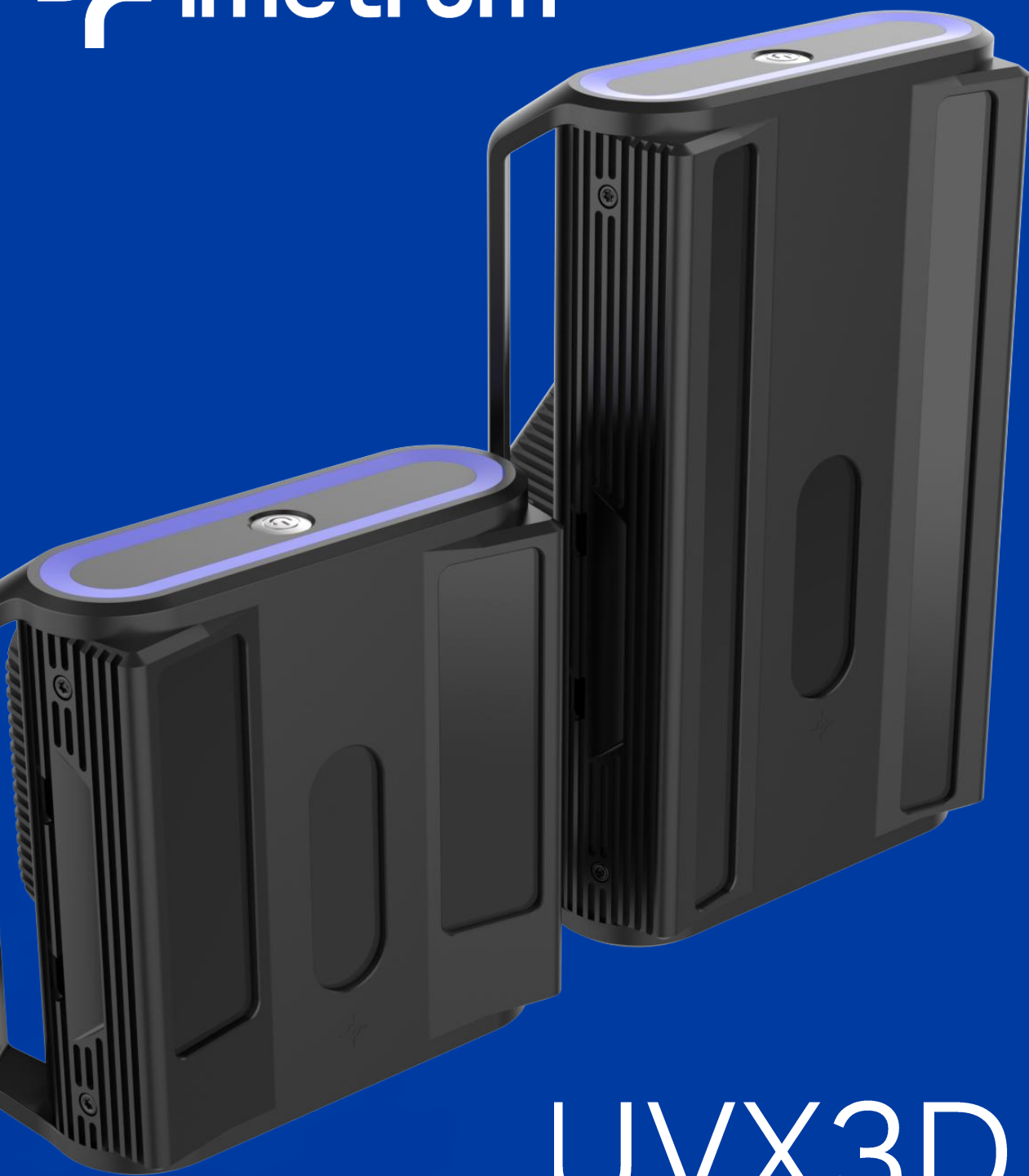




UVX3D

Product Range Brochure

UVX3D Advanced Video Extensometer



The practical, plug-and-play 3D video DIC - : pre-calibrated and highly capable.

Accurate and comprehensive to efficiently deliver reliable real-time strain data and capture video for reprocessing and post-processing.

Excellent ROI from the insightful and versatile toolset ideal for both material coupons and component testing.

Imetrum technology inside. Trusted from over 25 years of expertise in Digital Image Correlation algorithms.

Product Overview

UVX3D	Form	Operating Distance	Verified Gauge Lengths	Recommended Specimen Width
110		320 - 360 mm	10 – 80 mm	Uniaxial: $W \geq 2.1 \text{ mm}$ Biaxial: $W \geq 12 \text{ mm}$
220		320 - 360 mm	20 – 200 mm	Uniaxial: $W \geq 4.7 \text{ mm}$ Biaxial: $W \geq 25 \text{ mm}$

For all the aspects above, all UVX3Ds:

- Meet or exceed ISO 9513 **Class 0.5** and ASTM E83 **Class B-1**, and
- Capture and output at 500Hz to meet ISO 6892 and ASTM E8 **strain-rate control** for quasi-static testing or low cycle dynamic testing, and
- Capture video at 1000Hz for complex post-processing, and
- Operate reliably when **testing at temperature**, ranging from -100 °C to +370 °C, and
- Seamlessly integrate **input and output signals** via analogue $\pm 10\text{V}$ BNC, digital IO, and socket comms protocols.

The Modern Optical Extensometer

Consistent and Reliable Data

- Fully compliant with ISO and ASTM standards.
- Non-contact measurement eliminates the risk of test interference.
- No operator handling – removes human error.
- No knife edges – nothing to wear out or slip.

The Advanced Addition to Vector

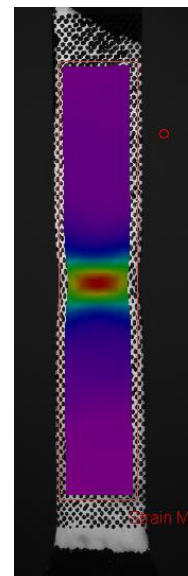
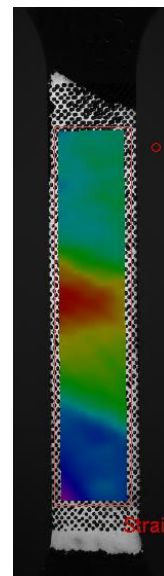
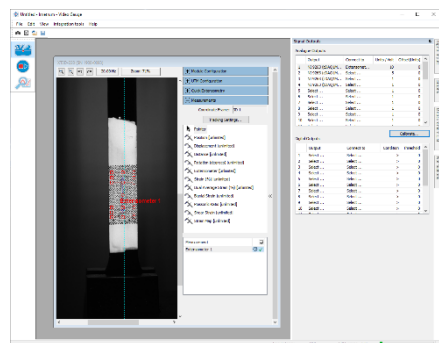
- The same intuitive UTM mounting and specimen marking methods.
- The same leading pre-calibrated 3D optical and tracking technologies at its core.
- Higher capture and output rates for strain-rate control of both static and dynamic tests.
- Configuration options for both live testing, advanced post-processed analysis, strain mapping, and data export.
- A different way to interact: Separate to Vector, UVX3D is powered by Video Gauge™ software on a dedicated powerful external PC.

Powerful and Comprehensive Interface

- Video Gauge™ has a proven pedigree in advanced material testing for over a decade.
- Effortless operation of 3D extensometry without the optical complexity.
- Expansive selection of standard measurement toolset and freedom to configure a test as desired.
- Easy laboratory integration: templates, presets, custom workflow, batch processing, socket comms, analogue IO, and data export.

Unparalleled Return on Investment

- Pre-calibrated 3D optical head, interface SW, controller PC, post-processing, and DAQ integration without breaking the bank.
- Plug and play operation prevents testing delays.
- 3D tracking prevents the measurement errors prone in single camera systems.
- Self-contained optical head enables rapid operator onboarding and infield verifications.



Measuring the Industrial World

UVX3D 110



For advanced material testing of smaller gauge lengths and extension ranges; for specimens, or replacing strain gauges on components - compression, tensile, bending and others. Comparable to the Vector B80 but with insightful measurement tools, increase capture rate capability, and video archive with reprocessing and post-processing.

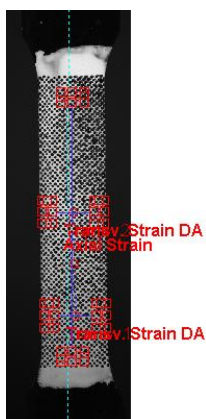


Operating Distance	320 to 360 mm
Verified Gauge Lengths	10 to 80 mm
Recommended Minimum Specimen Width	Axial; 2.1 mm Transverse; 12 mm
Image Width at 1000Hz	11 mm
Complete specification printed overleaf	

UVX3D 110 brings unparalleled value to many applications. Further information included below.

Routine R-value Determination

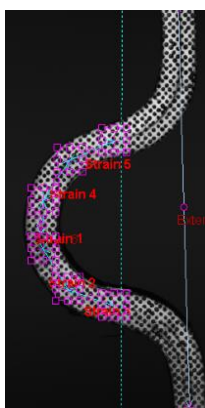
- Strain-rate controlled aluminium alloy
- 50mm Axial, 20mm dual-averaged transverse



- Accurate live data outputted to UTM
- Configured to suit the desired material behaviour.
- High throughput via pre-calibrated 3D, templates and custom workflow.

Virtual Strain Gauges

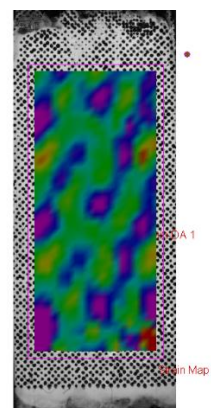
- Carbon composite with 5mm wide curved layup.
- Multiple 2mm and 6mm gauges.



- Practical multiple, small gauges without the pain of preparation.
- Reliable data, even below the verified gauge lengths.
- Easily test unusual geometries and materials, in both quasi-static and dynamic modes.

3D Strain Map

- Position-controlled Carbon composite to 0.5% axial strain.
- 3D map of shear strain.



- Insightful strain mapping in 3D,
- Accurate visualisation of specimen behaviour up to 1000Hz
- Fully self-contained system removes the task complexity.

Measuring the Industrial World

UVX3D 110 Data Sheet

Extensometer measurement applications	Uniaxial; Tensile, Compressive, Flexural or Shear Biaxial; Transverse, Dual-Average			
Measurement modes	Strain (%), Extension (mm), Displacement (mm), Positions (mm), Rotation (°), Poisson's ratio, Strain map.			
Field of view (Cuboid listed in mm) (Width varies with data rate)	Preset:	120 Hz	500 Hz	1000 Hz
	110H x 40D x	94W	23W	11W
Resolution	<0.5 µm			
Extensometer accuracy class	Meets or exceeds ISO 9513 Class 0.5 and ASTM E83 Class B-1 capable for the Verified Gauge Lengths below.			
Verified gauge lengths	10 to 80 mm			
Frame capture rate	Presets at 120, 500, 1000 Hz (1000 Hz measurements in post-processing only)			
Minimal specimen width	Axial; 2.1 mm Transverse; 12 mm			
Minimal recommended specimen parallel section	12 mm			
Maximum tracking speed	2500 mm/min			
Strain control	Real-time low latency strain data at presets of 120 and 500 Hz. Compliant to ISO 6892 and ASTM E8			
Operating distance	320 to 360 mm			
Strain signal interface	Analogue ±10V BNC available via NI DAQ interface			
Supported mark types*	Bullseyes, Dots, Rings, Speckles and natural patterns			
Recommended specimen temperature range	-100 to +370°C			
Dimensions	193H x 192D x 210W mm			
Weight (UVX3D module only)	3.95 kg			

*Always use marking kit provided.

Note: Specimen dimensions listed are typical guidelines. UVX3D offers the flexibility to test materials below these stated minimum thickness and size thresholds based on your specific setup and application needs.



<https://www.imetrum.com/products/uvx3d-110/>

UVX3D 220



For advanced material testing of larger gauge lengths and extension ranges; for specimens, or entire components and sub-assemblies - compression, tensile, bending and others. Comparable to the Vector U200 in optical volume but with insightful biaxial measurement tools, increase capture rate capability, and video archive with reprocessing and post-processing.



Operating Distance	320 to 360 mm
Verified Gauge Lengths	20 to 200 mm
Recommended Minimum Specimen Width	Axial; 4.7 mm Transverse; 25 mm
Image Width at 1000Hz	24 mm
Complete specification printed overleaf	

UVX3D 220 brings unparalleled value to many applications. Further information included below.

Highly-Straining Specimens

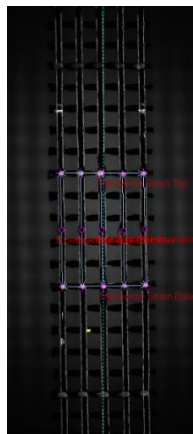
- Compression of Ø45mm conduit tubing sample
- Bucking behaviour observed during test



- Accurate throughout the large Field of View
- Highly capable pattern tracking
- 3D measurement without errors from out-of-plane movement.

Large and Awkward Specimen

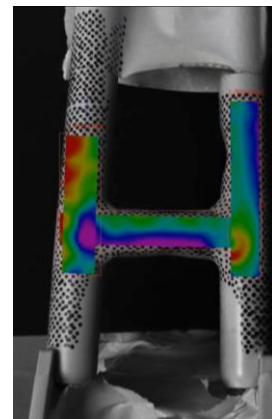
- 300mm long carbon fibre mesh specimen
- Simple pen markings on mesh nodes



- Practical freedom to place extensometer without contacts, edges, or clips.
- Highly versatile measurement tools included.
- Video archive stored for reprocessing.

3D Strain Map

- Load controlled flexure of bicycle frame stays.
- 3D map of axial strain in each section.



- Insightful strain mapping in 3D.
- Accurate visualisation of specimen behaviour up to 1000Hz
- Fully self-contained system removes the task complexity.

UVX3D 220 Data Sheet

Extensometer measurement applications	Uniaxial; Tensile, Compressive, Flexural or Shear Biaxial; Transverse, Dual-Average			
Measurement modes	Strain (%), Extension (mm), Displacement (mm), Positions (mm), Rotation (°), Poisson's ratio, Strain map.			
Field of view (Cuboid listed in mm) (Width varies with data rate)	Preset:	120 Hz	500 Hz	1000 Hz
	220H x 40D x	94W	48W	24W
Resolution	<0.5 µm			
Extensometer accuracy class	Meets or exceeds ISO 9513 Class 0.5 and ASTM E83 Class B-1 capable for the Verified Gauge Lengths below.			
Verified gauge lengths	20 to 200 mm			
Frame capture rate	Presets at 120, 500, 1000 Hz (1000 Hz measurements in post-processing only)			
Minimal specimen width	Axial; 4.7 mm Transverse; 25 mm			
Minimal recommended specimen parallel section	24 mm			
Maximum tracking speed	2500 mm/min			
Strain control	Real-time low latency strain data at presets of 120 and 500 Hz. Compliant to ISO 6892 and ASTM E8			
Operating distance	320 to 360 mm			
Strain signal interface	Analogue ±10V BNC available via NI DAQ interface			
Supported mark types*	Bullseyes, Dots, Rings, Speckles and natural patterns			
Recommended specimen temperature range	-100 to +370°C			
Dimensions	255H x 192D x 210W mm			
Weight (UVX3D module only)	5.05 kg			

*Always use marking kit provided.

Note: Specimen dimensions listed are typical guidelines. UVX3D offers the flexibility to test materials below these stated minimum thickness and size thresholds based on your specific setup and application needs.



<https://www.imetrum.com/products/uvx3d-220/>

Application Examples

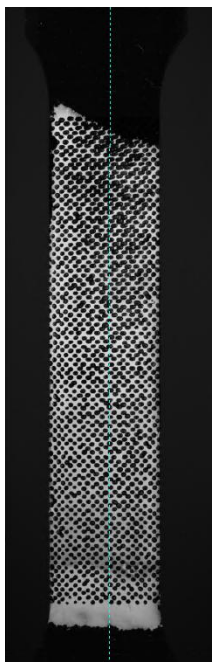
Post-Processed Biaxial Strain of Aluminium Alloy Specimen with Averaged Transverse

The aluminium alloy specimen exhibits discontinuous yielding throughout both the elastic and plastic regions which effect extensometry readings, especially in transverse. To combat the error, multiple gauges can easily be added with UVX3D. In the case below, eleven transverse gauges are spaced evenly throughout the specimen and computed using post processing and the data exported via .csv. The average of all gauges is taken and the holistic transverse behaviour can be easily and accurately determined from this average. More gauges could easily have been added to refine the result, as desired.

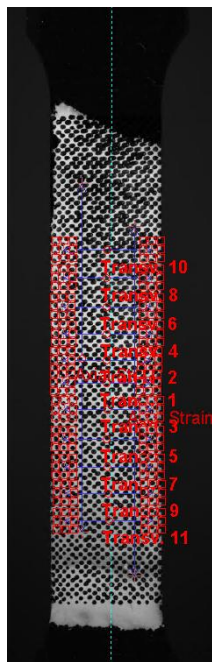
For this example, an accompanying strain map of the same test is included to demonstrate the Lüders banding present in the test. More information on strain maps



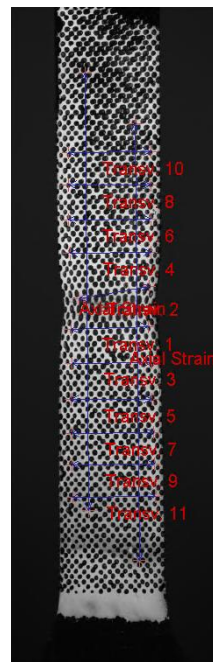
Specimen
Marking



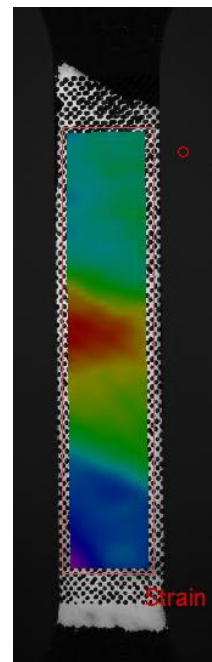
Specimen
Test Start



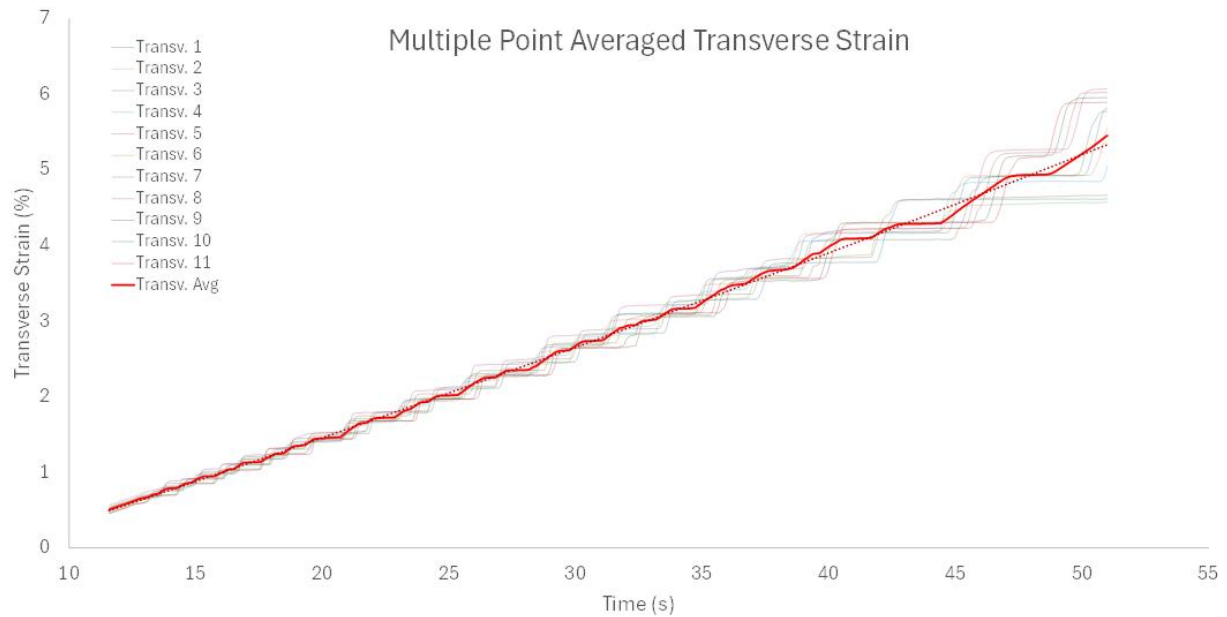
Measurement
Tools



Specimen
Test End

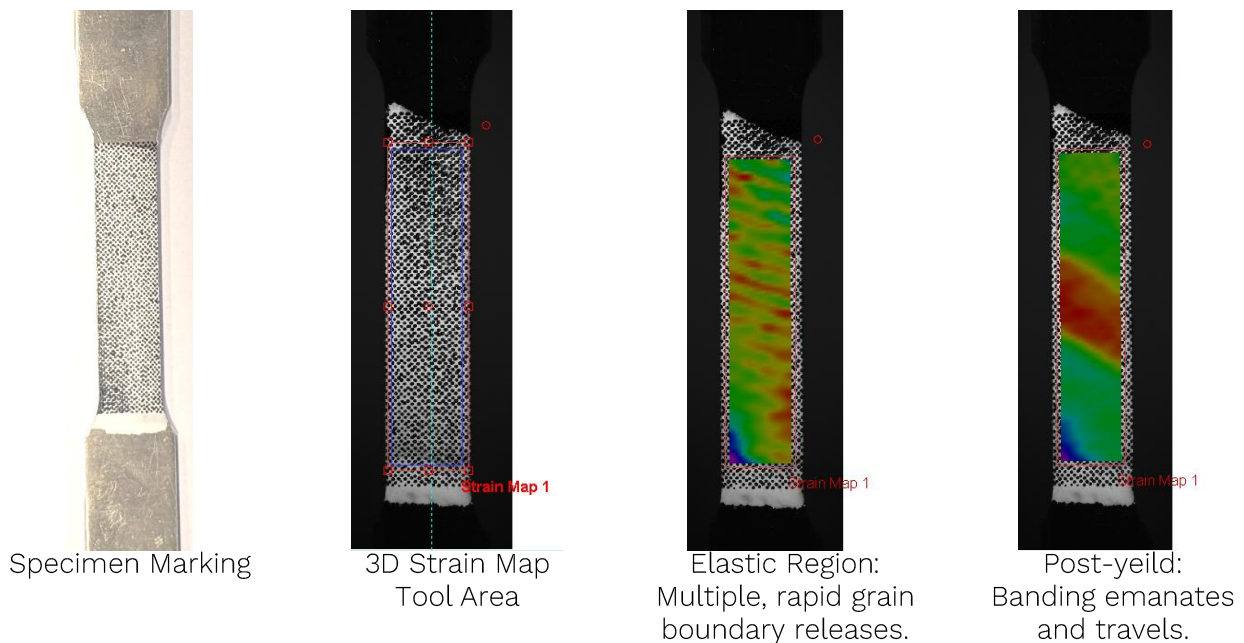


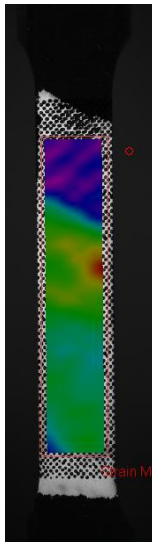
Strain Map
Mid-Test



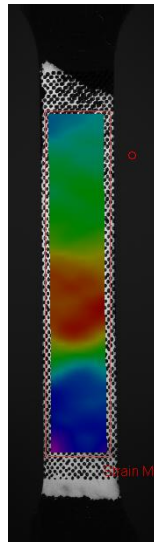
Post-Processed 3D Strain Map of Aluminium Alloy Specimen – Axial Strain

Using the same video as the previous example, a 3D strain map was generated to both visualise the Lüders banding present in the test and correlate the banding to the stress-strain curve. The force data was recorded from the UTM using a NI DAQ input channel into Video Gauge, inherently synchronised with the video data to produce a Force-Strain graph alongside the strain map. The 3D strain map below is configured to show the minimum to maximum axial strain per frame coloured through Purple – Blue – Green – Yellow – Red, respectively.

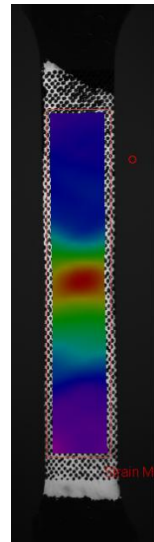




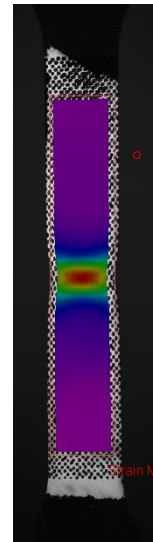
Post-yield:
Banding traveling
upwards.



UTS Point:
Banding focuses
around necking.



Necking:
Banding stops,
strain only at neck



Specimen failure:
High strain localised
to failure point.

With 3D strain mapping, the position, strain, and displacement behaviour is available in X,Y,Z, including XY shear strain. Out-of-plane movement is accurately measured.

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