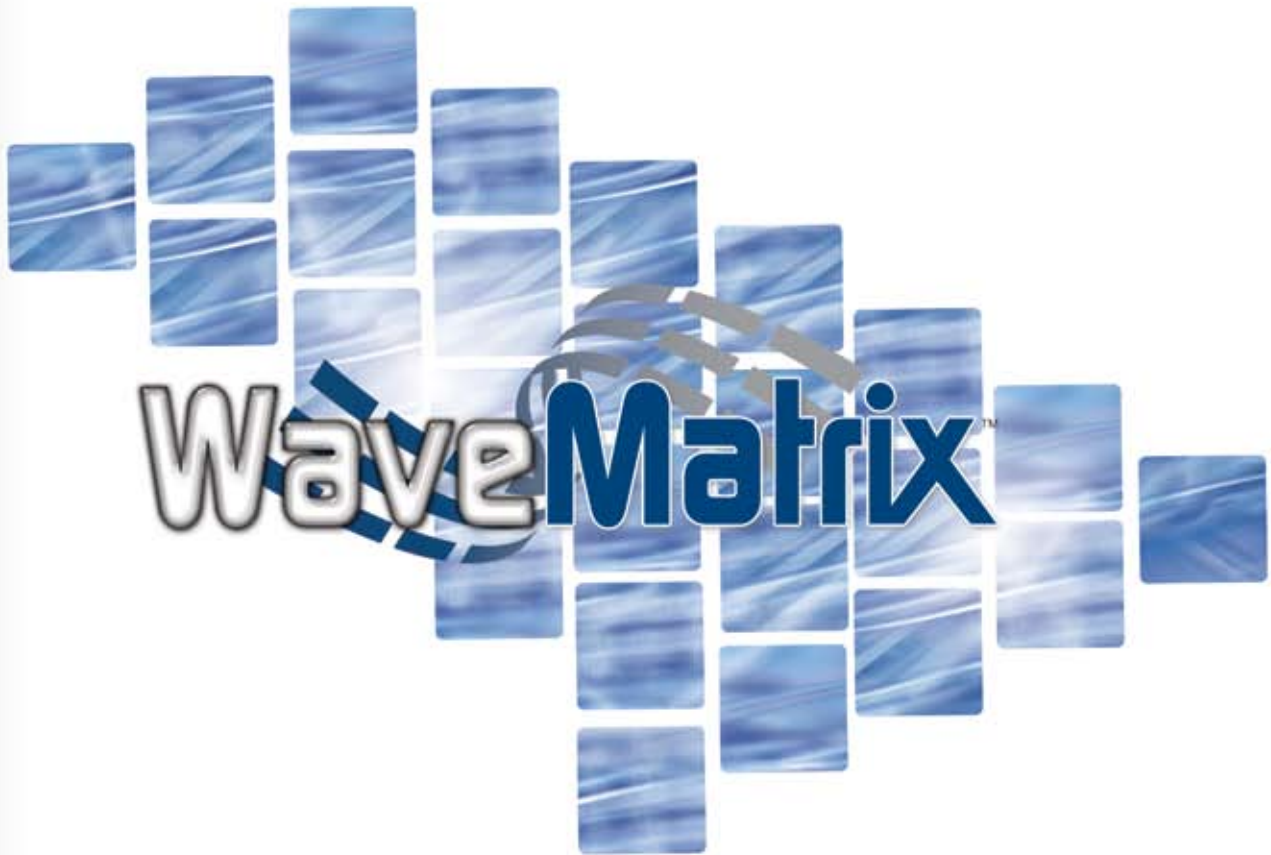


# WaveMatrix™

Intelligent Software for Fatigue and Dynamic Testing



# WaveMatrix™



**WaveMatrix™ is intelligent software designed for fatigue and dynamic testing of materials and components**



**It delivers flexibility - run everything from a simple static ramp, to cyclic waveforms through to complex multi-step, multi-axial tests**



**The highly visual environment with integrated tabular screens, clear menu structures, time-based matrix test preview and configurable live test workspace is designed to be intuitive and instill confidence**



**Packed with intelligent features, such as data reduction and built-in project organization, designed to simplify your testing**



U-CUP ROD SEALS INSTALLED

FORCE RATING  $\pm 100\text{kN}$  (22480 LBS)  
CAT # 2743-401 WT. 39KG (86 LBS)  
MAX PRESS. 21 MPa (3000 psi)

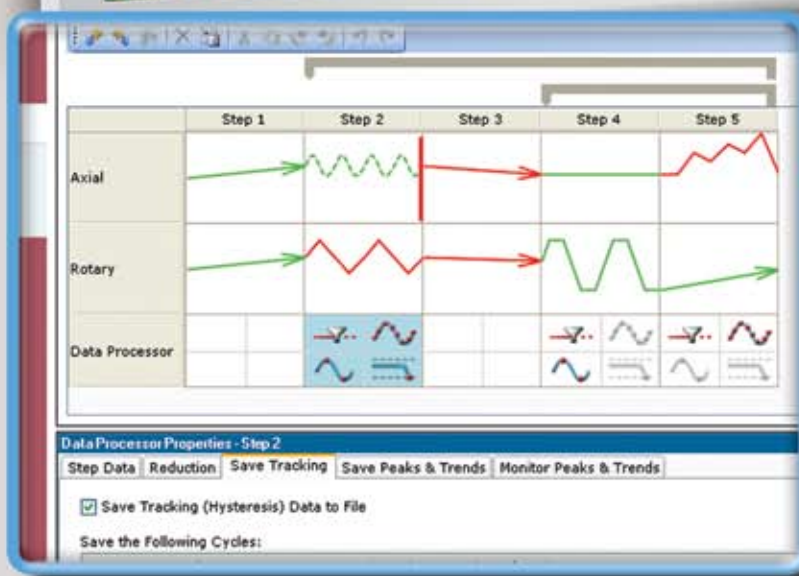


INSTRON



# VISUAL METHOD SETUP

Whether you are running simple cyclic or advanced multi-axial tests, the integrated method set up screen guides you to define a test in a logical progression. Select the waveform, set up any data logging requirements, save the method and be ready to run a test in seconds.



## Graphical matrix preview gives you confidence

See everything at a glance. The time-based graphical matrix provides users with a clear indication of the test before it's run. You can instantly see the step-by-step control and data acquisition settings, step sequencing, inputs/outputs, events and monitoring parameters. Even with the most advanced tests, there is no confusion with hidden steps or parameters that can lead to damaged specimens or wasted time.

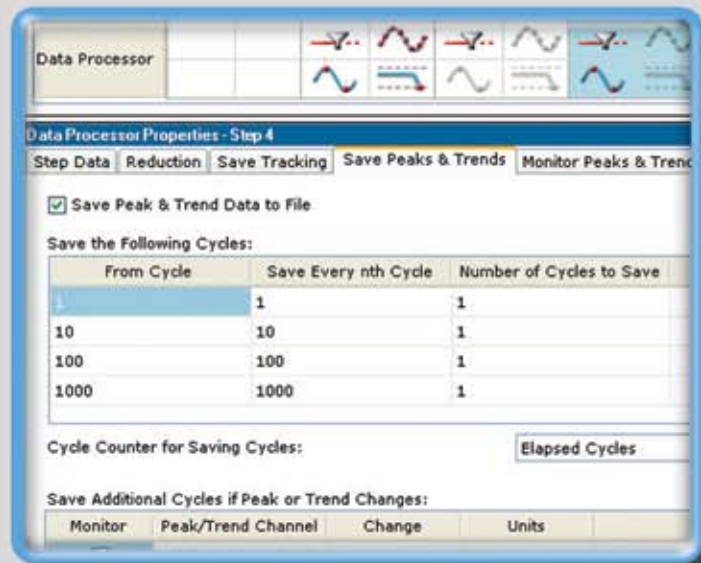
## Feel at ease with a tabular environment

Built upon the successful Bluehill® platform, WaveMatrix™ brings the familiar Windows® functionality to your dynamic tests. The fully integrated tabular layout ensures instant access to tests and methods without losing important information or parameters beneath a layer of windows. Use everyday functions, such as Cut, Copy, Paste and Tooltips, to increase ease of use.



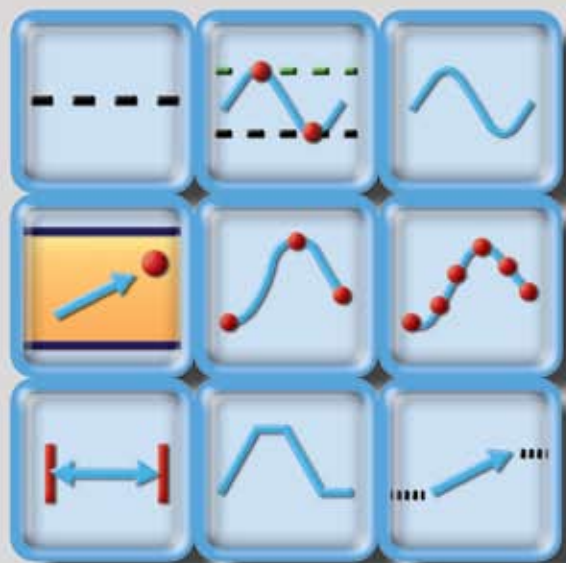
## Intelligent data processor saves you time

The advanced data processor sets the standard in data acquisition configuration, ensuring manageable data file sizes and capturing of the exact data you need. With tools such as data reduction or peak and trend monitoring, you can also store both tracking (hysteresis) data and peak/trend data with different cycle intervals and logging rates. And don't miss those critical specimen transitions - the last ten cycles are always captured.



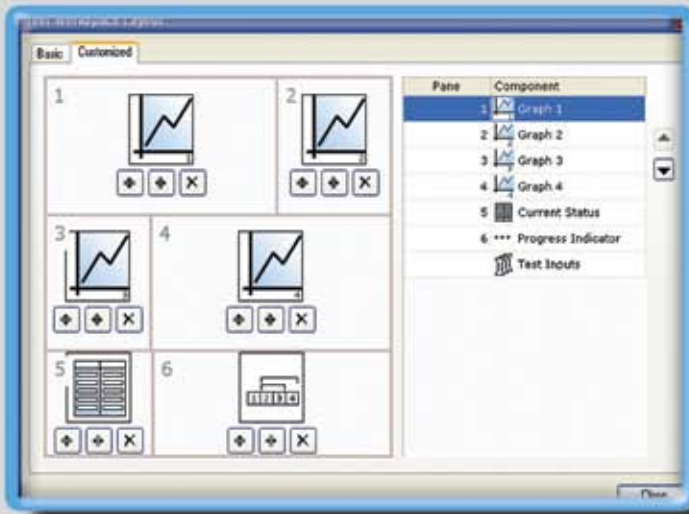
## Multiple steps provides complete test flexibility

WaveMatrix allows you to build multiple step test sequences using a combination of holds, ramps, multi-rate ramps, trapezoids, simple or Tri-Modal controlled cyclic waveforms, sample data, or turning point files. Define your data logging requirements and decide on test sequencing using step-by-step controls, loops and nested loops. If you need additional functionality you can add events, analogue outputs and digital inputs/outputs; balance strain devices; and control a temperature controller.



# LIVE TEST WORKSPACE

The user configurable Live Test Workspace offers complete clarity and control to a test. Simply choose your layout; set up the graph displays as required; check the status; use the simple controls to start, pause, continue or finish a test; and then click a button to view the results folder.



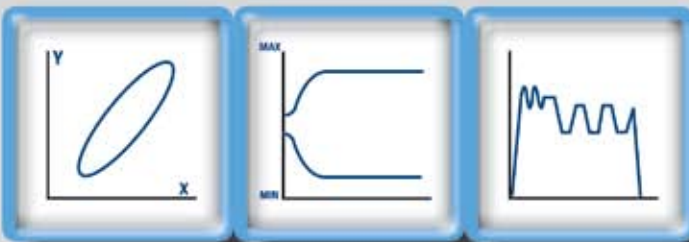
## Be empowered with the live test workspace

The Live Test Workspace offers flexibility to see what you want to see - add up to four user-configured graphs, a Progress Indicator, Current Status and a Test Inputs pane. The configuration can be set up and stored as part of the Method screen or defined in the Workspace while the test is running. Using Windows® tools, you can double click to change the graph setup, resize panes, zoom in on a portion of a graph, maximize a pane to full screen and configure the layout to show only what you need. During an important test phase, simply right-click to copy and paste a graph straight into your favorite Windows application.



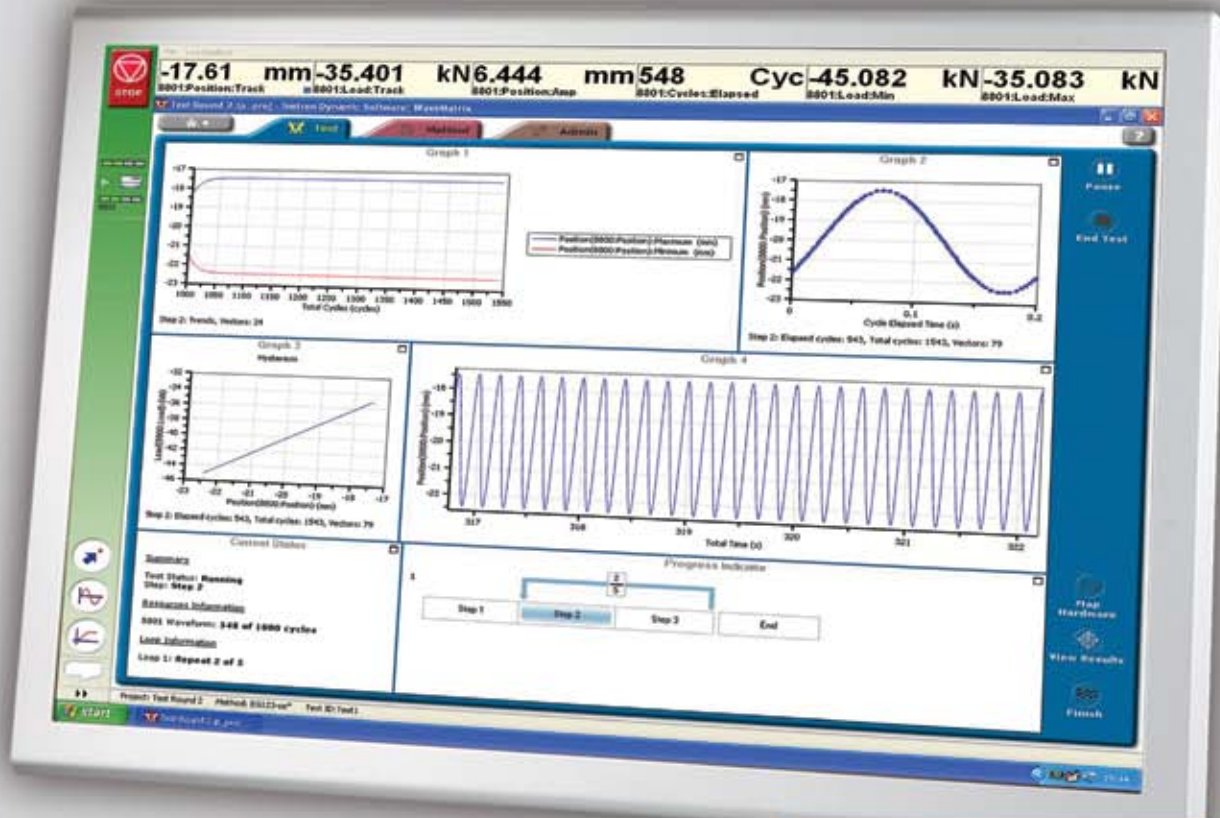
## Sequence indicators give instant test status

Keeping you up to date of the test status, the Progress Indicator and Current Status panes provide instant and clear displays of the total steps, current step, cycle count and any test loops in progress.



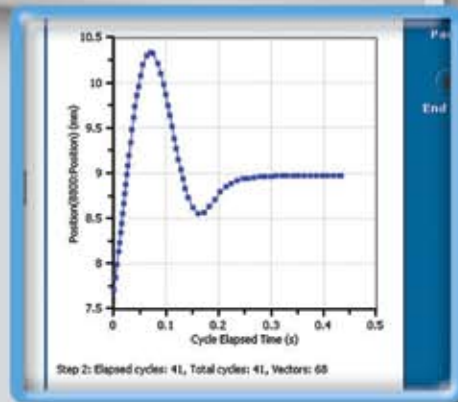
## Comprehensive graphing toolbox brings clarity to the most advanced tests

Whether you need a single or multiple graphs, the comprehensive graphing toolbox allows users to clearly display simple X-Y and double-Y graphs, peak and trend data charts, and Multi-Channel plots. Choose to show titles, add legends or show on a grid. Combine this with a time-based Chart Recorder that instantly displays desired data channels, WaveMatrix's™ graphing capability is second to none.



## Gain confidence with acquired data points on graphs

With the advanced capability of the X-Y graphs, no time is wasted searching through the data files to verify data acquisition settings after the test has started. The X-Y graphs display actual acquired data points while the test is running.



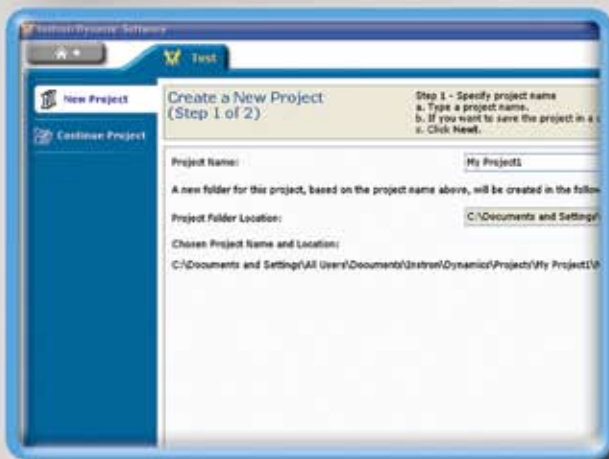
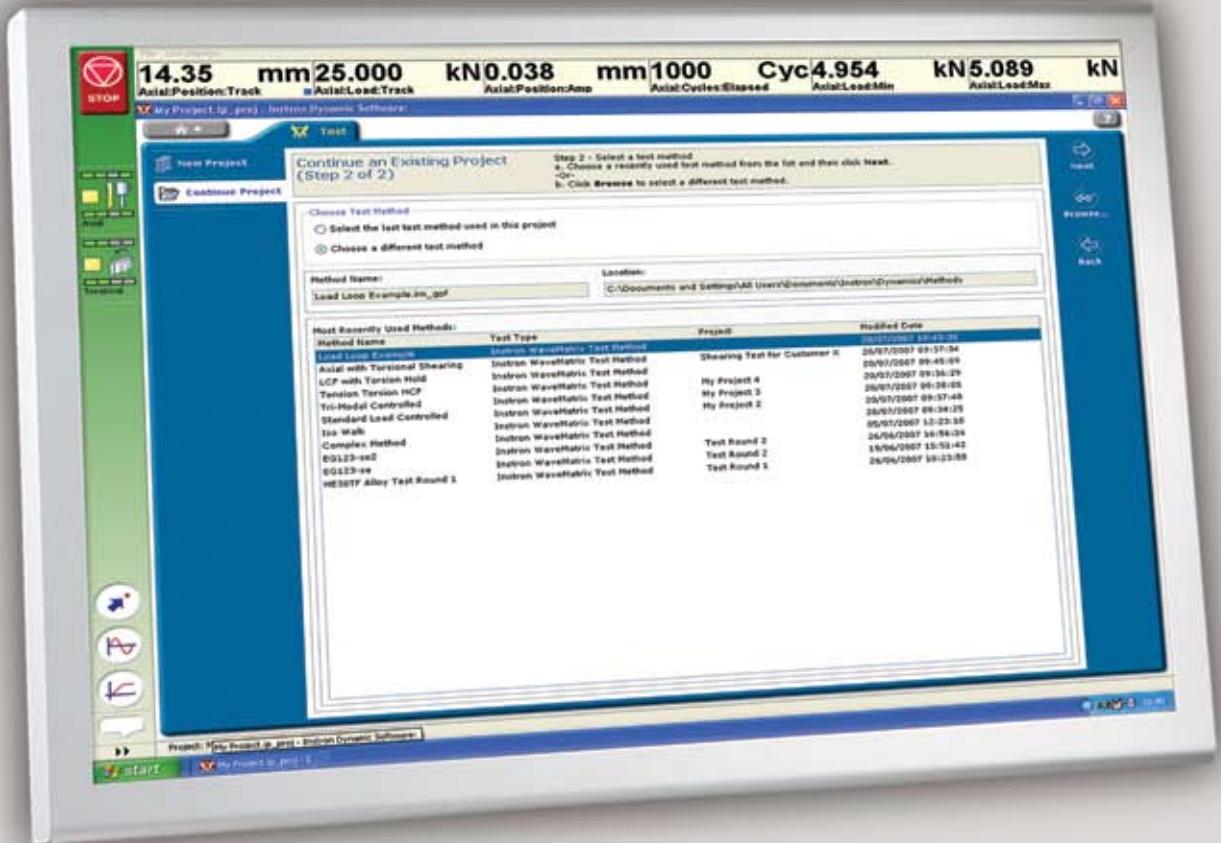
## Test controls right where you need them

Start, stop and finish a test. The simple test control buttons are consistently at the right side of the screen. For added convenience, a test can be paused and continued when desired.



# SIMPLIFY YOUR TESTING

WaveMatrix™ has been engineered to bring simplicity to your dynamic and fatigue tests. Use the built-in project organization to catalog tests and methods; click the View Results button to instantly find data files; and when needed, consult the online help to guide you to running your tests correctly and safely.



## Project wizard takes the hassle out of testing

The Project Wizard assists test organization, from designing and saving test method files through to storage of results. Create a project to cover a batch of samples, then sequentially name and number test runs and data files. This saves time normally spent administering the test and ensures you spend your time productively.



## Help when you need it

Even for the most advanced users, the context-sensitive online help displays detailed information about the software screens and functions with a single mouse click. This ensures your tests are running correctly and safely without added delays.

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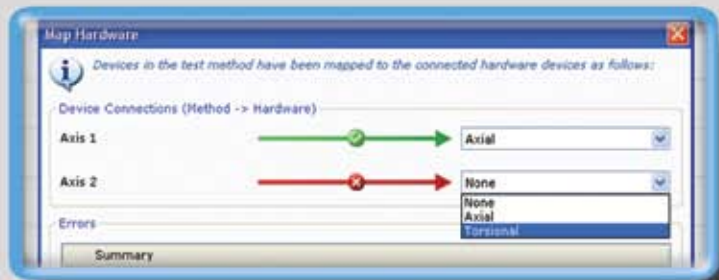
## Flexible format for analysis and reporting

For total flexibility of data analysis and report creation, WaveMatrix™ saves data in the universally recognized Comma Separate Value (CSV) file format.

	Total Cycles	Elapsed Cycles	Step	Loop 1	Loop 2	Position(Axial Position): Maximum (mm)	Position(Axial Position): Minimum (mm)	Load(Axial Load): Maximum (N)	Load(Axial Load): Minimum (N)	Rotation(Rotary Rotation): Maximum (A)	Rotation(Rotary Rotation): Minimum (A)
1											
2	1	1	2	1	1	17.17409	5.774503	29.943	10.0738	-17.5005	-17.54
3	2	2	2	1	1	17.16098	5.775747	29.92609	10.07484	-17.5319	-17.5
4	3	3	2	1	1	17.16154	5.774131	29.92698	10.07437	-17.5342	-17.55
5	4	4	2	1	1	17.16441	5.770912	29.9318	10.06756	-17.5307	-17.54
6	5	5	2	1	1	17.1652	5.76637	29.93068	10.05504	-17.5314	-17.54
7	6	6	2	1	1	17.17155	5.762293	29.93999	10.05124	-17.5325	-17.54
8	7	7	2	1	1	17.17355	5.763452	29.94103	10.05114	-17.5319	-17.54
9	8	8	2	1	1	17.17584	5.760705	29.94711	10.04679	-17.5284	-17.54
10	9	9	2	1	1	17.17812	5.757186	29.95187	10.04148	-17.5275	-17.54
11	10	10	2	1	1	17.17805	5.754719	29.95336	10.03743	-17.5306	-17.53
12	20	20	2	1	1	17.19239	5.744004	29.98189	10.01978	-17.5226	-17.53
13	30	30	2	1	1	17.19624	5.737867	29.9891	10.00897	-17.5169	-17.52
14	40	40	2	1	1	17.19902	5.737746	29.99111	10.00642	-17.5113	-17.5
15	50	50	2	1	1	17.20066	5.734584	29.99424	10.00406	-17.5083	-17.52
16	60	60	2	1	1	17.20324	5.734255	29.99526	10.00383	-17.5039	-17.52
17	70	70	2	1	1	17.20161	5.736171	29.99877	10.00066	-17.5044	-17.54

## Productivity with offline test creation

Maximize productivity by designing test methods on an office PC or another testing machine, and import them directly into WaveMatrix. Use the mapping function to ensure the hardware is correctly setup and be ready to test.



## Bring order to data file storage

Within the current project, tracking and trend data files are grouped together in a folder named according to the Test ID. Saved with a read-only copy of the test method, organization within WaveMatrix saves you time by bringing order to data file storage.



# BUILT-IN INTELLIGENCE

WaveMatrix™ is packed with intelligent features designed to assist with your testing, and to deliver advanced capability in a single software package.



## Multi-axial capability in one program

With support for up to six axes of control and 5 kHz data rates, WaveMatrix delivers the ultimate in material testing capability. Define unique waveforms on each axis, and select transducer or derived channel combinations for fully synchronized data acquisition in each step.



## Versatility with user-defined waveforms

The sampled data and turning point functions allow users to import user-defined data to generate complex demand waveforms within each step or test axis. This gives complete versatility to run profiles from a single loading pulse through to playback of complex in-service loading conditions, such as those generated in a knee during gait and other time-history data.



## Multiple channel support gives flexibility

WaveMatrix supports a variety of different devices, including servohydraulic actuators, electric actuators and ElectroPuls™ test instruments, as well as Eurotherm devices. Use raw transducer readings or derived channels such as true stress, true strain or displacement for control, and where required modally compensated transducers.



## Confidence with amplitude control

When running cyclic waveforms, the advanced amplitude control features of Instron's 8800 controller can be used within each step. Use auto tuning to set up the control loop and amplitude control during the test to ensure peaks and troughs are achieved. And with challenging specimens, such as visco-elastic materials, use Tri-Modal control to regulate peaks, mean level or amplitude across different control modes.

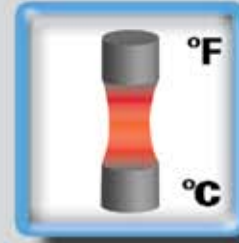


## Data reduction assists file optimization

Data reduction is a configurable real-time tool that allows you to discard data points that have not changed significantly since the last retained data point. While minimizing the data file size, it also saves you time by not having to browse through unnecessarily long data streams and analyze similar data points.

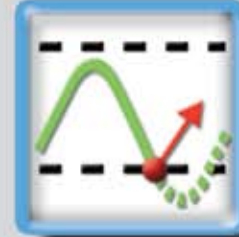
## Synchronized temperature control

With high or low temperatures tests, WaveMatrix™ seamlessly interfaces via RS232 with up to two Eurotherm® temperature controllers. This capability gives step-by-step set point generation, temperature feedback that can be logged synchronously with test data, as well as temperature monitoring and event detection.



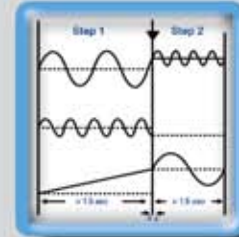
## Automatic control with events

Within each step, the event detector can be set up to sense when the real-time feedback signal rises or falls below a threshold value and automatically triggers. As well as offering advanced test control, the event allows different waveforms to run and stop the test if a specimen creeps or fails prematurely.



## Seamless flow gives complete control

Fully integrated with the 8800 controller, WaveMatrix allows immediate step transfers in 1 ms as defined by the user or event actions. In addition to delivering seamless control mode transfers and instantaneous event actions, it can minimize stress relaxation in critical specimens.



## Monitors detect changes for you

The peak and trend functions within WaveMatrix monitor the value of a selected peak or trend channel and trigger a user-selected action if the value changes by a specified amount from a reference value. This advanced functionality allows you to perform user actions, such as skipping to the next block if the sample stiffness changes or ending the test in a controlled manner if the specimen unexpectedly fails.



## I/O gives expanded capability

External devices, such as data acquisition or specimen cooling systems, can be synchronized with WaveMatrix tests using the input/output capability of the 8800 controller. Set analogue output voltage levels in each step, trigger systems using digital outputs, or activate step transfers using the digital inputs.



## Reduce analysis time with balancing

To negate the need to remove offsets during data analysis, WaveMatrix supports zero balancing of linear and rotary extensometers, displacement transducers and displacement derived channels at any step during a test.



# APPLICATION SCALABILITY

WaveMatrix™ is capable of running synchronized multi-step tests in the full six degrees-of-freedom.



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