

## ***LaCam<sup>®</sup> CI laser profile measuring system (converter installed) model***

New laser profile measuring system is based on a laser scanner of the new generation.

The **LaCam<sup>®</sup>** profile measuring system has been developed for non-contact measurement of refractory linings in metallurgical reaction and transport vessels.

The **LaCam<sup>®</sup> CI** (converter installation) model of the LaCam<sup>®</sup> measuring system series is designed for installation at converter processes.

The graphical user-interface permits detailed investigations of the wear development as well as automatically printed reports of the measurements.

The **LaCam<sup>®</sup> CI** system includes a laser measuring head and the appropriate coupled electronic units that is stationary installed at the converter to be measured and can be remotely controlled from the control room. Connection to a control and measuring unit as well as to an optional workstation is realised by a local computer network.

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

The **LaCam<sup>®</sup> CI** measuring system determines:

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

Furthermore, the **LaCam<sup>®</sup> CI** enables

- the maximising of converter life time
- control of gunning material consumption
- area dependent optimisation of lining material quality
- trend analysis and forecast of the durability of converter lining

## **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 transfers the measuring data of the laser measuring head and controls it. The distance between the control and measurement unit and the laser measuring head is dependent on the local situation.

One control and measuring unit is designated for each laser measurement system. A measurement can be made directly at this unit or via remotely controlled from workstations at the control room.

#### **Industrial-type computer**

**CPU Pentium<sup>®</sup> P4/3GHz (latest model)**  
512 MB RAM, PC 400  
3.5" floppy disk drive, DVD-RW  
Harddisk 80 GB (latest standard)  
VGA 64MB, AGP  
network connections, 100 MBit Ethernet  
11 MBit WLAN, USB Interface  
power supply

#### **Display unit**

TFT 15"

#### **Operating system**

WINDOWS XP<sup>®</sup> Professional

### 3. Workstation at the control room

Industrial-type computer with a TFT monitor 17". By means of the workstation, measurements can be made via remote service and for representation of the measured values.

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TFT 17"

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**Additional resources**

For each converter vessel, one FTE-INC is required and is included in the delivery.

### 4. Engineering

For a self-reliant mounting, instruction details will be 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 has to be made by the customer and Ferrotron Technologies GmbH cannot be held responsible.

## 5. Documentation

The documentation of the unit will be in three fold, which will be handed over to the customer when the unit is put into operation. The documentation includes the technical description of the system, an installation description as well as the description of the software installed. 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<sup>®</sup> system package of includes all measuring and evaluation software, which is needed for operation of the unit, as well as the Windows XP<sup>®</sup> Professional operating system, all as licensed original versions.

### **LaCam<sup>®</sup> system fixed installation; BOF, EAF & Ladle**

**The measuring system grants different measuring programs.  
These could be started via “single bottom operation”**

#### **BOF example:**

Program 1: bottom and lower part of the vessel,  
(measurement will cover 60% of the converter)

 **30 sec\***

Program 2: bottom, lower part of the vessel, impact area or  
tapping area

 **1 min 34 sec\***

Program 3: full converter

 **2 min 30 sec\***

\* Total downtime in fully automated operation (for example SSAB, Lulea)

The **LaCam<sup>®</sup> CIE** (converter installation extension) model of the **LaCam<sup>®</sup>** measuring system series is designed for the extension of an existing **LaCam<sup>®</sup> CI** system installation at further converters.

The **LaCam<sup>®</sup> CIE** system requires at least one existing **LaCam<sup>®</sup> CI** system installation.

The **LaCam<sup>®</sup> CIE** system has the same laser unit as the **LaCam<sup>®</sup> CI** system, but does not include the complete software tools of the **LaCam<sup>®</sup> CI** system installation.

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## Cooling and protection housing



Interior  
Shutter with  
integrated  
water cooling



Housing with  
LaCam<sup>®</sup> -  
Laser inside