HITACHI
Inspire the Next

DMA7100

VISIBLY BETTER

Don’t miss a thing with the DMA7100

Advanced materials development and quality control needs fast and accurate materials characterisation. Dynamic mechanical analysis (DMA) delivers a high level of sensitivity for glass transition and material stiffness measurements, and can determine the effect of frequency on mechanical characteristics. Hitachi’s DMA7100 is relied upon by product engineers within applied research and materials development to give precise and reliable mechanical properties measurements for simple and complex materials.

The DMA7100 has world-class sensitivity thanks to its patented Fourier transform operation that minimize noise and unsurpassed force resolution allowing the measurement of the smallest transitions. Additional functions, such as synthetic oscillation, RealView observation, and Lissajous monitoring, mean that you can catch very fast modulus changes, understand unexpected behaviors such as sample damage or color change and check the reliability of each data point – even after the measurement run is complete.

A robust, heavy instrument, the DMA7100 has an extremely large modulus range making it ideal for very soft and very stiff samples, and you can choose from many different deformation modes. With advanced features such as TTS and activation energy calculations included as standard, you can fully characterize thermo-plastics, polymer blends and undergo curing studies for composites. Equally at home in the lab and for routine analysis, the DMA7100 is very easy to use, even for non-specialist users.

Comprehensive materials characterization made easy

ULTRA-HIGH SENSITIVITY

A wide applied force range with 0.00001N resolution and very low levels of noise in the output signal makes the DMA7100 sensitive enough to detect and resolve the smallest transitions.

COMPREHENSIVE MECHANICAL ANALYSIS

The RealView system, a wide choice of measurement probes, the detection of very fast modulus changes and advanced analysis features makes the DMA7100 ideal for research use.

RESULTS YOU CAN TRUST

It’s easy to verify the reliability of each data point during or after analysis with the Lissajous monitor function so you can be confident in the results.

EASY TO USE

A simple sample clamping mechanism and intuitive software that can be set up to guide the operator through the analysis process means the DMA7100 can be operated by non-experts.

LOW-COST OPERATION

The efficient design of the liquid Nitrogren dewar cooling platform reduces liquid nitrogen consumption by up to 30% to keep operating costs down and running time up. With our efficient liquid Nitrogen control cooling, you can measure up to 11 cycles (-125 to 25C) with a 30L Dewar.

SUITABLE FOR MANY APPLICATIONS

The DMA7100 is delivered with all software modules as standard, including master curve (TTS) and activation energy calculations, making it ideal for a large range of applications.

DMA7100 technical specifications

	DMA7100					
Deformation mode options	Tension	Single/Dual-cantilever bending	3-point bending	Shear	Film-Shear	Compression
Measurement range (1Hz)	10^5 – 10^{12} Pa	10^5 – 10^{12} Pa	$10^{6.5}$ – $10^{13.5}$ Pa	10^3 – 10^9 Pa	10^4 – 10^{10} Pa	10^5 – 10^9 Pa
Measurement modes	Dynamic measurements: sinusoidal wave / synthesis wave oscillation modes Static measurements: program stress control / program strain control					
Frequency	Sinusoidal wave oscillation: 0.01 to 200 Hz, max 20 frequencies Synthesis wave oscillation mode: 5 frequencies					
Force range	Dynamic force: +/- 10 N/ Static force +/- 10 N					
Temperature range	-150 to 600ºC					
Temperature scan rate	0.01 to 20ºC					
Gas purge control	300 mL / min with gas flow controller included as standard					
Cooling unit	Auto LN2 gas cooling unit: -150 to 600ºC Forced air cooling unit: Ambient to 600ºC					
Dimensions	420(W) x 630(D) x 725(H) mm					
Output values	Temperature, Frequency, Time, E'(G'), E"(G"), | E* | (| G* |), tanδ, η, J', J", Ft, dL, Stress, Strain					

Deformation mode options

The DMA7100 is delivered with the tension measurement probe as standard.

However, you can choose from a range of probes to suit the deformation mode you need. All measurement probes are made to be easily exchangeable and easy to mount samples.

VARIETY OF DEFORMATION MODES

Tension

Single/Dual-cantilever bending

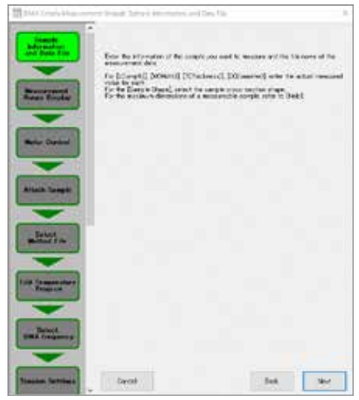
3-Point Bending

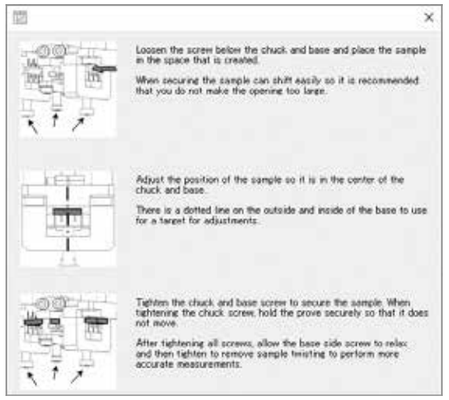
Shear

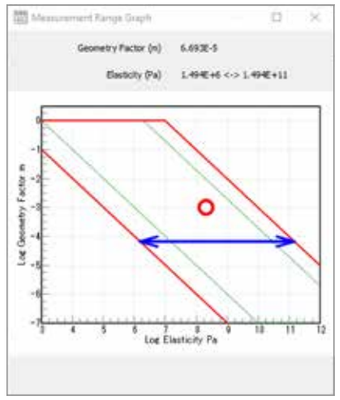
Film-Shear

Compression

NEXTA TA Software: simplifying complex procedures







DMA is one of the most technical thermal analysis techniques for material characterization, often needing expert operators to set up the analysis and start the measurement. The NEXTA TA software makes DMA sample setup and analysis simple with 'guidance mode'. This mode walks the operator through the analysis step by step, from giving information about the analysis method, to sample information and running the analysis, to extracting the final results. This makes the DMA7100 excellent for teaching labs or when analysis will be carried out by non-specialist staff.

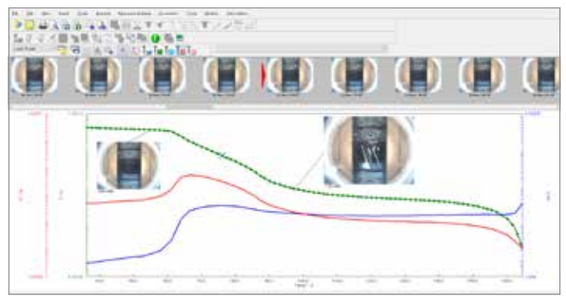
You can easily switch from guidance mode to simple mode – where just the important features are shown on the screen for more experienced analysts – and finally to standard mode where advanced users can choose from the whole range of parameters.

Offline data analysis is included with the NEXTA TA software, meaning that analysts can work with their results from their desk or from home without the need to purchase extra licenses.

DMA RealView for visibly better analysis

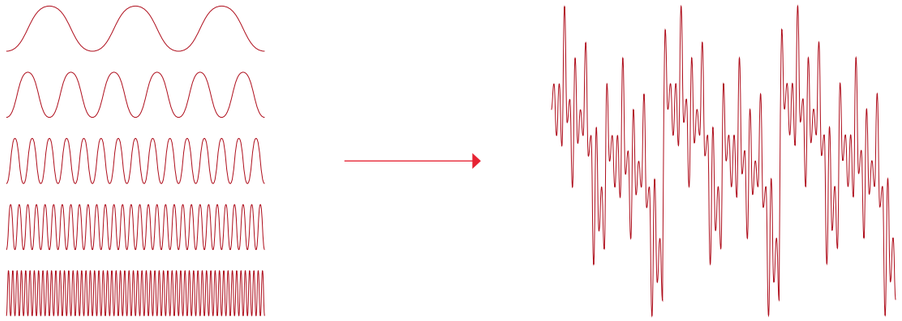
RealView allows you to see what's happening visually to your sample in real time as well as after the analysis. This gives the operator a complete understanding of what's happening with the sample during the process and helps to avoid erroneous interpretation of the results.

For example, if a sample is not mounted properly, it might give unexpected results which could be difficult to understand. In this example, RealView allows us to see that the sample was mounted diagonally to its anisotropy which leads to a two steps glass transition on the storage modulus. Another example is an increase of E' before the glass transition point usually indicates a thermal phenomenon, like crystallization. However, the same result can occur if the sample is not clamped properly in the fixing. Viewing the sample during the process makes this clear.



You can watch your sample in real time, and RealView captures the visual data so that you can replay the video of the sample after the event, where the software shows at which point the in output trace the visuals were taken. Using RealView you can also see and measure the color changes of samples affected by temperature.

Synthetic Oscillation: catch fast modulus changes



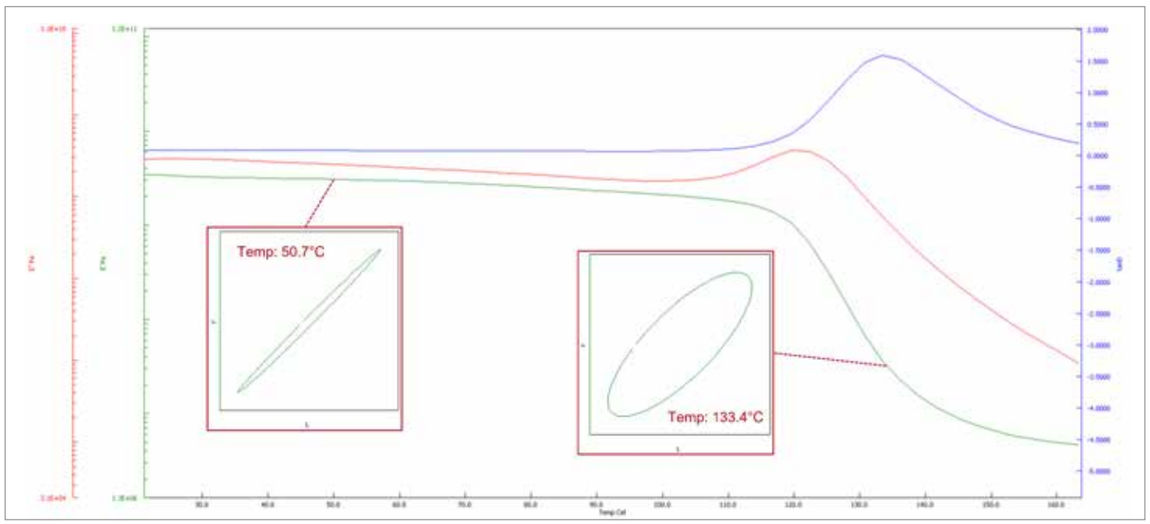
Five different sinusoidal waves

Synthesised wave

As well as being highly technical, DMA measurements can take a long time when compared with other thermal analysis techniques. To help accelerate material characterization, the NEXTA TA software can create synthetic oscillations comprised of up to five different frequencies at the same time. This is especially useful for very fast modulus changes, where the change can be easy to miss using standard sinusoidal oscillations of a single frequency.

Lissajous Monitor: confidence in your data

The Lissajous monitor function gives a simple way of checking the reliability of each data point. You can do this in real time during a measurement, or you can go back and check each point after the analysis is complete. This function gives you the relationship between stress and strain of the sample. You are looking for an even, regular shape in the Lissajous output graph (see diagram for example of a ‘good’ shape); if you get odd bumps in the shape, then the results need investigating further as you may have an issue with the sample setup in the fixture.



Our Service

Hitachi High-Tech’s global network of service hubs offers a full range of technical support to keep you up and running:

GLOBAL HELP DESKS

Whenever you have a problem, we’re ready to help.

ONLINE DIAGNOSTICS

In-depth and rapid support via our website.

TRAINING

To help you get the most out of your analyzer and its full range of features.

EXTENDED WARRANTIES

To give you extra peace of mind and avoid unplanned costs.

REPAIR SERVICE

We offer a fast and efficient repair service, recertification and maintenance through our service agreements to ensure your analyzer is maintained in excellent condition and avoids any unplanned costs.

What next?

Contact one of our experts today at **contact@hitachi-hightech.com** to discuss how the DMA7100 analyzer could support your materials development work.

MORE INFORMATION

To find out more about the DMA7100 and other instruments in the Thermal Analysis range, visit **hhtas.net/DMA**

Other products

We have been providing materials characterization instruments to a wide range of industries for over 45 years.

- **Thermal Analysis**: We offer a range of other thermal analysis instruments including DSC, STA, DMA and TMA. All of these work on the NEXTA TA software platform, allowing continuity across your analysis without extra training.
- **Bulk XRF**: for rapid and powerful elemental analysis for a wide range of applications.
- **Microspot coatings XRF**: for precise analysis of the smallest samples and features.

Browse our full range of products online at **www.hitachi-hightech.com/hha**

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