LaCam® - M 4th generation

LaCam®
FAST, ACCURATE, RELIABLE LASER SCANNER FOR HOT SURFACE APPLICATIONS

3D Laser Profile Measurement in Hot Vessels and Transport Ladles.
- Increases Safety
- Reduces Cost
- Extends Refractory Life
- Optimizes Processes
LaCam® - M4 mobile version
LaCam® - M4 Laser Scanner Profile Measurement in Hot Vessels and Transport Ladles

FERROTRON
sold more than 260 laser measuring units world wide
(165 mobile versions and 99 fixed versions )

3D Laser Profile Measurement
- Increases Safety
- Reduces Cost
- Extends Refractory Life
- Optimizes Processes
Benefits

1) Safety
   • Minimize dangerous and expensive break-outs

2) Extension of vessel life by
   • Accurate measurement of refractory lining
   • Visualization and measurement of high wear areas
   • Optimization of vessel brick lining
   • Trend analysis and forecast of vessel lining life
     (accurate planning of downtimes)

3) Process Control, Maintenance
   • Bath level measurement for optimal lance positioning
   • Improved control of slag splashing and slag coating practices
   • Control of gunning material selection and consumption
   • Optimization of tapping angle
Technical details

Depending on application up to 4 million measuring points are achievable with a scan of 30 seconds due to a laser repetition rate of 300 KHz and an extended vertical viewing angle of 110°. The smallest laser beam size of 3 mm is offering the highest resolution and best accuracy. This allows improved joint and edge detection in ladles and other vessels.
Principle Time-of-Flight Measurement

- short laser pulse in a highly-collimated beam is sent in well-defined direction
- pulse is partially and diffusely reflected by target(s)
- receiver gathers backscattered optical signal (echo signal) and converts it into electrical signal
- receiver electronics detects target(s)
- time between start pulse and stop pulses is measured and gives range
LaCam® 4th generation introduces new upgrades offering the best performance for our customers:

- Measuring Speed
- Accuracy
- System Design
- Reliability Service
Measuring Speed

• Reduced over all measurement time due to intelligent positioning methods
  Immediate Positioning System (IPS)

• Significant reduction of measurement time due to
  Instant Result Scanning (IRS)

Benefits:

• Fastest lasercanner for hot surfaces on the market
  • Laser Pulse Repetition Rate of 300 Khz
  • Scan Rate: 135,000 Measuring Points/sec.
  • Total time for one scan: less than 10 sec. (Scanframe 110° x 80°, 880,000 Measuring Points/Scan)
  • 4 Million measuring points within a scan of 30 sec. ➔ extreme high point density

• Results available and monitored after each single scan

• Ability to decide after each scan if areas of interest are already measured (no need to continue with additional scans)

• Echo digitization with full waveform analysis measurements are less sensitive to smoke and dust influence this leads to improved measuring results
Accuracy, Positioning

- Highest available accuracy, due to the use of latest laserscanner-technology and one scanner for positioning and measurement
  - Precision: +/-2 mm
  - Angular pointing accuracy: 0.0005°
  - Min. Angle stepp width: 0.0024°
  - Beam Diameter: 3 mm

Advantages in Positioning compared to competitors:

- no additional errors based on:
  - second laser for positioning
  - reflecting targets
  - additional surveying measurement by a third party company

High flexibility in choosing structures for positioning due to multiple positioning methods (patented)
System Design

- Active water cooling allows unlimited use
  no down times between measurements required

- Sturdy construction and the multi-wheel cart-design
  enables an easy movement of the LaCam® - M

- Extended vertical viewing angle of 110°

- Permanent network access and remote access (also wireless)

- Safety: Overhead protection for operator against skulls or debris

- Integrated Pyrometer (optional)
  Benefit: allows temperature maps and tuyere status determination

- Operation mode: Battery or AC-power 85V – 265V
  Benefit: enables operator to perform measurement (even if the battery
  is not fully charged)
Reliability, Service

- Reduced temperature stress on mechanical and electrical components due to active water cooling
- No need for maintenance of positioning system (extra targets)*
- User-friendly due to modular setup
- Active cooling system is monitored on-line

- Service teams available world wide, Minteq provides infrastructure in more than 40 countries.
- Experienced manufacturer of laser-profile measuring equipment with more than 260 sold units world wide.

*Competitor uses additional reflecting targets (which have to be cleaned) and a second laser for positioning which increases the overall error rate
Graphical User Interface and 3D for EAF Application
Graphical User Interface and 3D for EAF Application
SCANTROL®- Intelligent Control Module between Laser Wear Measurement System LaCam® and Automatic Spraying Manipulator

LaCam® M
LaCam® Cl, converter
LaCam® - EAF
LaCam®, LI ladles

Link to Scantrol PPT

Tornado Shooter
Minscan
Lego Manipulator
LaCam® Option: Pyrometer - Images

Temperature image