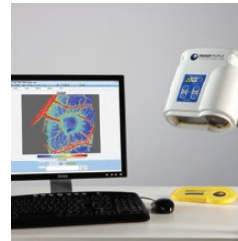
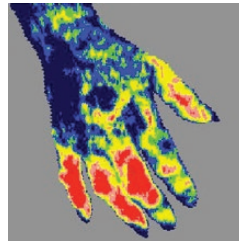
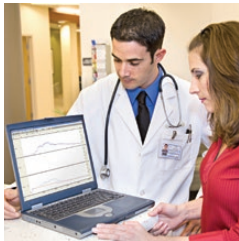
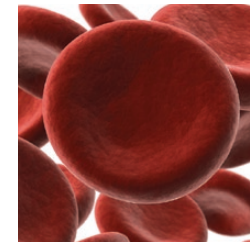


Blood flow imaging

2014 Imager Catalogue



moor instruments
innovation in microvascular assessment

Product highlights

Moor are proud to offer a choice of six advanced imaging systems for assessment of microvascular blood flow. Featured products include;

- **Clinical Burn Assessment**
A choice of two clinically proven systems with the release of the rapid moorLDLS-BI.
- **Laser Speckle - moorFLPI-2**
Fast full-field imaging based on the laser speckle technique - now with image resolution of 1M pixels/cm² and full area imaging at 25 frames/sec.
- **Laser Doppler - moorLDI2-HIR**
fully optimised for hind limb ischemia and angiogenesis modelling with 830nm laser and focussed optics to enable clear imaging of subsurface collateral vessels.

This catalogue is intended to provide an overview. Please contact us for further details or to arrange a no obligation on site visit. Visit www.moor.co.uk for full details of our imaging and moorVMS family for blood flow and oxygen monitoring. Clinical users can visit www.moorclinical.com for all burn assessment information.

Moor Instruments

Moor Instruments, established in 1987, is a world leader in the design and manufacture of laser Doppler systems.

Our systems are used for the measurement of skin blood flow and microvascular blood flow in other organs for a broad range of clinical and research applications such as wound management, plastic surgery, dermatology and dentistry.

Quality

Moor Instruments is an ISO 13485 registered company and has been for at least a decade. By working to strict quality procedures we ensure product safety, reliability and effectiveness.

Customer support

First hand experience of laser Doppler research and development within Moor dates back to 1978 and with this we have the breadth of knowledge to help with your application and the enthusiasm to try to find answers to any of your questions.

By giving priority to performance, quality and service we strive to be our customers number one choice.



moor instruments
innovation in microvascular assessment

The future

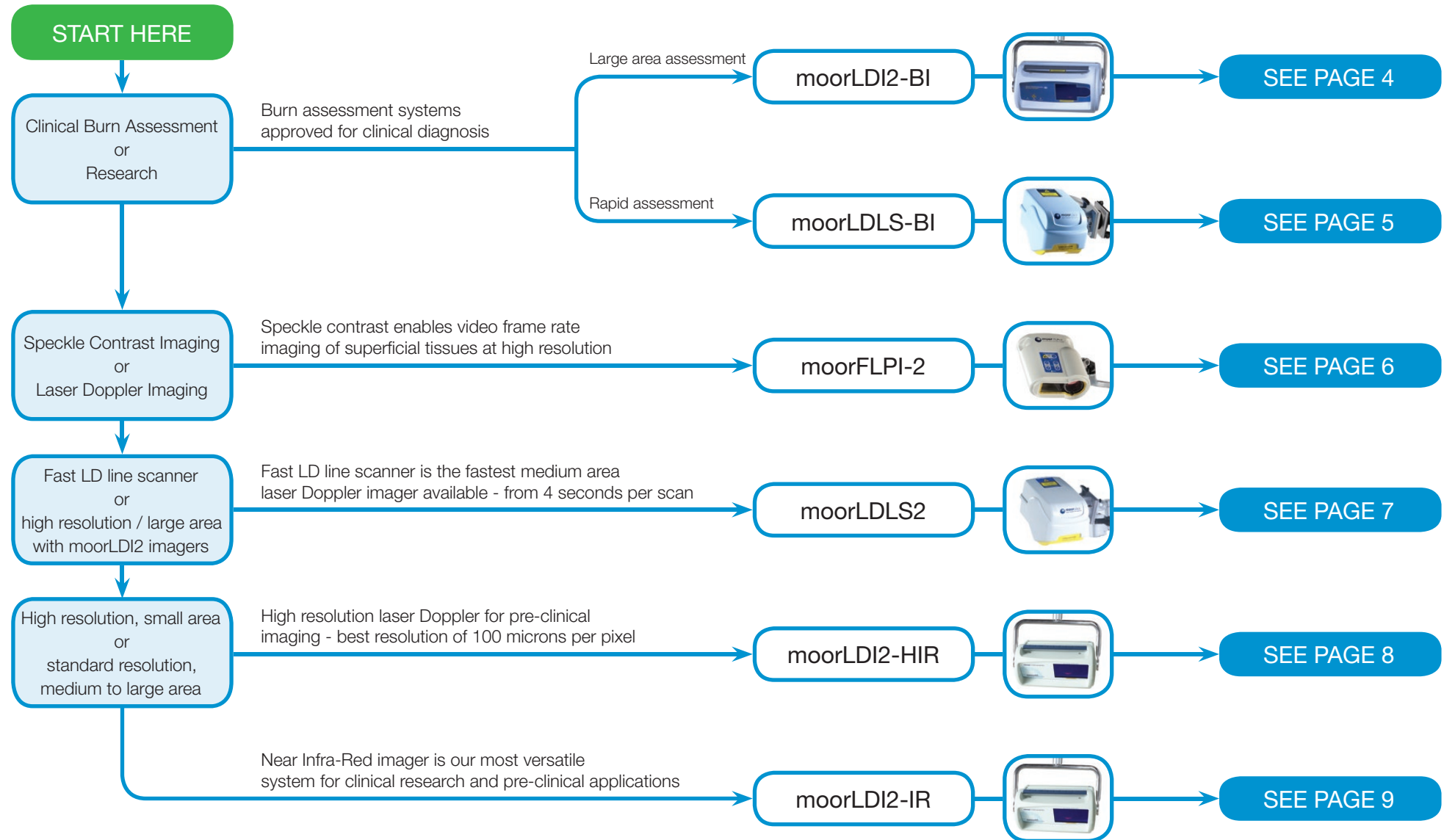
Our aim will always be to offer technical excellence within each product we manufacture.

Our experienced and highly skilled design team are also involved with a number of development projects for other partners and manufacturers. Whatever your needs, as a researcher, clinician or manufacturer, Moor will work harder for you.



moorLDI2-BI with MS2 mobile stand and touchscreen panel PC

Choosing the right package



moorLDI2-BI Large area burn assessment imager

Date Of Birth: 1 Jan 2001 (Age: 2)

Burn Cause: scald - water/drink

Time Post Burn: 58:56 hrs (Day 2 Post Burn)

Scan Size (WxH): 37.2 x 37.2 (cm x cm)




Healing Potential: more than 21 days	Healing Potential: 14 to 21 days	Healing Potential: less than 14 days
Low	Medium	High

Low ——— Blood flow within burn area ——— High

Clinical Assessment Day 3

Lund and Browder chart records initial clinical opinion for surgical treatment of abdomen and both thighs. The regions appear deep 2nd degree and full thickness.

moorLDI2-BI™ Assessment Day 3

moorLDI2-BI™ shows high flow (HP14) on the abdomen and right thigh (except for a few regions of slightly lower flow, HP14-21) indicating a good healing potential. The left thigh shows low flow (HP>21) within the burn area indicating no healing within 21 days. The clinical decision was to treat the left thigh surgically and the remainder of the other burn areas conservatively.

Outcome Day 23

All areas treated conservatively healed well by day 23 - as shown in the photograph. The need for surgery of the upper left thigh was indicated by the moorLDI2-BI. This was confirmed by biopsy, the results of which showed full thickness burn within this area.

Large area imaging is a key feature of the moorLDI2-BI. Areas up to 50cm x 50cm can be mapped in one scan (rather than a sequence that needs to be “stitched” together), with scan times ranging from 40 seconds up to 2 minutes.

Numerous studies using moor laser Doppler consistently show accuracies achieved in excess of 96% accuracy enabling early and effective planning of surgery or conservative management.

The complete package includes the moorLDI2-BI imager, clinical stand, isolation transformer, touchscreen panel PC, printer and burns imaging software. An integral part of the system is the installation, competence based training and a service contract ensuring support when needed.



moorLDI2-BI with MS2 mobile stand and touchscreen panel PC

Key Features

- Scan times from 40 seconds
- Large assessment area of up to 50cm x 50cm
- Long reach mobile stand



moorLDLS-BI Rapid burn assessment imager



Date Of Birth: 1 Dec 2009 (Age: 11 months) **Time Post Burn:** 47:40 hrs (Day 1 Post Burn)
Burn Cause: contact - other **Scan Size (WxH):** 12.0 x 10.1 (cm x cm)

Healing Potential:
 more than 21 days (Blue)
 14 to 21 days (Yellow)
 less than 14 days (Red)

Low ——— Blood flow within burn area ——— High

Clinical Assessment
 Initially assessed clinically on admittance as 2nd degree, <1% TBSA. At 5 days post burn the wound was clinically reviewed and the decision taken to apply a split skin graft, however the patient was unwell for theatre, and was not grafted.

moorLDLS-BI™ Assessment Day 2
 Wound mainly red indicating healing potential less than 14 days.

Follow Up 9 Days Post Burn
 Dorsum of hand - central area slightly deeper, the rest almost healed. Pink around edges. Surgery not performed.

Outcome Day 16
 Recorded as fully healed.

Rapid imaging is an essential feature of moorLDLS-BI which is most useful when scanning patients who are unable to keep still for long. With scan times of around 4 seconds for areas up to 15cm x 20cm the system is ideal for paediatric cases and can also be used for adults with easy to use repeat imaging to cover separate wounds or adjacent areas of large burns.

Numerous studies using moor laser Doppler consistently show accuracies achieved in excess of 96% accuracy enabling early and effective planning of surgery or conservative management.

The complete package includes the moorLDLS-BI imager, clinical stand, isolation transformer, touchscreen, panel PC, printer and burns imaging software. An integral part of the system is the installation, competence based training and a service contract ensuring support when needed.



moorLDLS-BI with touchscreen panel PC and MS3b mobile stand

Key Features

- Scan times from 4 seconds
- Areas up to 15cm x 20cm
- Multi-scan mode for multiple burn sites

VISIBLE AND INVISIBLE LASER RADIATION
 AVOID DIRECT EYE EXPOSURE
 CLASS 3R LASER PRODUCT
 WAVELENGTH 785nm MAX. POWER 30mW
 WAVELENGTH 650nm MAX. POWER 5mW
 IEC 60825-1 : 2007

moorFLPI-2 High resolution, video frame rate blood flow imaging

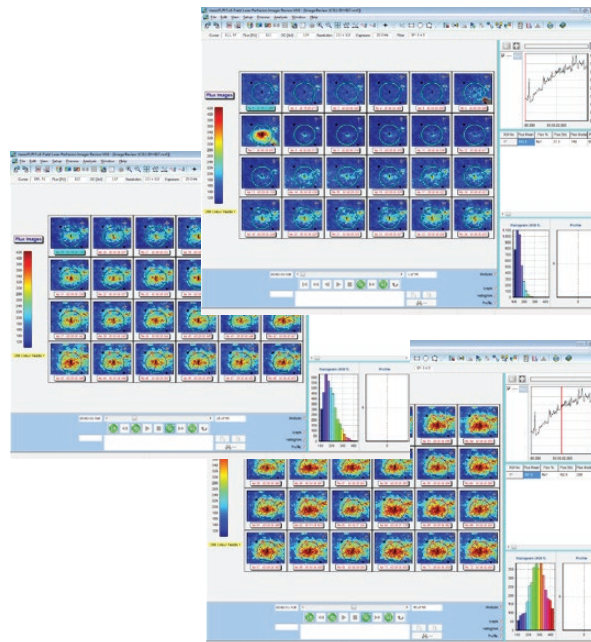
The moorFLPI-2 blood flow imager uses the laser speckle contrast technique to deliver real-time, high-resolution blood flow images, providing outstanding performance in a wide range of pre-clinical and clinical research applications, such as stroke modelling, spreading cortical depression, inflammation and irritancy.

User-friendly features promote smooth workflow and enable the high through-put required to scan cohorts quickly and accurately. Advanced analysis functions help you to draw sound conclusions from your blood flow images.



moorFLPI-2 with desktop stand/arm and PC

The system is ideally suited to any application where rapid changes are occurring – where conventional laser Doppler imaging could not provide data with sufficient time or spatial resolution. It is possible to image cardiac pulsations, fast changes during reactive hyperaemia and spatial variations due to axon reflex and drug stimulations. The moorFLPI-2 is ideal for very high resolution imaging, visualising blood flow in structures as small as 10 microns.



Forearm blood flow flare response to intradermal histamine. The images enable different areas to be analysed with high spatial and temporal resolution.

Images courtesy of Dr Geraldine Clough and Prof. Martin Church, Southampton, UK.



moorFLPI-2 with optional MS3b mobile stand and touchscreen panel PC

Key Features

- Frame rates up to 25 images per second
- CCD camera – motorised zoom and auto focus
- Scan areas from 5mm x 7mm to 15cm x 20cm
- Colour photo image matches blood flow images precisely



moorLDLS2 Rapid laser Doppler blood flow imaging

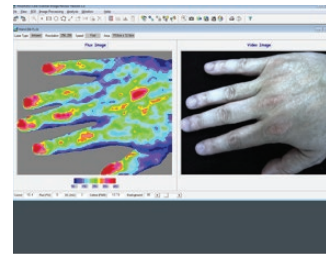
The moorLDLS2 line scanning system images at rates 4 to 5 times faster than the standard moorLDI2 imagers. The system employs a laser line to sweep across the tissue recording data from 64 points simultaneously.

The penetration properties of the laser line are similar to the moorLDI2 systems but the imaging times are much shorter e.g. 64 x 64 pixels in just 4 seconds.

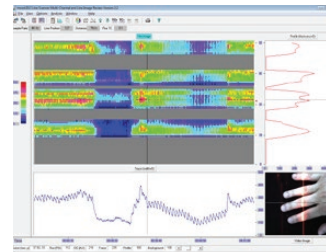
The system is ideally suited to any application where the dynamic changes are too rapid to be captured by conventional single collimated beam laser Doppler imaging. It is ideal where the work volume is such that time/cost savings can be attained by using fast line scanning and where it is necessary in a clinical/surgical environment to minimise the scan time.



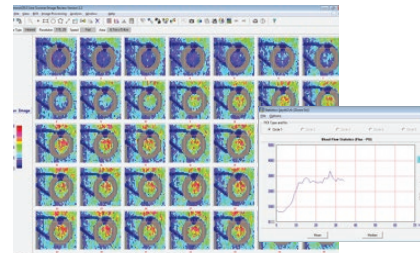
moorLDLS2 with desktop stand/arm and PC



moorLDLS2 single image mode



moorLDLS2 line scan mode – scratch on hand



moorLDLS repeat scan mode heating with moorVMS-HEAT



moorLDLS2 with optional MS3b mobile stand and touchscreen panel PC

Key Features

- Scan time 4 seconds for 64 x 64 pixels
- Scan areas up to 20cm x 15cm



moorLDI2-HIR High resolution imager

The moorLDI2-HIR™ is suitable for a wide range of pre-clinical research investigations, more typically where smaller areas are under investigation. The system features unique focused optics to provide 100 micron pixel size and 256 x 256 pixel resolution for high resolution blood flow images. The scan areas range from just 2.5cm x 2.5cm up to 25cm x 25cm with scan times typically less than 5 minutes. Use of 830nm wavelength laser provides a deeper measurement depth, optimal for angiogenesis studies such as hind limb ischemia and tumour modelling and pre-clinical cerebral blood flow imaging. Highly refined image measurement and analysis software allows for flexibility in measurement set up and comprehensive analysis functions. The moorLDI2-HIR™ features a colour photo image of the scanned area and

automatic distance measurement, making the positioning and comparison of images easier.

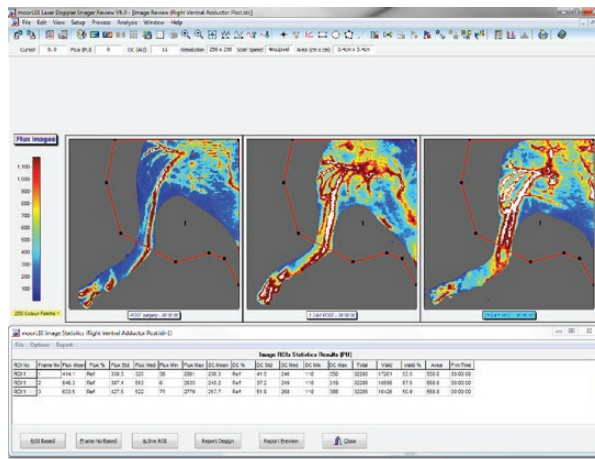
The system is in routine use in numerous laboratories and clinics globally and employs unique, optical design and signal processing in order to generate the highest resolution and clearest images of its class. LDI is often compared to laser speckle imaging and whilst there are some similarities, both techniques offer unique advantages. LDI (and moorLDI2-HIR™ in particular) generally offers deeper penetration enabling enhanced visualisation of small vessels below the tissue surface, perfect for pre-clinical studies. For certain applications these features are critical.



moorLDI2-HIR with optional DS2 stand

Key Features

- High resolution – maximum resolution of 10,400 pixels per cm²
- 2.5cm x 2.5cm scan area at maximum resolution



Angiogenesis modelling in hind limb ischemia model, where average perfusion in a ligated limb is compared with the control limb. Multiple scans over days can identify the time course of collateral vessel development.

Image courtesy of James Faber, UNC, USA.

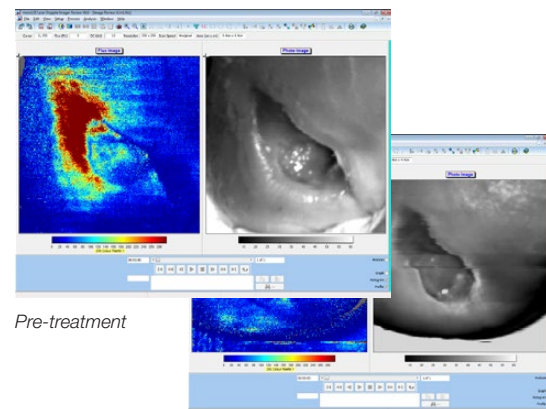
moorLDI2-IR Near Infra-Red imager

The moorLDI2 laser Doppler blood flow imager offers a well proven, high specification solution to your blood flow application for clinical or research application. The system is in routine use in numerous laboratories and clinics globally and employs unique, optical design and signal processing in order to generate the highest resolution and clearest images of its class.

LDI is often compared to laser speckle imaging and whilst there are some similarities, both techniques offer unique advantages. LDI generally offers deeper penetration enabling enhanced visualisation of small vessels below the tissue surface, perfect for angiogenesis modelling or through skull pre clinical cerebral blood flow imaging.

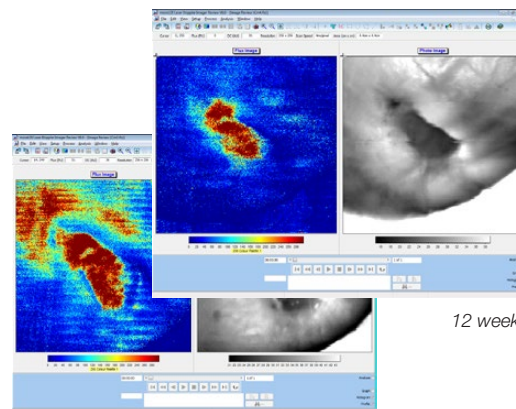
This sequence shows an ischemic ulcer on the heel of a foot. The region of deepest wound was slowest to heal and demonstrated increased blood flow during healing period (12 week assessment).

Images reproduced with kind permission of Dr Faisal Khan and Dr David Newton, Ninewells Hospital, Dundee.



Pre-treatment

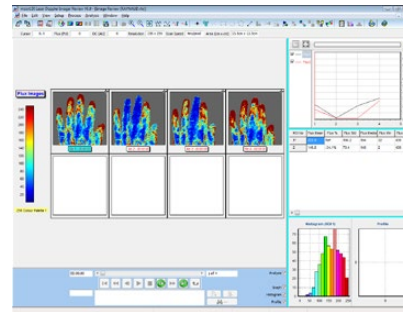
4 weeks post-treatment



8 weeks post-treatment

12 weeks post-treatment

A full range of accessories are available, including stands for clinical or bench top use. Dedicated software and hardware is available to enable control of iontophoresis, pressure and skin heating protocols (please refer to the MIC2 brochure for iontophoresis control, moorVMS-PRES brochure for pressure control and the moorVMS-HEAT brochure for skin heating).



Baseline (image 1), post cold water immersion (image 2), 7.5 minutes recovery (image 3) and 15 minutes recovery (image 4).









moorLDI2-IR with optional MS2 mobile stand and touchscreen panel PC

Key Features

- Highest sensitivity of moorLDI2 range
- Suitable for wide range of research applications
- Maximum resolution of 2,600 pixels per cm²
- Scan areas from 5cm x 5cm to 50cm x 50cm



Summary chart Moor Instruments blood flow imaging product range

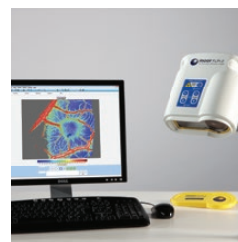
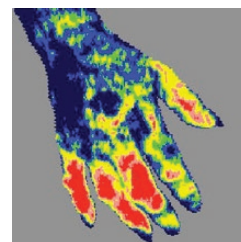
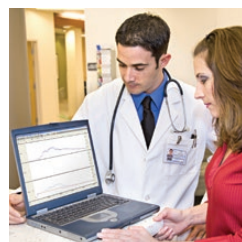
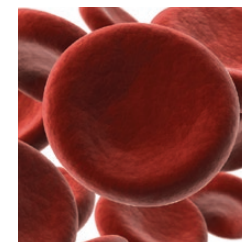
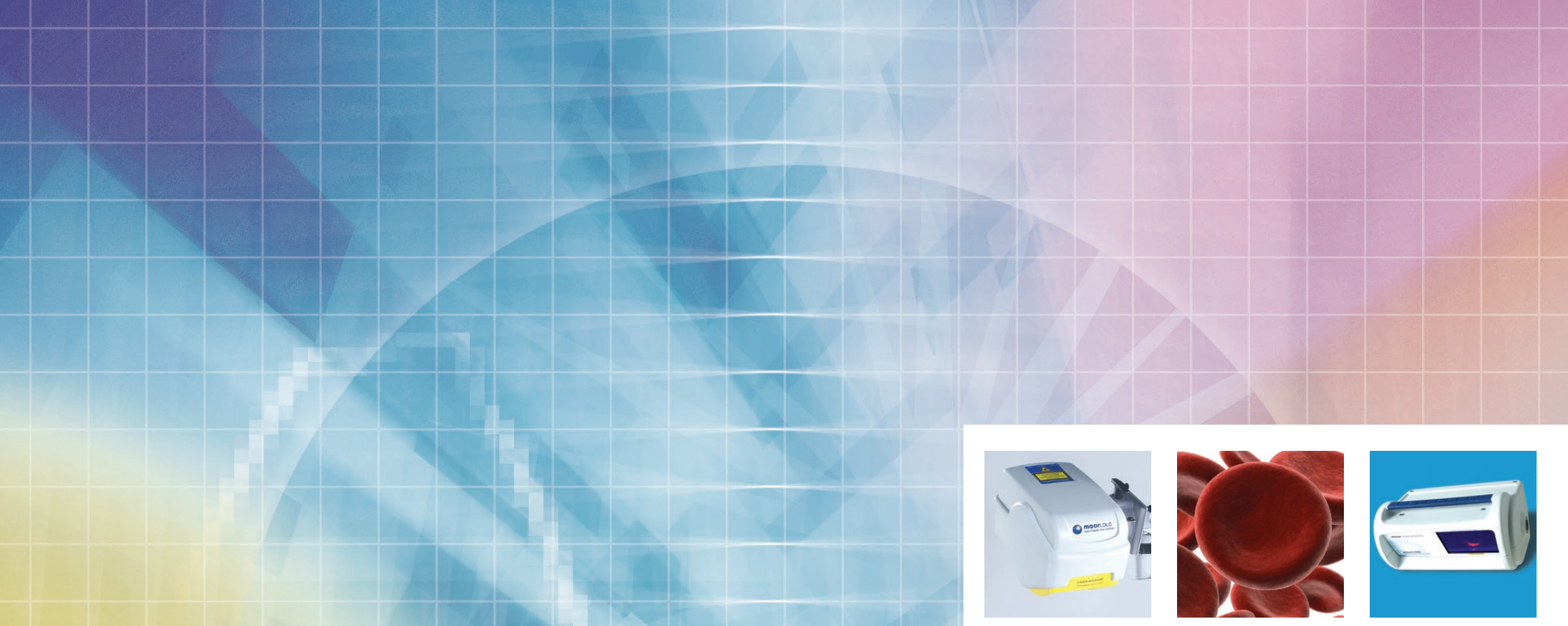
PRODUCT		moorLDI2 RANGE				moorLDLS2	moorFLPI-2
		moorLDI2-BI	moorLDLS-BI	moorLDI2-IR	moorLDI2-HIR		
							
MEASUREMENT PRINCIPLE		Single beam Laser Doppler	Laser Doppler Line	Single beam Laser Doppler		Laser Doppler Line	Full-Field Speckle
APPLICATION	Blood Flow Imaging	●*	●*	●	●	●	●
	Burn Assessment	●	●				
SCAN AREA AT FULL RESOLUTION	cm x cm	5 x 5 to 50 x 50	3.7 x 10 to 20 x 15	5 x 5 to 50 x 50	2.5 x 2.5 to 5 x 5	3.7 x 10 to 20 x 15	0.5 x 0.7 to 15 x 20
WORKING DISTANCE	cm	30 - 100	10 - 20	30 - 100	20 - 30	10 - 20	10 - 38
MAXIMUM SCAN RESOLUTION	Pixels	256 x 256	256 x 64	256 x 256	256 x 256	256 x 64	568 x 760
MAXIMUM PIXEL DENSITY	Per cm ²	2,600	440	2,600	10,400	440	1,000,000
MAXIMUM PIXEL RESOLUTION	µm	-	-	200 x 200	100 x 100	145 x 1560	10 x 10
MONITORING MODE	Number of Points	-	-	1 point/40Hz	1 point/40Hz	64 points or one line/40Hz	16 R.O.I.s/ 25Hz
FASTEST SCAN TIME	Seconds, 64 x 64 pixels	20	4	20	20	4	0.04
MEASUREMENT DEPTH	Superficial/Nutritive						●
	Superficial/ Full Skin Thickness	●	●	●	●	●	
VIDEO IMAGE		Colour	Colour	Colour	Colour	Colour	Colour
LASER CLASSIFICATION		3R	3R	3R	3R	3R	1
Page Number		Page 4	Page 5	Page 9	Page 8	Page 7	Page 6

Please consult with Moor Instruments for further information.

Moor Instruments reserves the right to change specifications without notice.

*Research software can be supplied with burn assessment system on request.

Notes



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