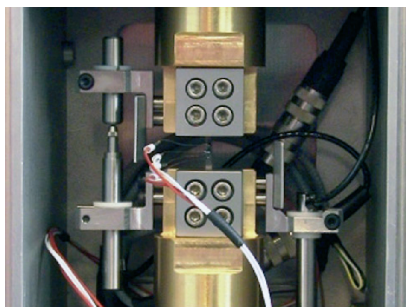


High Temperature Testing

With StrainMaster systems



Specimens in environmental chambers. Courtesy of Dr. B. Grant et al, School of Materials, University of Manchester

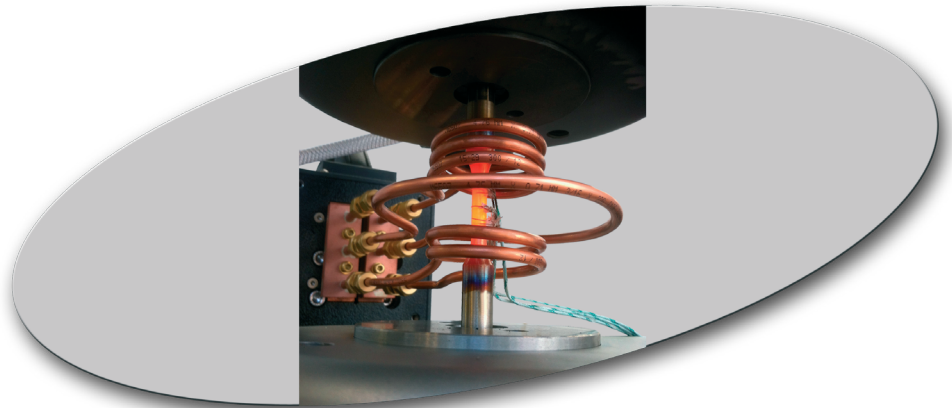
Applications

- ▶ characterize high performance aerospace alloys
- ▶ measure the thermal expansion of automotive engine and exhaust components
- ▶ correlate temperature and strain „hot-spots“ during manufacture
- ▶ creep resistance of superalloys
- ▶ assess the heat affected zone around welded parts

Heat affected zone

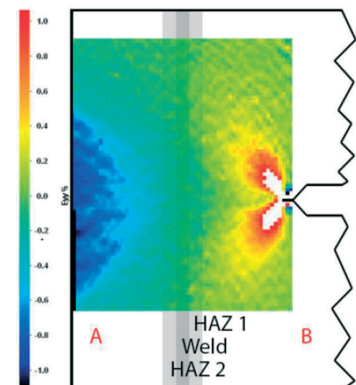


Measuring the strain response during loading at high temperature is a key capability for determining the mechanical and thermophysical properties of materials that are to be used at elevated temperatures. This topic is especially important in applications such as power generation, automotive engines, and gas turbine combustors, where the material may be operating beyond normal temperature limits.



Different experimental conditions at the material surface require specific optimization of the experimental setup for successful Digital Image Correlation (DIC) measurements. LaVision offer dedicated solutions for high temperature DIC measurements in terms of lighting, optics, and surface preparation

StrainMaster systems provide a non-intrusive and non-destructive means to test components in harsh environments where conventional gauges or extensometers cannot work. In the example shown DIC was used to investigate crack propagation through a welded interface to validate a finite element model.



Courtesy of Dr Alex Forsey (now at the Open University), and the University of Manchester in association with Serco Assurance

Main image: Instron Thermomechanical Fatigue (TMF) system - image courtesy of Instron UK

LaVisionUK Ltd

2 Minton Place / Victoria Road
Bicester, Oxon / OX26 6QB / United Kingdom
E-Mail: sales@lvision.com / www.lvisionuk.com
Phone: +44-(0)-870-997-6532 / Fax: +44-(0)-870-762-6252

LaVision GmbH

Anna-Vandenhoeck-Ring 19
D-37081 Göttingen / Germany
E-Mail: info@lvision.com / www.lvision.com
Tel. +49-(0)551-9004-0 / Fax +49-(0)551-9004-100

LaVision Inc.

211 W. Michigan Ave. / Suite 100
Ypsilanti, MI 48197 / USA
E-mail: sales@lvisioninc.com / www.lvisioninc.com
Phone: (734) 485 - 0913 / Fax: (240) 465 - 4306

Black body radiation



Blue LED illumination unit

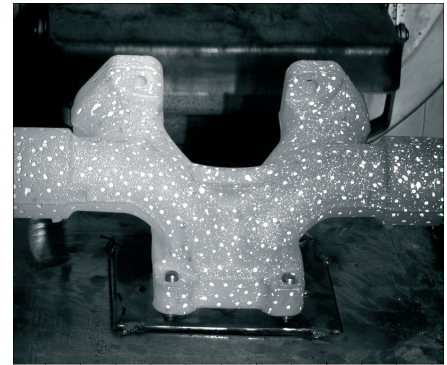
Parts for high temperature testing



Data provided by LaVision is believed to be true. However, no responsibility is assumed for possible inaccuracies or omissions. All data are subject to change without notice.

Nov-22

Specimens which are heated exhibit black body radiation which can easily obscure the visible surface pattern. A combination of blue lighting and the correct filter allows you to block out the glow from the surface. We are also able to give advice in terms of surface preparation suitable at very high temperatures (>1200 °C)



*DIC measurements of a hot (800°C) exhaust manifold - with filter (left) and without filter (right)
Acknowledgement: images taken during a project with KTH Royal Institute of Technology (Sweden) and Scania.*

1103521 blue illumination

1108600 camera filters

information available for specific applications: high temperature paint

It is also possible to incorporate thermal imaging data into the StrainMaster project within the same measurement space in order to bring together the full field temperature and strain maps, providing a powerful tool to validate complex simulations.



This document gives an overview of the capabilities with respect to our solutions for high temperature testing with **StrainMaster** systems, but we are continually developing our capabilities and are happy to discuss your specific requirements which may extend beyond the options mentioned.

Please consult with your LaVision representative for options and details.

LaVisionUK Ltd

2 Minton Place / Victoria Road
Bicester, Oxon / OX26 6QB / United Kingdom
E-Mail: sales@lvision.com / www.lvisionuk.com
Phone: +44-(0)-870-997-6532 / Fax: +44-(0)-870-762-6252

LaVision GmbH

Anna-Vandenhoeck-Ring 19
D-37081 Göttingen / Germany
E-Mail: info@lvision.com / www.lvision.com
Tel. +49-(0)551-9004-0 / Fax +49-(0)551-9004-100

LaVision Inc.

211 W. Michigan Ave. / Suite 100
Ypsilanti, MI 48197 / USA
E-mail: sales@lvisioninc.com / www.lvisioninc.com
Phone: (734) 485 - 0913 / Fax: (240) 465 - 4306