

See Figure 6.9 for more information regarding the µTS compression grips.

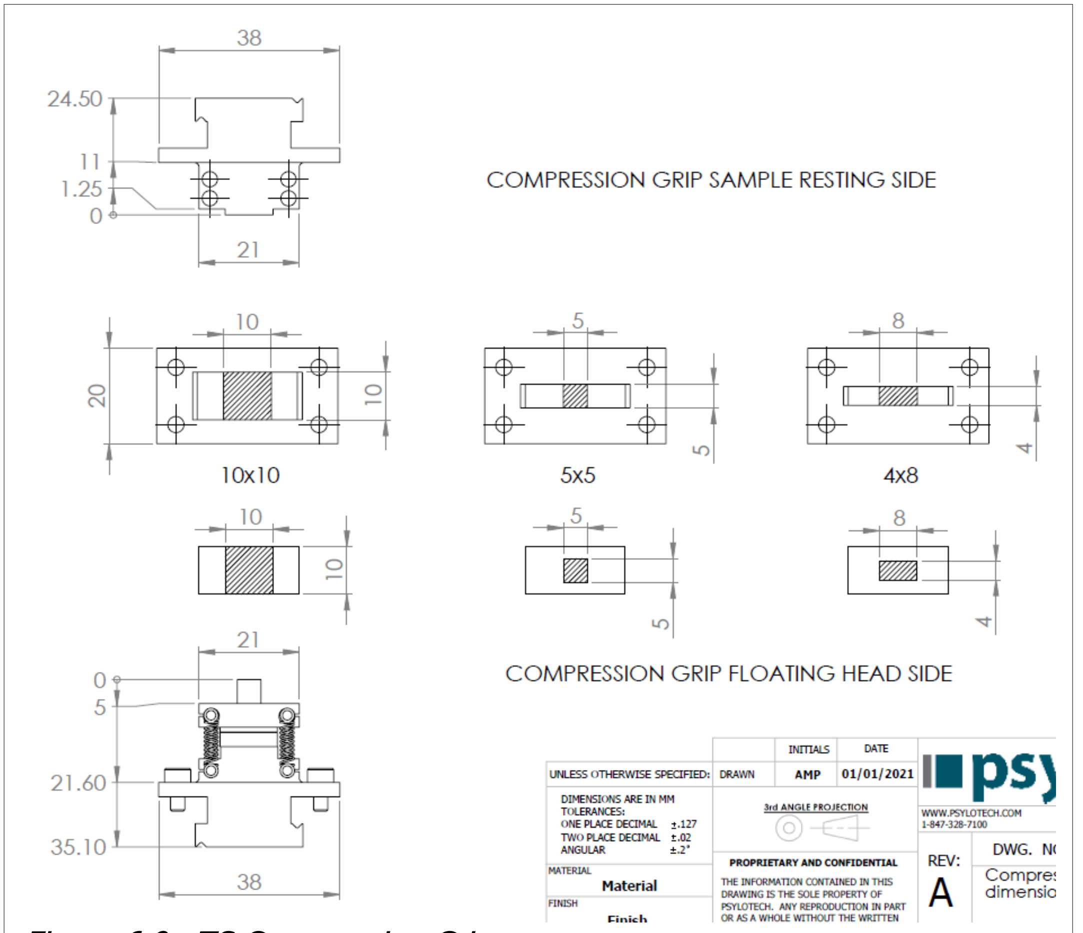

Figure 6.9 µTS Compression Grips

6.1.4.4 Horizontal Platform Grip

The platform grips are designed to be the foundation of a host of other experimental techniques. With a grid array of tapped holes, these grips are suited to mounting any other type of grip module to them.

Mounting and positioning the specimen on axis will provide more reliable and accurate data. Calipers can be used to verify specimen placement by measuring the distance between the top surface of the crosshead and the top surface of the grip.

Distance from the top of the crosshead to the top of the grip (mm) = 1.5 + (specimen thickness/2)

See Figure 6.10 for mounting information regarding the platform grip.

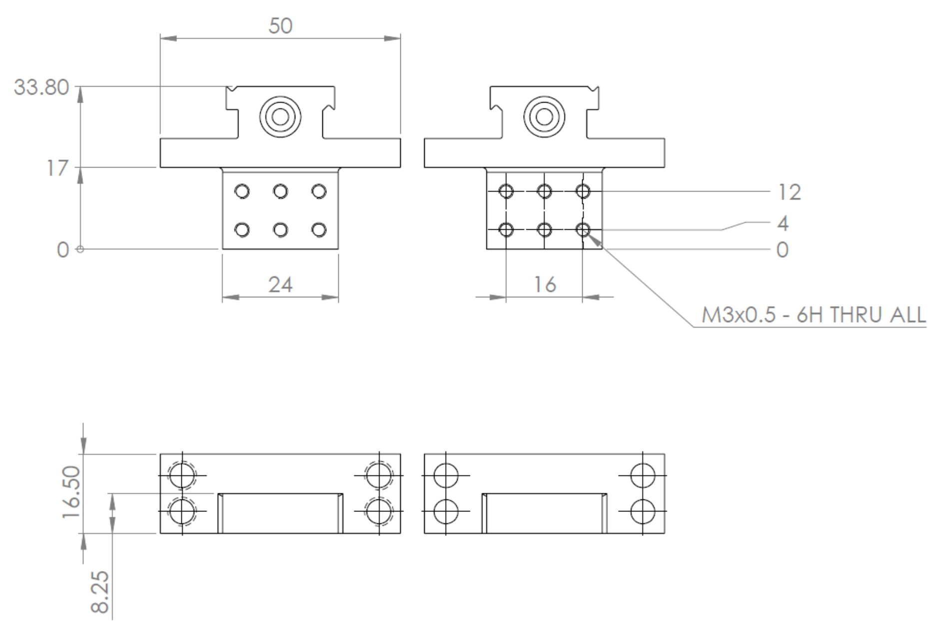

Figure 6.10 µTS Platform Grip

6.1.4.5 Arcan Grips

The Arcan grip is useful for measuring tension, pure shear, and mixed tension/shear loading of a specimen. It is a good way to achieve a multi-axis stress state from a uni-axial loading.

Mounting and positioning the specimen on axis will provide more reliable and accurate data. Calipers can be used to verify specimen placement by measuring the distance between the top surface of the crosshead and the top surface of the grip.

Distance from top of crosshead to top of grip (mm) = 4.1mm + (specimen thickness/2)

See Figures 6.12, 6.11, and 6.13 for more information on sizing and test methods with the Arcan Grip

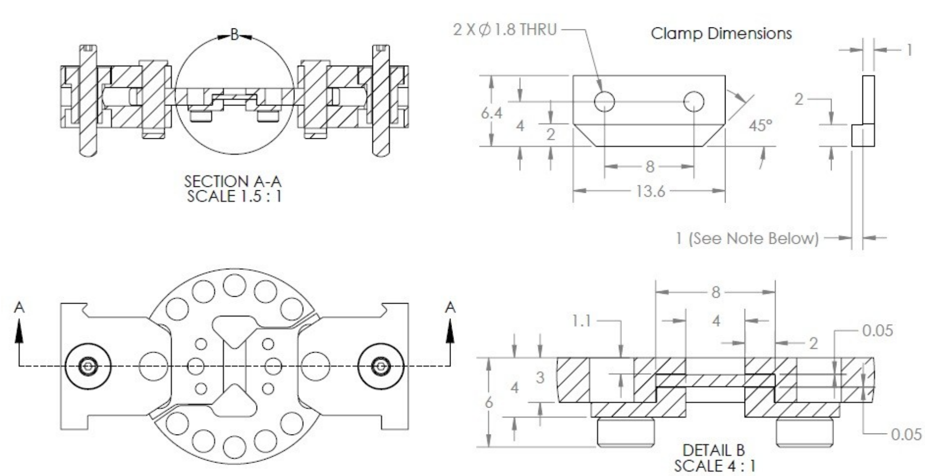

Figure 6.11 µTS Arcan Grip Assembly

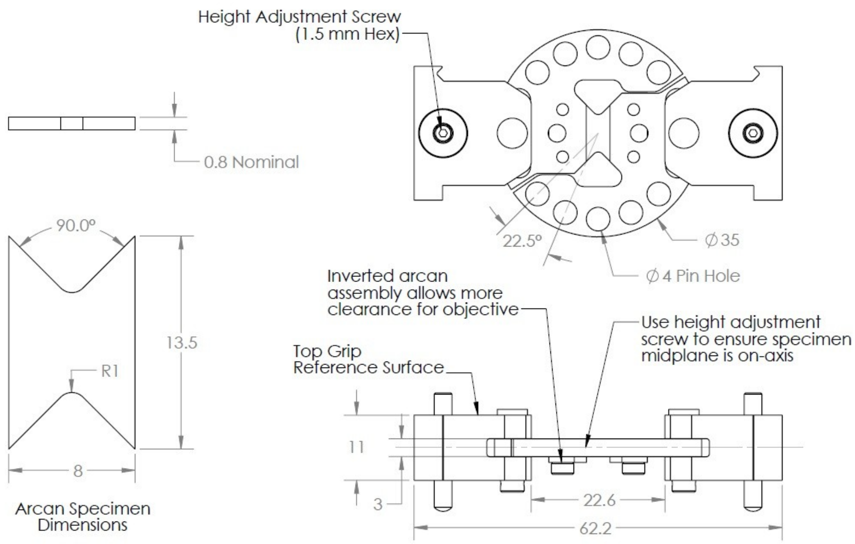

Figure 6.12 µTS Arcan Grip and Specimen Dimensions

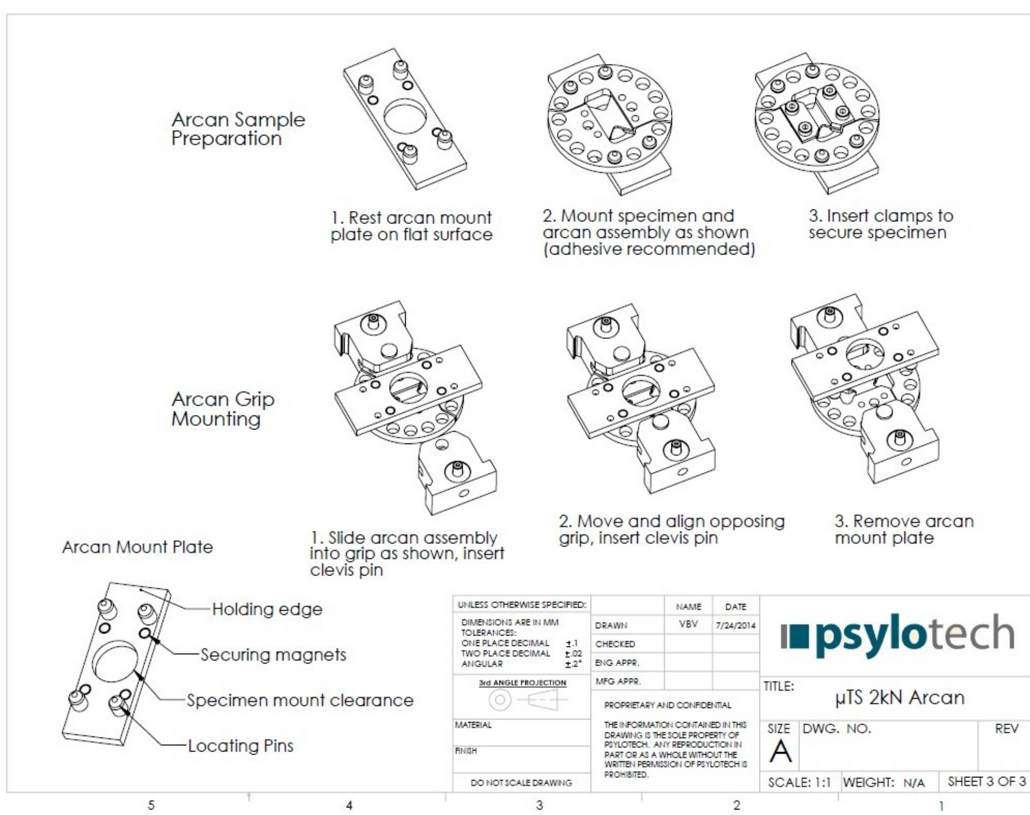

Figure 6.13 µTS Arcan Grip Guide

6.1.4.6 Bending Grips

The bending grips are meant to apply single or multiple point bend loads on specimens.

Mounting and positioning the specimen on axis will provide more reliable and accurate data.

If the specimen has a width less than 12mm, shims can be placed beneath the specimen on the specimen platform in order to ensure on-axis specimen placement.

Shim thickness (mm) = 4 – (specimen thickness/2)

See Figures 6.14-6.16 for more information regarding the μTS system's bending grips.

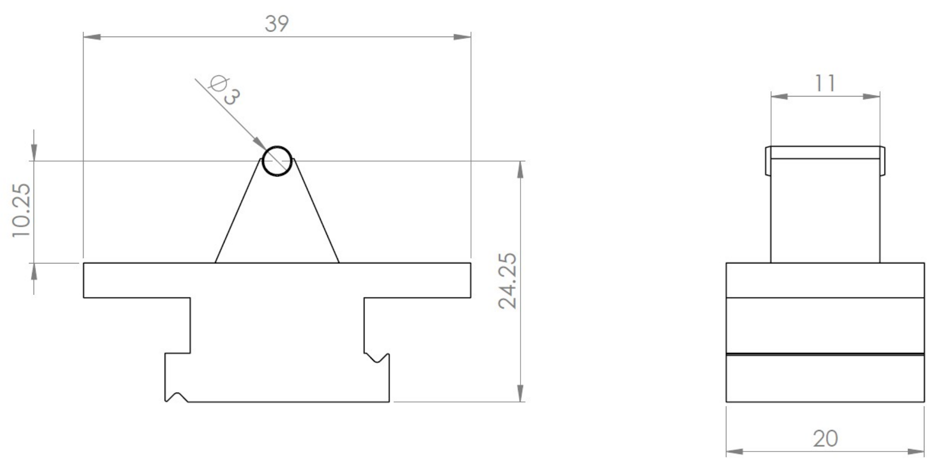

Figure 6.14 μTS 3pt Bend Indenter

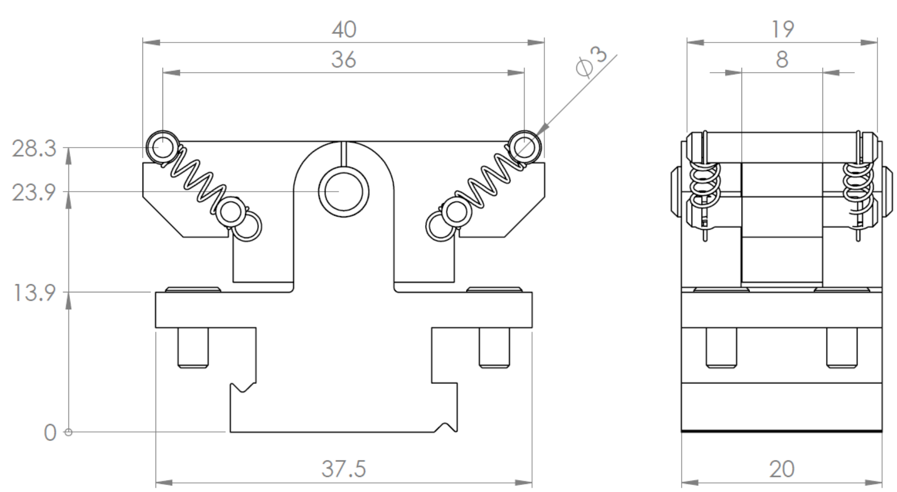

Figure 6.15 μTS 4pt Bend Indenter

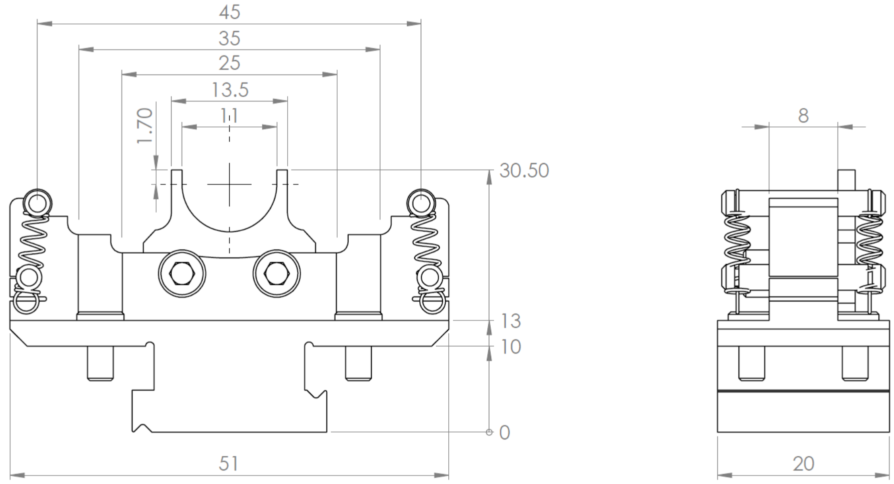

Figure 6.16 µTS Bending Grip Carriage

Helpful Hint: Custom grips and fixtures are available upon special request. The T-slot interface (PDF or STEP) is available to users to allow researchers to quickly design and build custom grips.

6.1.7 Temperature Chamber Grips

The temperature chamber grips are to be specifically paired with the temperature chamber and temperature chamber grip extensions. The grips are much thinner compared to their air counterparts.

These grips may be used with standard systems, but care must be taken to place the sample at the center of the loading axis via precision ground spacers.

6.1.7.1 Temperature Chamber Grip Extension

The temperature chamber grip extensions adapt the air t-slot to the chamber t-slot. They are rigid in the loading direction while maintaining low mass and reducing temperature effects on the load cell.

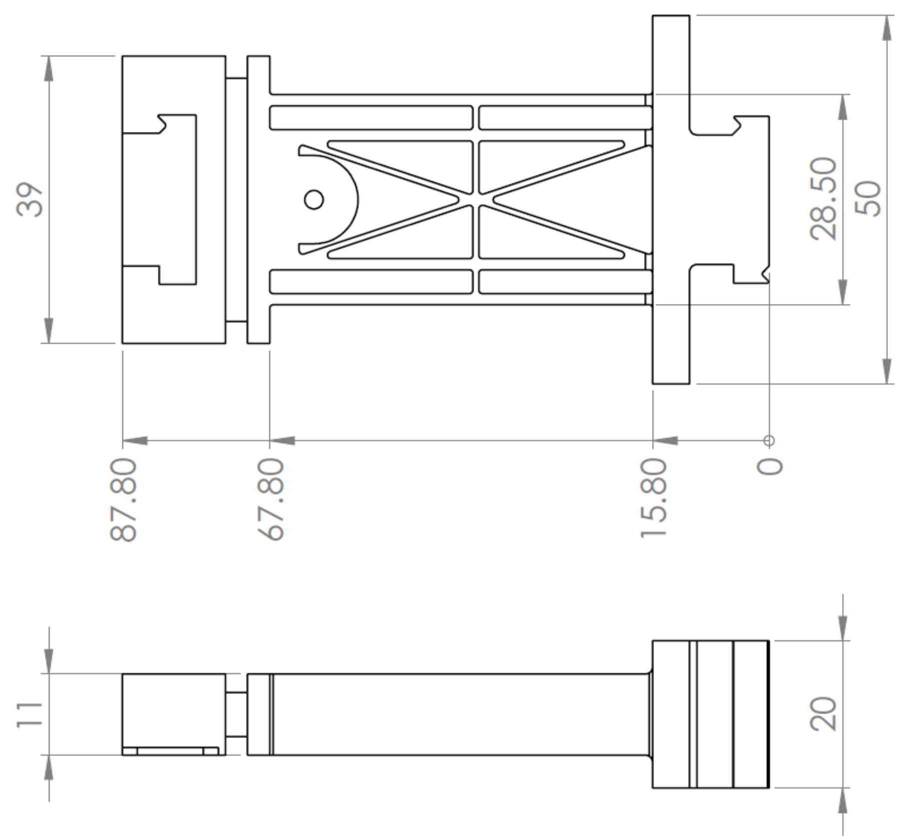

Figure 6.21 µTS Temperature Chamber Grip Extension

6.1.7.2 Temperature Chamber Dogbone Tension Grip

See section 6.1.4.1 for a detailed description of the tension dogbone grips as well as specimen drawings. This version of the grips is thinner to accommodate the temperature chamber as seen in Figure 6.22.

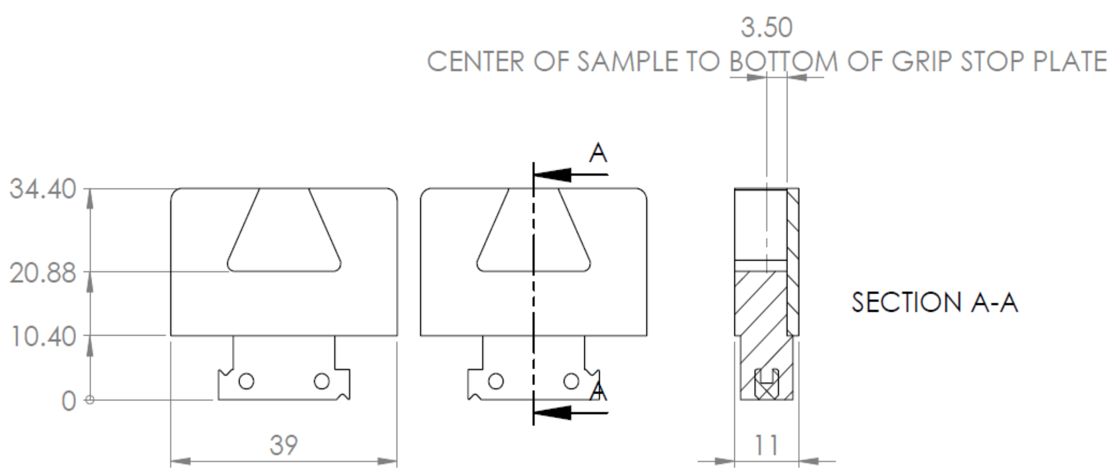

Figure 6.22 µTS Temperature Chamber Dogbone Tension Grip

6.1.7.3 Temperature Chamber Clamp Grip

See section 6.1.4.2 for a detailed description of the clamp grips. This version of the grips is thinner to accommodate the temperature chamber as seen in Figure 6.23.

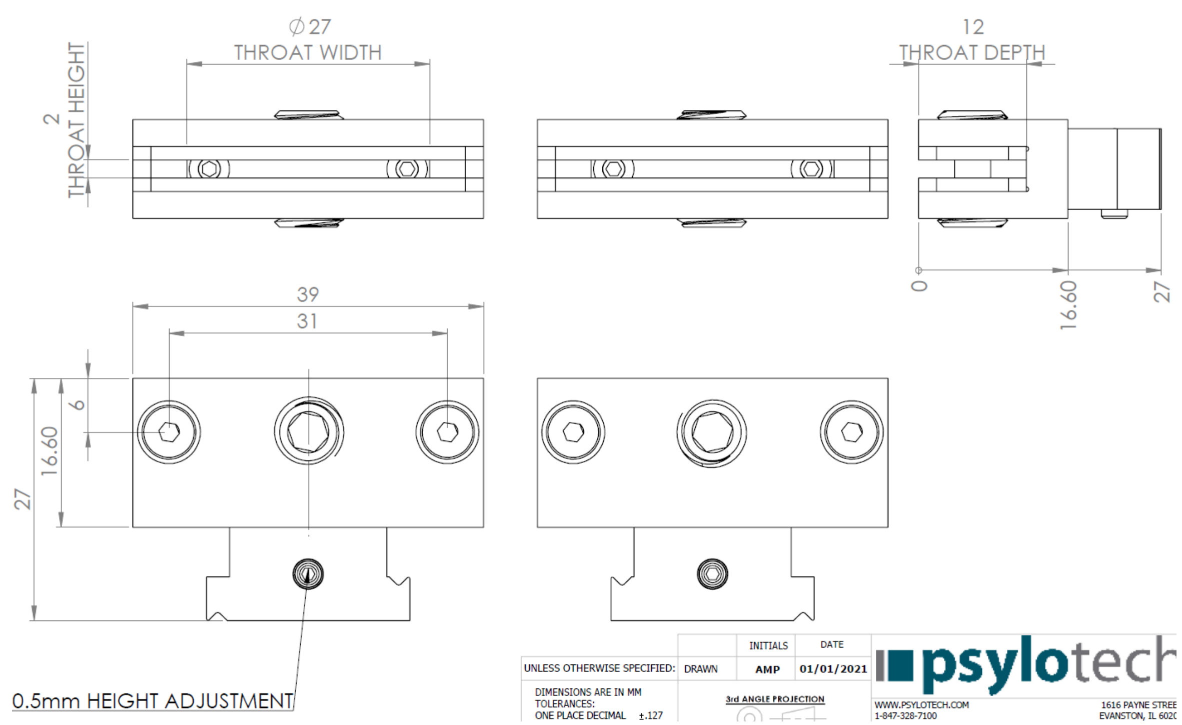

Figure 6.23 µTS Temperature Chamber Clamp Tension Grip

6.1.7.4 Temperature Chamber Compression Platen

See section 6.1.4.3 for a detailed description of the compression platen. This version of the grips is thinner to accommodate the temperature chamber as seen in Figures 6.24 and 6.25.

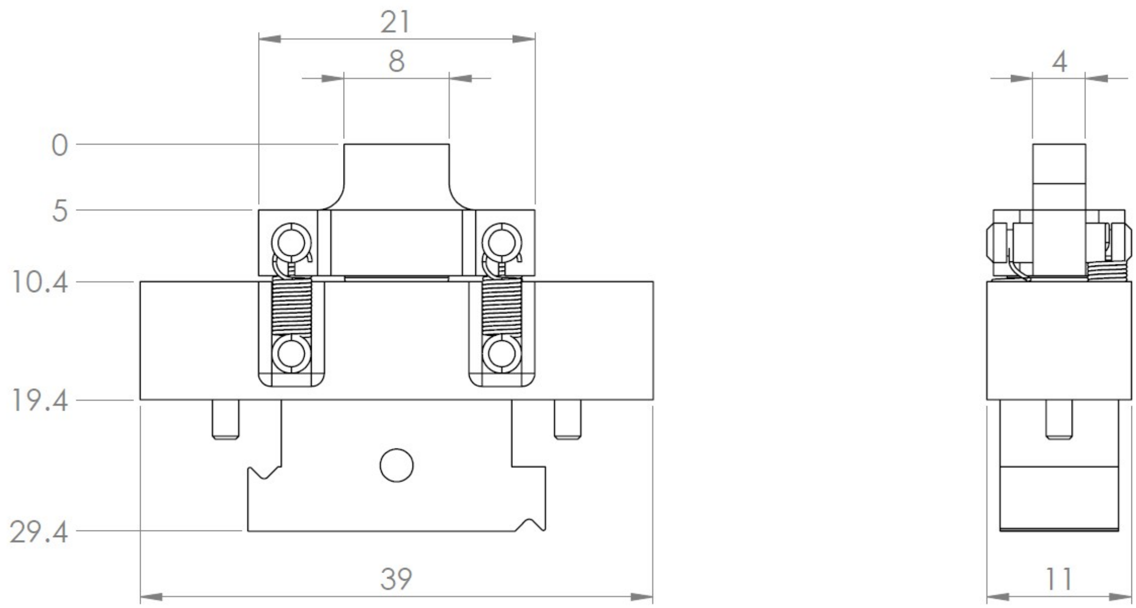

Figure 6.24 µTS Temperature Chamber Compression Grip Head

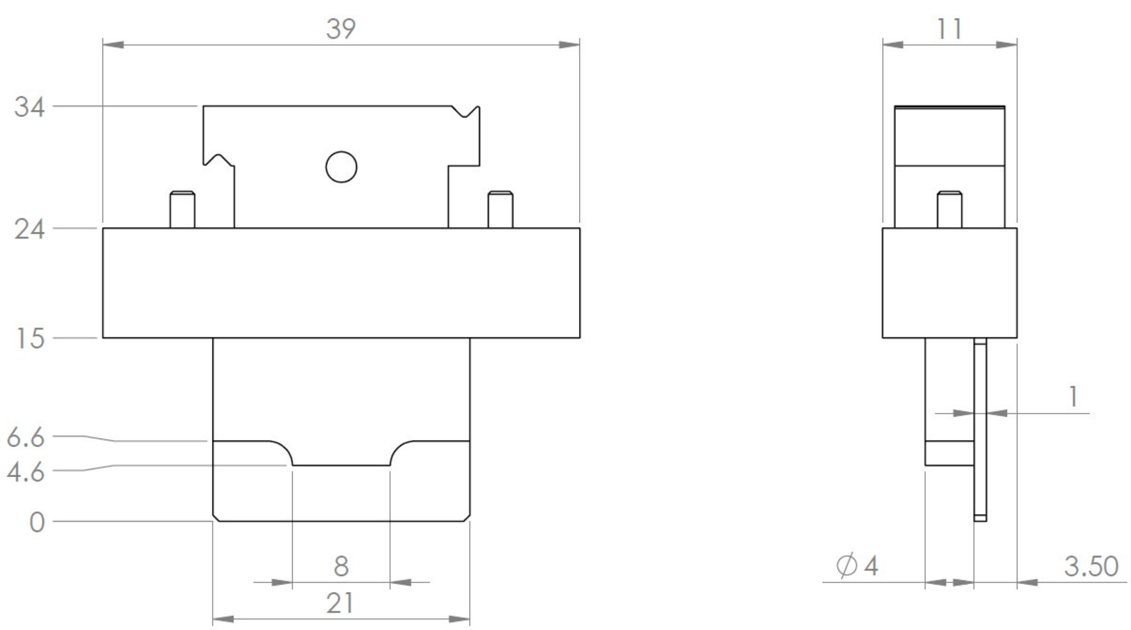

Figure 6.25 µTS Temperature Chamber Compression Grip Platen

6.1.7.5 Temperature Chamber Platform Grip

See section 6.1.4.4 for a detailed description of the platform grip. This version of the grips is thinner to accommodate the temperature chamber as seen in Figure 6.26.

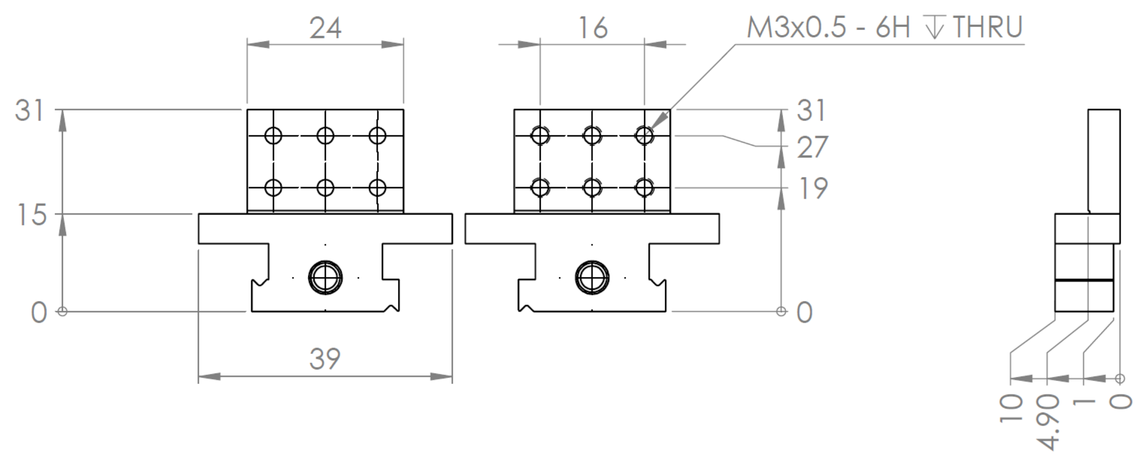

Figure 6.26 µTS Temperature Chamber Platform Grip

6.1.7.6 Temperature Chamber Arcan Grip

See section 6.1.4.5 for a detailed description of the arcan grip and drawings of the other components which are shared bewteen versions. This version of the grips is thinner to accommodate the temperature chamber as seen in Figure 6.27.

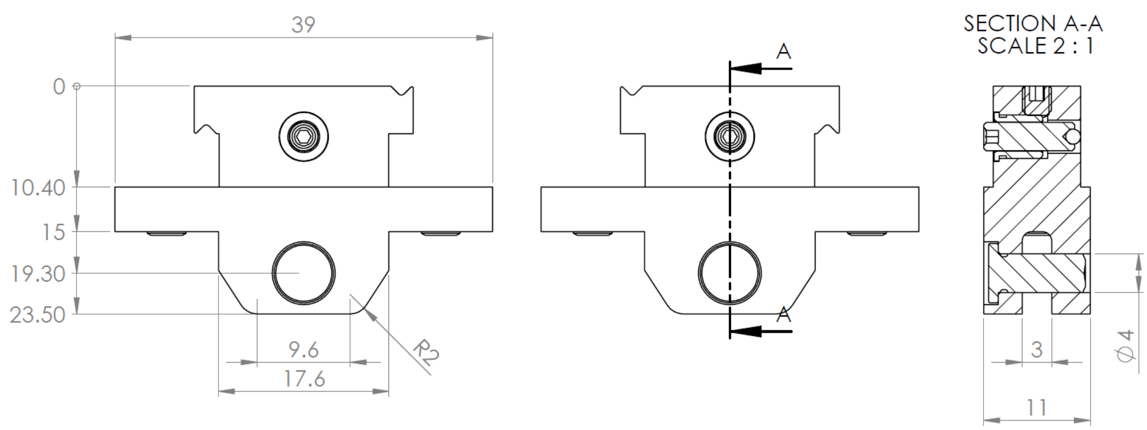

Figure 6.27 µTS Temperature Chamber Arcan Grip

6.1.7.7 Temperature Chamber Bending Grip

See section 6.1.4.6 for a detailed description of the bending grip. This version of the grips is thinner to accommodate the temperature chamber as seen in Figures 6.28 and 6.29.

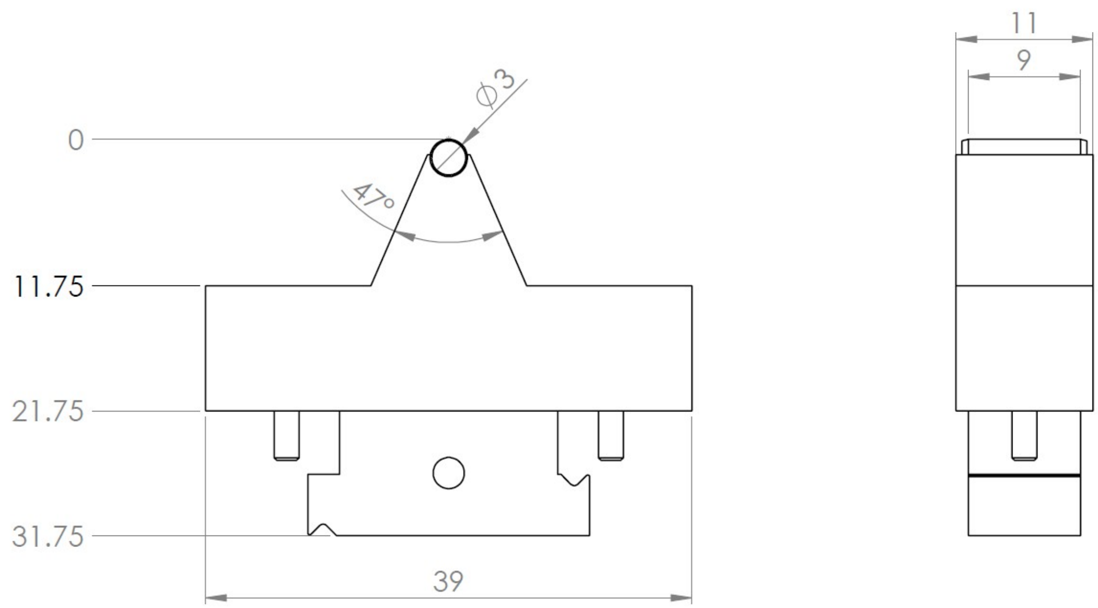

Figure 6.28 µTS Temperature Chamber Bending Grip 3pt Indenter

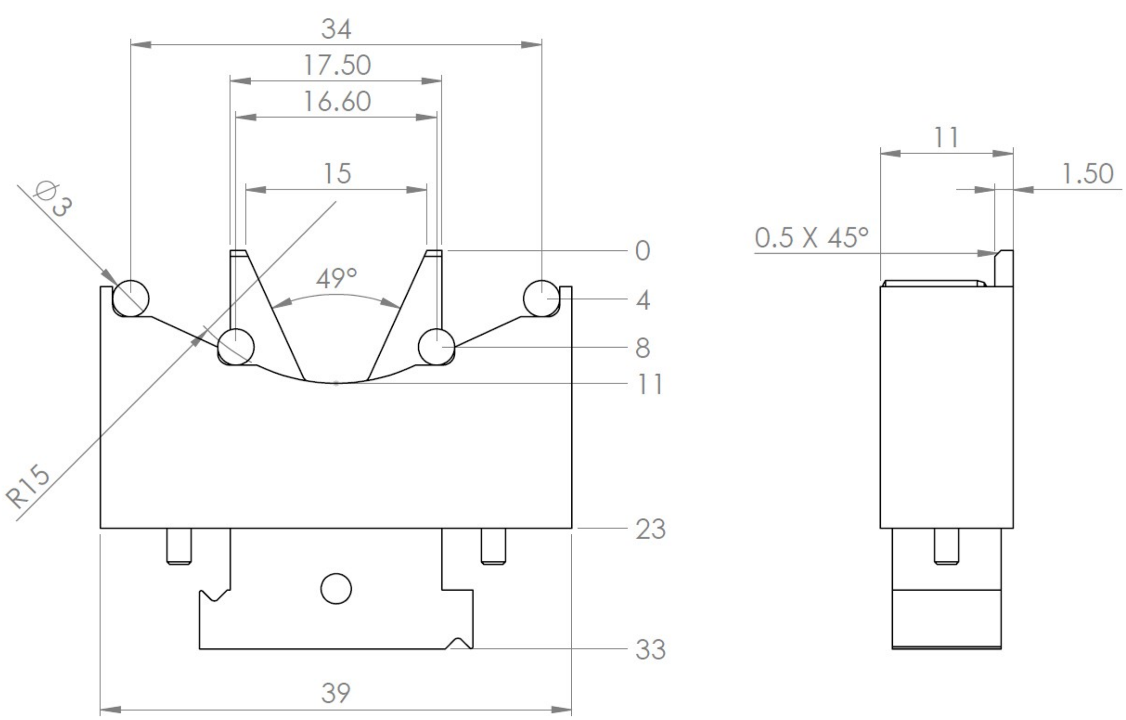

Figure 6.29 µTS Temperature Chamber Bending Grip 3&4pt Carriage