

Technical scope of supply

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LaCam[®] LI (ladle installed) measuring system

The **LaCam[®] LI** laser profile measuring system is based on a new generation laser scanner.

The LaCam[®] profile measuring system has been developed for non-contact measurement of refractory linings in metallurgical reaction and transport vessels.

The **LaCam[®] LI** (ladle installation) model of the LaCam[®] measuring system series is designed for installation at ladle metallurgical processes.

The graphical user-interface investigates wear development and automatically prints reports of the measurements.

The **LaCam[®] LI** system, including laser measuring head and the appropriate coupled electronic units, is stationary installed at the ladle measuring stand and can be remotely controlled from the control room. The system is connected to a control and measuring unit as well as to an optional workstation via a local computer network.

If a measurement is necessary, start and monitoring of results is made at the operator desk (console and monitor). After automatic scanning of the surface, the results are available on all PCs connected to the network within a few seconds.

The **LaCam[®] LI** system determines:

- Residual brick thickness of the refractory lining
- Wear of the refractory lining
- Wear speed of the different refractory materials
- Volume of ladles
- Bath level for optimal lance positioning
- Deformation of ladles

Furthermore, the **LaCam[®] LI** system enables

- Maximizing of ladle life time
- Controlling gunning material consumption
- Specific application of gunning material
- Area dependent optimisation of lining material quality
- Trend analysis and forecast of the durability of ladle lining

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Specifications

1. Laser measuring system

Principle of measurement	Single shot time-of-flight
Real number of range points per frame	200,000
Measuring time per frame	20 s
Measuring range	2 – 20 m
Accuracy	± 5 mm
Resolution	1 mm
Max. surface temperature	1700° C

Technical data of the scanner (Laser measuring head)

Vertical scan angle	80° fixed
Horizontal scan angle	0° - 360° selectable (80° standard)
Laser wavelength	0.9 µm (near infrared)
Cooling of the head	internal cooling system
Laser safety class	class 1 laser product (total system is eyesafe)

2. Control and operator unit

The control and operator unit reads-in the measuring data of the laser measuring head and controls it. The distance between control and measurement unit and laser measuring head depends on the local situation.

For each laser measurement system, one control and measuring unit is designated. A measurement can be made directly at this unit or via remote control from a workstation at the control room. Furthermore, all measurement results are represented and can be evaluated. A modem for remote service is also included.

Industrial-type computer	CPU Pentium® P4/3GHz (latest model) 512 MB RAM, PC 400 DVD +/- RW 2 500 GB harddisc (Raid system) VGA 256MB, AGP network connections, 100 GBit Ethernet USB Interface power supply
Display unit	17" TFT
Operating system	WINDOWS XP® Professional

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3. Additional resources

The scope of supply may include additional resources if, during pre-engineering, position and angle cannot be determined.

4. Engineering

For do-it-yourself mounting, instruction details are furnished to the customer prior to commissioning:

- Construction of the mechanical components
- Wiring-/cable plans for all connections
- Position of the requested air and water connections
- Plans for the mounting of the single components

The execution of the above stated instructions must be made by the customer. Ferrotron Technologies GmbH accepts no responsibility for damages or liabilities related to or resulting from customer installation.

5. Documentation

The documentation of the unit is threefold given to the customer when the unit is placed into operation. The documentation includes the technical description of the system, an installation description and a description of the software. A documentation on data CD is included in the scope of supply.

The following components are also included:

- Operating systems for all units
- Installation disks/CD ROM of the system software
- Backup "Image" of the harddrive

6. Software

The LaCam[®] system package includes all measuring and evaluation software needed for operation of the unit, as well as the Windows XP[®] Professional operating system, all as licensed original versions.

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LaCam®- LI fixed Installation at a ladle tilting stand



Installation at ThyssenKrupp Steel AG in Duisburg, Germany



Installation at Corus Steel Plant, Aldwarke, UK

File: M-FE-30-PDF-LI.doc

Update: 9/2009