INSTRON®

The difference is measurable®

DIC REPLAY

2D Digital Image Correlation Software

Digital Image Correlation (DIC) is an optical technique that compares images of a tested specimen's surface to generate full-field strain and displacement maps. This powerful tool enables materials testing professionals to analyze advanced strain characteristics by visualizing strain and displacement over the full two-dimensional surface of the specimen. Though the technique of DIC has been around for more than a decade, many users have struggled with complex interfaces and problems with synchronization. Instron's DIC Replay package is streamlined for the materials testing industry with a simple and familiar interface along with built-in synchronization of DIC images with collected test data, including load, position, and more.

FEATURES

Full Field Strain and Displacement

Visualize strain and displacement over the full surface of a two dimensional object*. Displays include axial strain (εyy), axial displacement (dy), transverse strain (εxx), transverse displacement (dx), shear strain, maximum normal strain, and minimum normal strain.

Simple Display Options

Adjust display options using intuitive graphical icons. Options include:

- A variety of color palettes for contour maps
- Automatic or fixed scaling options
- Display gridlines to show data point locations
- A toggle to show or hide the raw sample images

Virtual Gauges

Snap on and resize strain gauges or extensometers to analyze strain behavior over a specific area of the test specimen or the average strain between two points.

Method Saving

Save strain/displacement and plot methods to recall and apply to other specimens.

Integration with Materials Testing Software

View and plot results against the test data collected with Bluehill 3 Software — no additional synchronization hardware or cabling required.

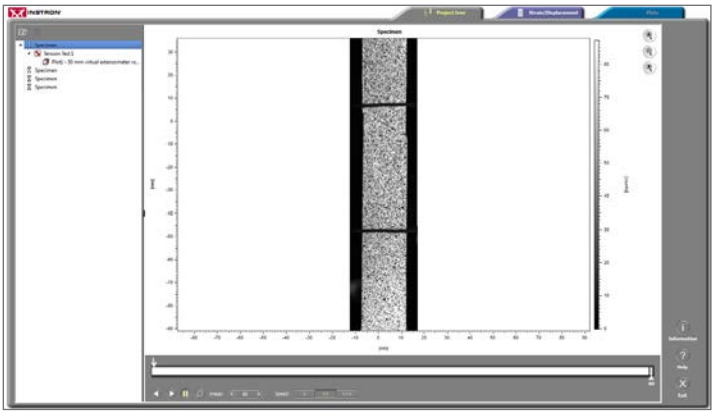
Flexible User License

Users can install the DIC Replay software on many PCs while ensuring secure access through a portable USB dongle. This dongle acts like a key to open the software and allows users to process data away from the testing machine (e.g. on an office laptop) or without a network connection.

* 2D analysis is appropriate where surface height deformation is negligible

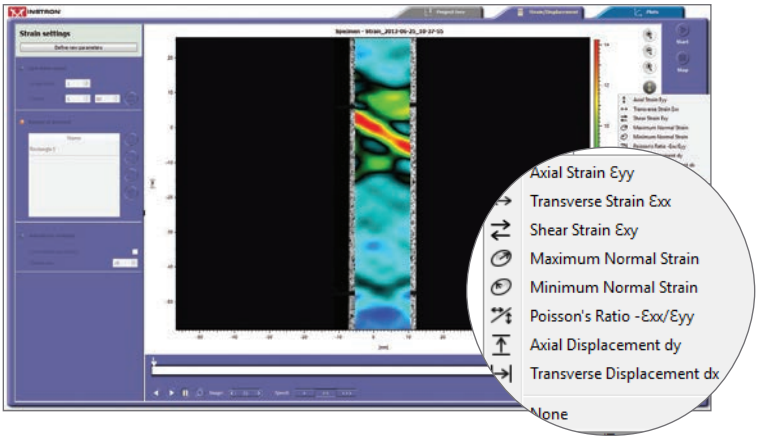
SOFTWARE OVERVIEW

Instron® DIC Replay Software is a self-contained 2D DIC package. The software consumes images and calibration data saved by Instron's Advanced Video Extensometer (AVE) and works in a post-processing mode. The user interface leverages the same tabbed style and graphical design of Bluehill® Software. In fact, there are only three screens to sort, analyze, and plot DIC results.



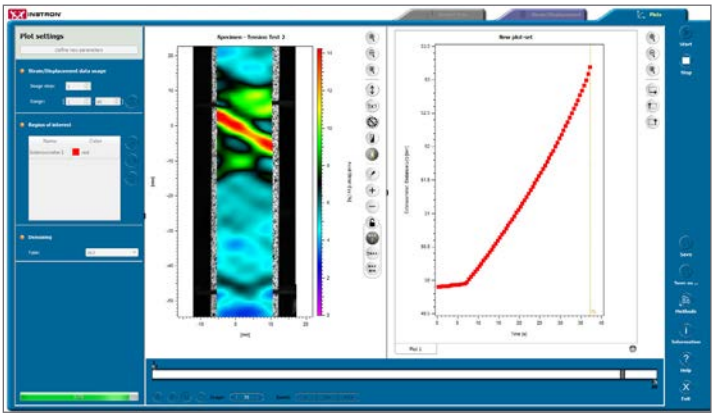
Sort Data with a Logical Project Tree

- Browse and play raw image sequences from tested specimens
- Explore calculated full-field displacement and strain maps
- Find saved line plots showing virtual extensometer and virtual strain gauge data



Analyze Strain and Displacement Maps

- Define a region of interest with simple "click-and-drag" shape tools or let the wizard select the speckled region automatically
- Calculate strain and displacement maps over the entire sequence or from a region of interest
- Choose the type of strain or displacement values to display using intuitive visual icons
- Save processing settings and apply them to future specimens

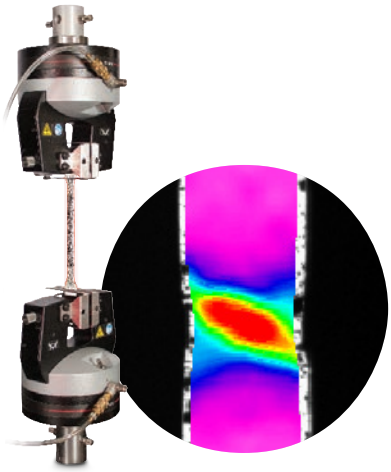


Create Simple Line Plots

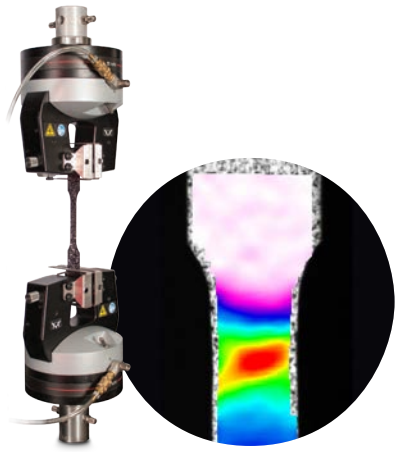
- Click, place, and size virtual extensometers or virtual strain gauges anywhere on the processed region
- Display average strain (strain gauge) or strain between two points (extensometer) using simple line plots
- Plot virtual gauges against synchronized measurement data collected during the test
- Configure a range of plots using X/Y axis settings and simple worksheet tabs
- Export images and video of the animated strain and displacement maps

APPLICATIONS

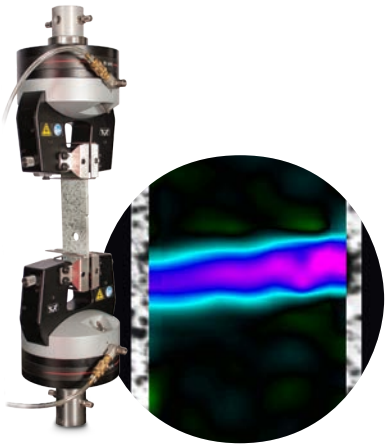
2D full-field strain and displacement maps are useful for a number of diverse applications, including: visualizing material behavior on coupons or components, checking specimen alignment, and ensuring that localized strain occurs within the gauge length of a conventional extensometer.



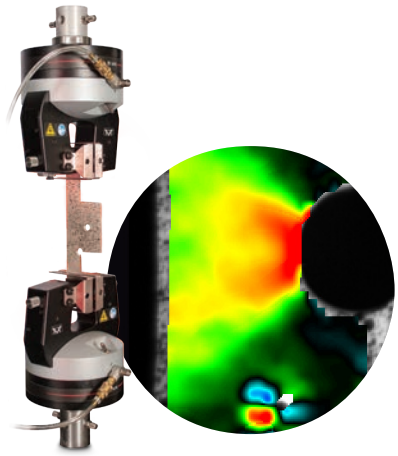
Check specimen preparation techniques by comparing one specimen to the next and looking for localized strain concentrations.



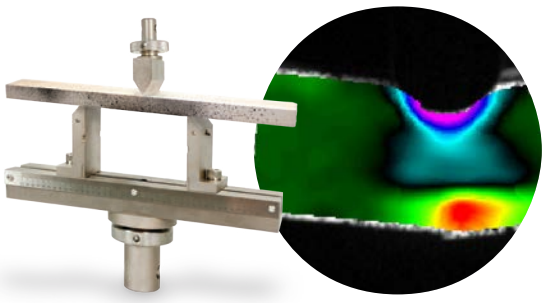
Check for standards compliance by identifying localized strain that falls outside of the standard gauge length or clip-on extensometer.



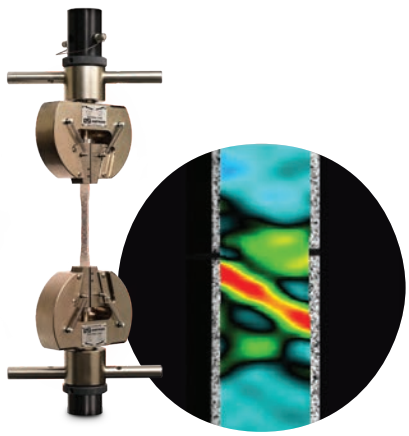
Visualize and detect cracks that are not visible to the eye or are in the raw images under tension or compression loading.



Analyze strain and displacement on the flat surface of a part or component where traditional extensometers are impractical.



Visualize the side profile of a flexure or compression specimen to observe tension and compression strain behavior.



View materials testing phenomena such as discontinuous yielding, localized necking, and more.

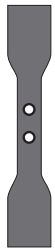
MODES OF OPERATION

Speckle Only

Analyze specimens after the test using the DIC Replay Software

Mixed Mode

Capture average strain in real-time (large dots) and use background speckle for DIC post-test processing



Real-time Strain

Turn off DIC mode to run traditional tests (capturing average axial or transverse strain in real time)

EXPECTED ACCURACY FOR DIC COMPUTATIONS

Field of View (FOV) - up to:	**mm**	100	170	240	400	425	700	840
Lens Focal Length	**mm**	35	35	16	16	9	9	6
Virtual Extensometer (5 mm GL)	**± µm**	1	1	1	1.5	3	4	7
Virtual Strain Gage (5 × 5 mm)	**± µε**	140	240	330	550	590	970	1160

Notes
1. Refer to AVE literature for accuracy of real-time strain.
2. Accuracy figures reflect ambient conditions and do not apply to tests conducted within chambers.

HARDWARE AND SOFTWARE REQUIREMENTS AND SPECIFICATIONS

Compatibility	Instron® AVE2 and Bluehill® Universal
Minimum PC Specifications	3.06 GHz Pentium 4, 4 GB memory, 250 GB HDD, and Microsoft® Windows® 7 Professional (32 and 64 bit).
Image Collection Rate	User defined up to 50 Hz

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