Good consistent sample preparation is the key to accurate results. The fact is there are many causes of premature tensile strain failure associated with poor sample preparation and only properly cast samples break at the true material strength. The following is a procedural guide for Direct Tension sample preparation. Keep in mind that the temperatures listed are recommended and considered safe for most asphalt binders. If you find it difficult to pour or completely fill the mold then it is best to contact the Producer for recommended handling temperatures and working time limits. Some modified varieties may require slightly higher conditioning temperatures to ensure the sample is fluid enough to pour into the molds.

Samples should be heated for approximately 30 minutes in a 135°C oven to facilitate pouring.

Preheat a sand-bath covered with Al foil in a 135°C oven.

A release agent of glycerin and talc is applied to the inside edge and top of mold with a small brush prior to assembly of the mold set. The assembled mold set is then placed in the preheated sand-bath for 3 minutes in a 135°C oven. Overheating will cause the glycerin to dry and make it difficult to remove the sample from the mold.

Stir sample with a preheated steel bar or glass rod and then continuously pour sample into the mold until slightly over-filled. Reheat and stir sample between pouring each new mold. Allow filled mold to stand out at room temperature and to cool down to room temperature. This takes approximately 45 minutes.

Trim sample with a stiff putty knife that is heated using a Bunsen burner and then let stand for ~10 minutes to again cool back down to room temperature.

To remove the sample from the mold, first flip the sample onto a second chilled mold base; then remove the Teflon release sheet by carefully pealing the release sheet off the mold without bending or twisting the sample.

Drop the sample with the mold side plates into the Direct Tension fluid bath to begin the thermal conditioning process. Currently, the procedure requires the
samples to be conditioned for 60 minutes +/- 5 minutes. Carefully, snap each of the side plates off of the sample prior to testing while in the bath. The finished sample should look like the following:

To prepare the Direct Tension to accept a sample, the Loading Pins must be set to the proper distance. This is easily accomplished by the software.

Photo. Set “Home” of the “Loading Pins” software Icon.

By homing the loading pins on the Direct Tension Tester, returns the loading pins within range to accept the sample.
Photo of the sample in the DT. Place the sample on the loading pins.

Photo of the Start Button. Start the test by clicking on the software Start icon.

The instrument will verify all systems, zero itself, apply the specified pre-load force and appropriately begin the test at the specified strain rate according to the AASHTO TP-3. The data is automatically collected and sequenced for each run.
Photo of the broken sample on the DT.

Once the sample breaks the Operator is prompted to note the observed location of the failure. This is not a requirement of the test but it proves to be a helpful method of documenting the proficiency of sample preparation. Samples that tend to fail at the end tabs are typically not prepared as well as those that fail in the middle of the beam.

Photo of the software prompting remarks. The instrument software automatically collects all the required data for all 6 samples, omits the 2 lowest set of results, performs all the required statistical analysis to provide a simple report of the required information. For quick comparison of samples, data can be overlaid on a common graph.
**Photo.** Typical comparison of sample data.