

Welcome to the Instron® Materials Testing Accessories Newsletter

In This Issue: Optimizing Specimen Alignment

Why Alignment Matters

As a general rule, care should always be taken to ensure that the axis of force application runs through the centerline of the specimen. Off-axis loading of the specimen can lead to various problems:

- Specimen bending, which results in poor modulus values when using single-sided extensometers (averaging extensometers can help to resolve this within an aligned load string)
- Specimen buckling in compression and through zero tests
- Offset loading of the load cell, which leads to errors in output or in extreme cases load cell damage
- Non-uniform stress conditions within the material, making it behave differently
- Edge effects caused by high local stress at the specimen edges
- Scatter in test results if misalignment is random

There are several ways to improve the alignment of the specimen. Some applications require the use of additional fixturing to obtain the best possible alignment where others may simply require more attention from the operator to ensure the specimen is loaded accurately and consistently.



[Flexible or universal couplings](#) can be employed to allow the grip to align itself with a slightly bent specimen. Some types of grips employ two universal couplings, one at the top and one at the bottom.



Some grips and fixtures feature specimen stops that allow the specimen to be accurately and repeatably located.



Compression testing can utilize the spherical seating platen to ensure even loading.



Applications, such as Low Cycle Fatigue (LCF), where alignment is critical are best handled using fully-rigid load strings with special adjustable alignment fixtures. Typically these allow adjustment of both concentricity and angularity. The Instron AlignPro™ system allows the user to monitor the output from a strain gauged specimen while making alignment adjustments.

Apart from special equipment designed to improve alignment, there are simple guidelines you can follow to help improve or maintain good specimen alignment.

- Check basic alignment using a stiff, straight specimen such as a piece of steel. Small adjustments can often be made by slackening and retightening the load cell and base adaptor mounting bolts.
- Make sure that any universal [couplings](#) or [jaw faces](#) designed to pivot are free from wear and well lubricated. If in doubt, we suggest replacing them.
- Check grips periodically for any accidental damage that might cause misalignment.
- Some grips (e.g. [screw action grips](#)) have independently adjustable jaw faces. Ensure that they are adjusted to grip the specimen down the centerline of the applied force. If the specimen thickness changes significantly, remember to adjust both faces to maintain good axial alignment.
- Ensure that your specimen preparation is good. A bent or badly prepared specimen can make your other efforts worthless.

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Related Links

- Fourth Edition of the [Accessories Catalog for Materials Testing](#) is now available!



- Missed previous issues of the Accessories Newsletter? Catch up at the [Instron Library](#). Follow the link and select "Newsletter" as the Document Type.

Future Events

- For a list of upcoming shows that Instron will be attending, please visit the [Events](#) page of our website.

- Make sure you pre-load the load string if your grips feature lock or check nuts. Load the system to the maximum grip capacity and hand tighten the lock nuts before releasing the load. This also increases the stiffness of the load string and eliminates backlash and play (often seen as non-linear effects at the beginning of the test).
- Ensure that the load cell is bolted firmly to the load frame using the correct number of bolts and the correct torque.
- Ensure that all connecting pins and adaptors are in good condition. DO NOT use bolts or undersized pins to substitute for the correct Instron parts. Consider buying spare pins to replace worn or lost items.
- Ensuring your grips and fixtures are clean and lubricated with the recommended lubricants. Jaw faces designed to slide in the grip body, such as in [wedge grips](#), will not function correctly without lubrication and can induce bending if one of the faces slides and the other does not. Specimen slippage can also occur.
- Make sure that the system users understand that care taken in loading the specimen will minimize scatter in test results.

For more information on Accessories, visit us [on the web](#), submit an [online request](#), or call us at [+800 564 8378](#) (US only) or [+44 1494 456815](#) (Europe only)

Are you testing something a little different? Do you think more people should know about it? Would you like to submit an article for possible publication in the Instron accessories newsletter? If so, please [submit your story](#).

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