LDV
SYSTEME

LDV LASER- UND LICHTSYSTEME GMBH

LDV LASER- UND LICHTSYSTEME GMBH: TECHNOLOGIES FOR SURFACE INSPECTION

In May 2012 LDV Laser- und Lichtsysteme GmbH took over the business of LDV-Systeme GmbH. LDV-Systeme GmbH was founded in 1999 and specializes in manufacturing non-contact measuring systems. The main area of application for these measuring systems is in the steel and aluminum industry which are supplied with speed and length measurement as well as with visual surface inspection systems.

The existing systems are produced and developed and refi ned in the company's in-house development department.

LDV IS A FOUNDING MEMBER OF QUALITY ALLIANCE.

LDV's leading position in the world market is due to its globally active distribution network, its years of experience, and its qualifi ed workforce.

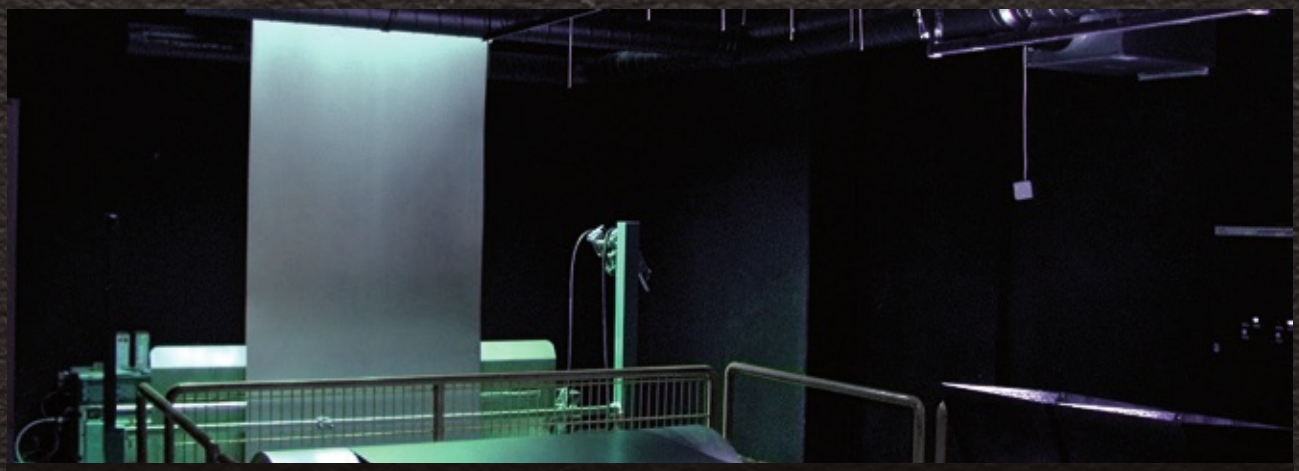
In the area of non-contact measurement techniques and visual surface inspection LDV is a single-source supplier of comprehensive turnkey solutions.

In August 2008 the product portfolio was strategically expanded when the products and the related patents of VH Lichttechnische Spezialgeräte GmbH were incorporated.

Through the effective use of the work tool light in the patented lighting systems, surface defects can be detected more rapidly and much more clearly.

The products needed for visual surface inspection are incorporated within LDV Laser- und Lichtsysteme GmbH as a separate business unit known as iLux Lighting Systems.

iLUX LIGHTING SYSTEMS
VISUAL SURFACE INSPECTION



Strip inspection in metal industry

INSPECTING INDUSTRIAL SURFACES WITH iLUX LIGHTING SYSTEMS

The human eye and the human vision system exhibit performance and adaptability capabilities that cannot be equaled by any technology. The human visual faculty adapts to both bright and dark light conditions. The recognition performance it achieves is truly remarkable.

Inspection areas are often brightly lit by a large number of fl uorescent tubes. Light intensities of 2,000 lx and more are measured at many control stations. This makes it diffi cult for observers to maintain fatigue-free surface control.

Too much light causes stress to the human eye and leads to rapid fatigue. The iLux Lighting Systems use reduced light intensity from 470 to 980 lx. Consequently there is an increase of 30 % in the visual performance of the human eye.

SEEING MORE WITH LESS LIGHT

Through double redirection the iLux Lighting Systems create indirect light. The patented Light Sails® direct the light almost parallel onto the surface to be inspected. In this way defects are given a structure that is easily recognized. They are thus clearly visible to the inspectors.

The employee doing the inspection reacts refl exively to light signals emitted by the defects and does not have to scan the surface point by point with the eyes.

The iLux Lighting Systems enable inspectors to work for an extended period of time in a concentrated and fatigue-free manner.

iLux
Lighting systems
VISUAL SURFACE INSPECTION

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VISUAL SURFACE INSPECTION

The successful use of our product in the steel and aluminum industries confi rms:
Our patented iLux Lighting Systems make possible a clearer and more rapid detection of surface defects!

Many years of experience, consistent quality, and continuous further development and refi nement of our products have secured for us the reputation of being leaders in the global market.

DECREASE IN COMPLAINTS AND COST REDUCTION

Follow-on costs resulting from surface defects can have a drastic effect on the cost-effectiveness of a branch of production.

Visit our iLux-Showroom and discover for yourself the advantages of the iLux Lighting Systems.

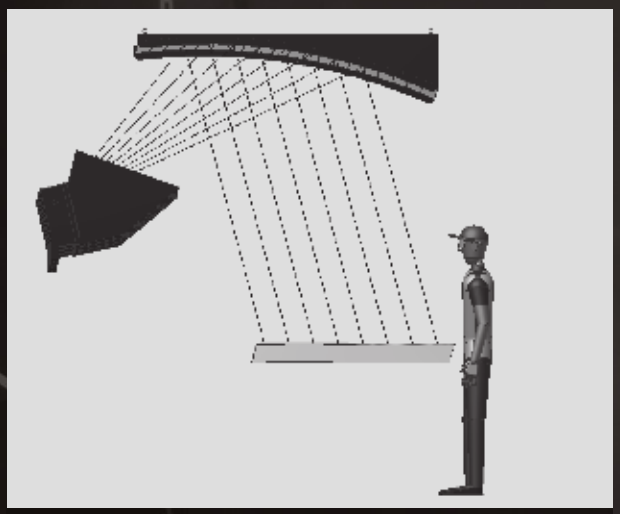
The iLux horizontal generates directed light which illuminates the material at a fl at angle. The smallest topographical defects (e.g. sink marks, dents, bulges) immediately become visible through the formation of contour edges (light - dark). The system is of modular design and can be expanded whenever the need arises. The basic version is 500 mm wide.

iLux vertical functions analogously and is utilized for vertical inspections. The system can be operated both for stationary surface inspections (e.g. wooden doors), or on processing lines (e.g. strip inspection in the metal industry).

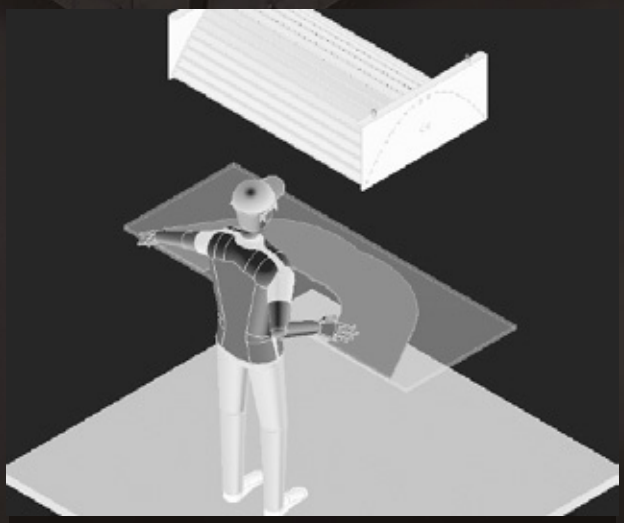
The patented Light Sails® are utilized in the visual surface inspection systems: iLux mini, iLux compact and iLux maxi. The light is generated by means of double defl ection, allowing homogenous distribution over a large area.

SIMPLE AND EFFECTIVE USE OF iLUX LIGHTING SYSTEMS:

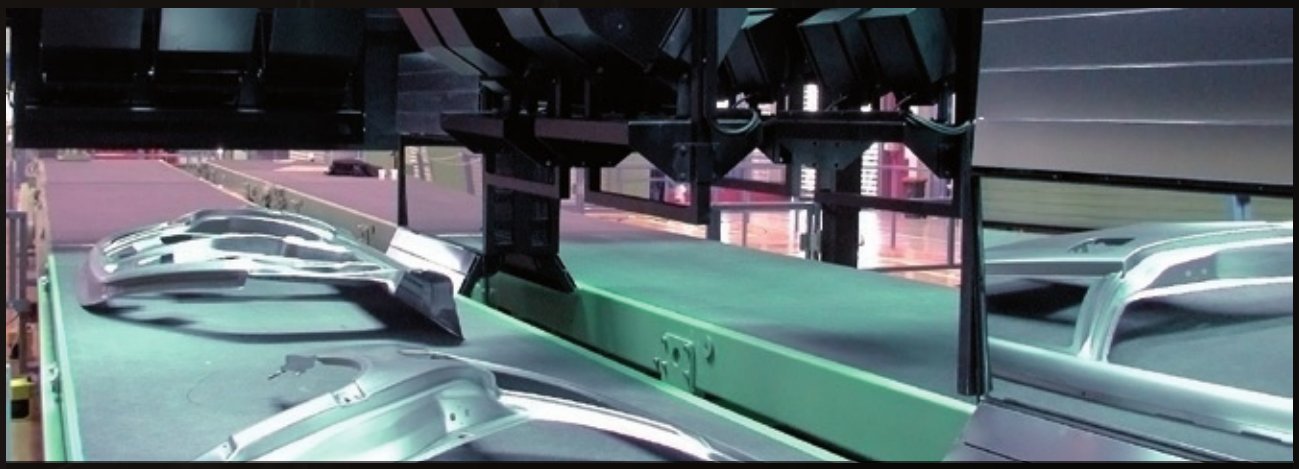
- Optimization of inspection results
- more rapid defect detection
- early defect detection during the production process leads to energy conservation
- ergonomically optimized inspection work places → glare-free and reducing eye strain
- fatigue-free light → longer inspection cycles
- savings in time and costs during the inspection process - thanks to the homogenous surface illumination
- the possibility of viewing simultaneously from different angles



Glare-free directed light by iLux Lighting Systems



Optimal illumination of the work station by the iLux LightBox



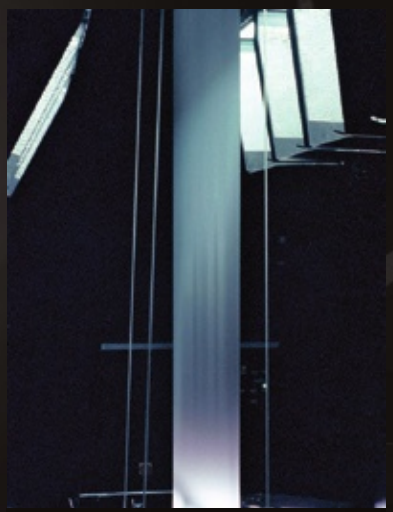
Inspection at a press line of the automotive industry

In this way more rapid and more secure defect detection is made possible and premature fatigue is avoided. The Light Sails® can be adjusted very precisely according to the area to be illuminated. The nature of material and of defect determines different light guidings.

The application of the systems ranges from stationary inspection of complex parts at individual test stations, to application in metal Industry, to continuous strip inspections.

Additional stroboscopic light systems are available for the purpose of identifying defects at fast running strips. Here the light is not focused directly on to the strip, but is fi rst defl ected by means of an upstream Light Sail.

In cooperation with our partners we are in a position to install automatic defect detection. Here the camera system is complemented by our lighting system.



Vertical strip inspection in the production line

iLux Light Sails®

iLUX LIGHTBOX

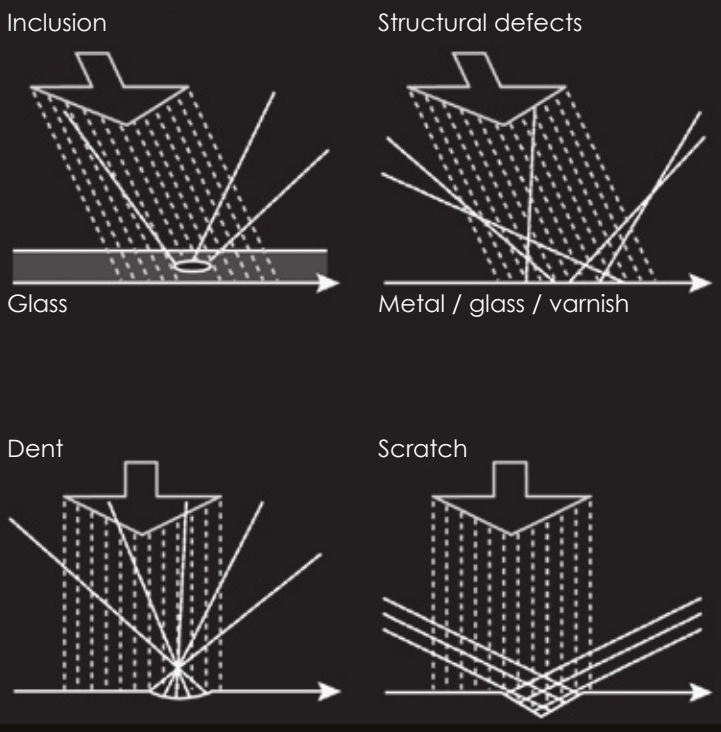
DIRECTED LIGHT FOR TESTING STATIONS

LDV Laser- und Lichtsysteme GmbH has once again extended its portfolio and developed iLux LightBox, a compact light tool for individual work stations in the fi eld of visual inspection.

The iLux LightBox is equipped with a special illuminant. The fl uorescent tube is a specially designed model with a color rendering index of > Ra 90; with a color temperature of 5,200 K - akin to daylight. Alternatively the iLux LightBox can be equipped for example with illuminants which have splinter protection in the event a lamp is broken, as well as special UV-protection. This qualifi es them for use in the production of microchips.

In contrast to other lighting systems, the light here is not focused directly on the work station. The illuminant is in fact specially protected and the light is fi rst defl ected before it reaches the work station.

CHARACTERISTIC REFLEXIONS OF DEFECTS ON SU



Individual inspection with the single LightBox

Individually adjustable lamellas ensure the fi ne adjustment of the light guidance. In this way the light attains the uniform glare-free quality for which the larger iLux Lighting Systems are known. The iLux LightBox is typically equipped with a dimmering system which is designed to regulate the light intensity over

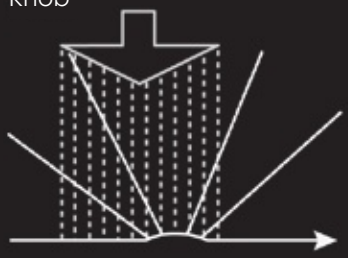
Triple LightBox

RFACES

Cords / drops

Lacquered surfaces

Knob



the full range. Thus the operator can control highly refl ective surfaces with less than the required 2,000 lx according to standards.

The iLux LightBox is available in various dimensions. A standard size single LightBox with 1,200 x 800 mm and 1,500 x 800 mm is available. Alternatively, for larger testing stations there is also a double and triple LightBox available. In the larger dimensions the iLux LightBox fully illuminates the human reach of 1.6 x 0.6 m. Homogenous lighting is then present in this area. This is very important as in such a situation eye adjustment is not necessary and errors will not be missed.

Because of its compact build the iLux LightBox can be easily transported. This is ideal when it is needed at different testing stations. Mounting is done by means of chains, snap hooks and turnbuckles. In this way the iLux LightBox can be easily moved and adjusted.

iLUX LIGHTTROLLEY

MOBILE SURFACE INSPECTION

To facilitate the surface inspection of heavy plates we have developed the iLux LightTrolley. Two LED stripes, each with 18 LEDs and with a special designed optic illuminate the area ahead the iLux LightTrolley in such a way that the inspector is easily able to inspect the plate in front of him.

Through the use of glancing light technology, all topographical defects within the inspector's visual range are clearly accentuated. The illuminated inspection area is about two square meters in size.

The LED stripes are powered by a rechargeable battery. The capacity of the rechargeable battery is suffi cient to ensure that the iLux LightTrolley can be utilized continuously for the duration of a complete shift. At the completion of the shift a charging station is available to which the iLux LightTrolley can be attached via a plug-in connection to recharge the battery.

Alternatively the system can also be equipped with a quick-change device for the battery. The iLux LightTrolley can then be utilized continuously for as long as a corresponding number of replacements for the battery are available.

Heavy plate surface

TECHNICAL DATA

Light source:	2 lighting stripes, each with 18 LEDs
Width of light:	approx. 750 mm
Depth of light:	approx. 2000 mm
Rechargeable Battery:	24 V, 17amp hours
Battery time:	approx. 10 hours
Trolley:	2 fi xed rollers, 1 guided roller

Further dimensions on request

COMPONENTS

1 push handle **2** trolley frame **3** case with power supply
4 LED lighting stripes **5** guided roller **6** fi xed rollers

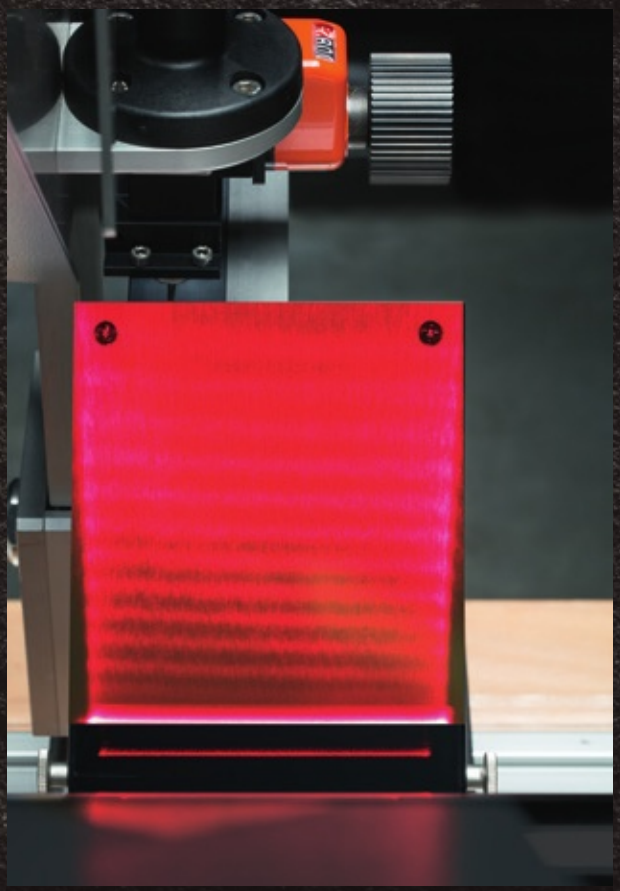
iLUX ROLLINSPECTION

EQUIPMENT FOR THE VISUAL INSPECTION OF WORK ROLLS

Work rolls truly play a crucial role in the production process. Their surface structure, which is transfered onto the strip surface during the rolling process, must be carefully defi ned.

Till recently this microscopically fi nely designed surface was judged to be „fi nished" after grinding. Possible defects (e.g. chatter marks) only became visible after the work roll was used in the mill and these marks were then transfered from the roll on to the strip.

In the past these defects could only be identifi ed once a sample of the strip material was examined in the laboratory. When you utilize the iLux roll inspection this last step is no longer necessary.



Chatter marks on a work roll

The iLux work roll inspection system makes it possible to scrutinize the roll directly after the grinding process. Should further defects be detected, the grinding process can be continued.

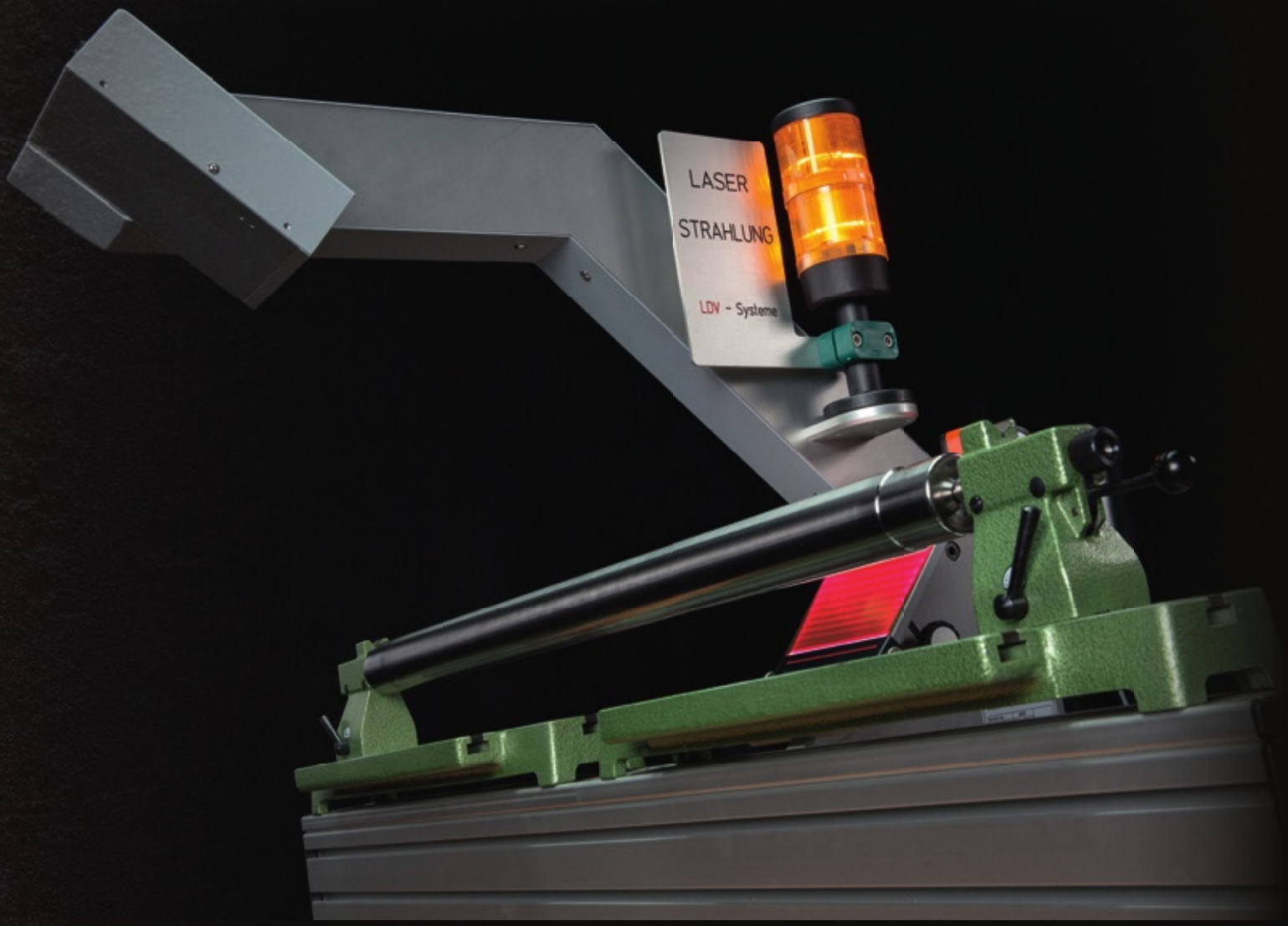
The illustration shows a sample confi guration for the inspection of work rolls up to 850 mm wide. The system can be adjusted for roll diameter between 40 and 140 mm.

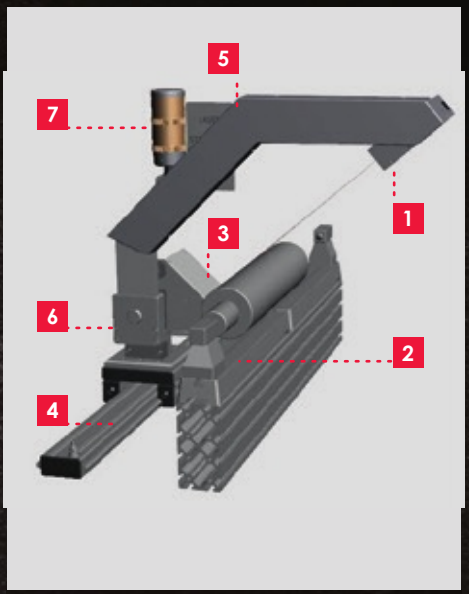
Alternatively, on request, the system can be modifi ed for rolls with different dimensions. Larger rolls are not fi xed between tailstocks but are placed on two roller bearings.

During roll inspection, a laser module illuminates a section on the roll 70 mm in width. The greatly enlarged image is then projected on to a white refl ecting surface similar to a screen. Here, similar to an image on a screen, a greatly enlarged image of the surface structure is to be seen.

Irregularities in the surface structure are immediately visible. Thus defects such as chatter marks can be detected instantly. By turning the roll manually this effect is intensifi ed. The swivel arm with the laser module and the refl ection area can be adjusted along the roll in such a way that the complete surface of the roll can be inspected.

The operators discover whether they have machined the surface suffi ciently so as to eliminate all defects, or whether they should continue re-working. Till recently one could only be sure of having eliminated all defects if a large amount was removed. Now it is no longer necessary always to re-grind. Consequently the life span of the expensive work roll is extended signifi cantly.





TECHNICAL DATA

Roll diameter:	40 – 140 mm*
Roll lenght:	max. 850 mm*
Illuminated length of strip:	70 mm
Projection surface:	approx. 100 X 80 mm
Magnifi cation in x-direction:	approx. 1.4-times
Magnifi cation in y-direction:	approx. 40-times
Power supply:	230 V, 50 Hz, 12 W

Further dimensions on request
* continuously adjustable

COMPONENTS

1 laser module with separate switch **2** tailstocks **3** projection surface **4** slide rail **5** swivel arm **6** main switch **7** laser warning lamp

iLux
Lighting systems
VISUAL SURFACE INSPECTION

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