



# LaCam<sup>®</sup> TORPEDO

**SAFETY!  
SAVINGS!  
SPEED!**



3D-Laser Profile Measurement for Refractory Lining Thickness in hot Torpedo Ladles.

- Increased Safety
- Extended Refractory Life
- Cost Savings: Energy, Maintenance & Materials
- Optimized Ladle Fleet

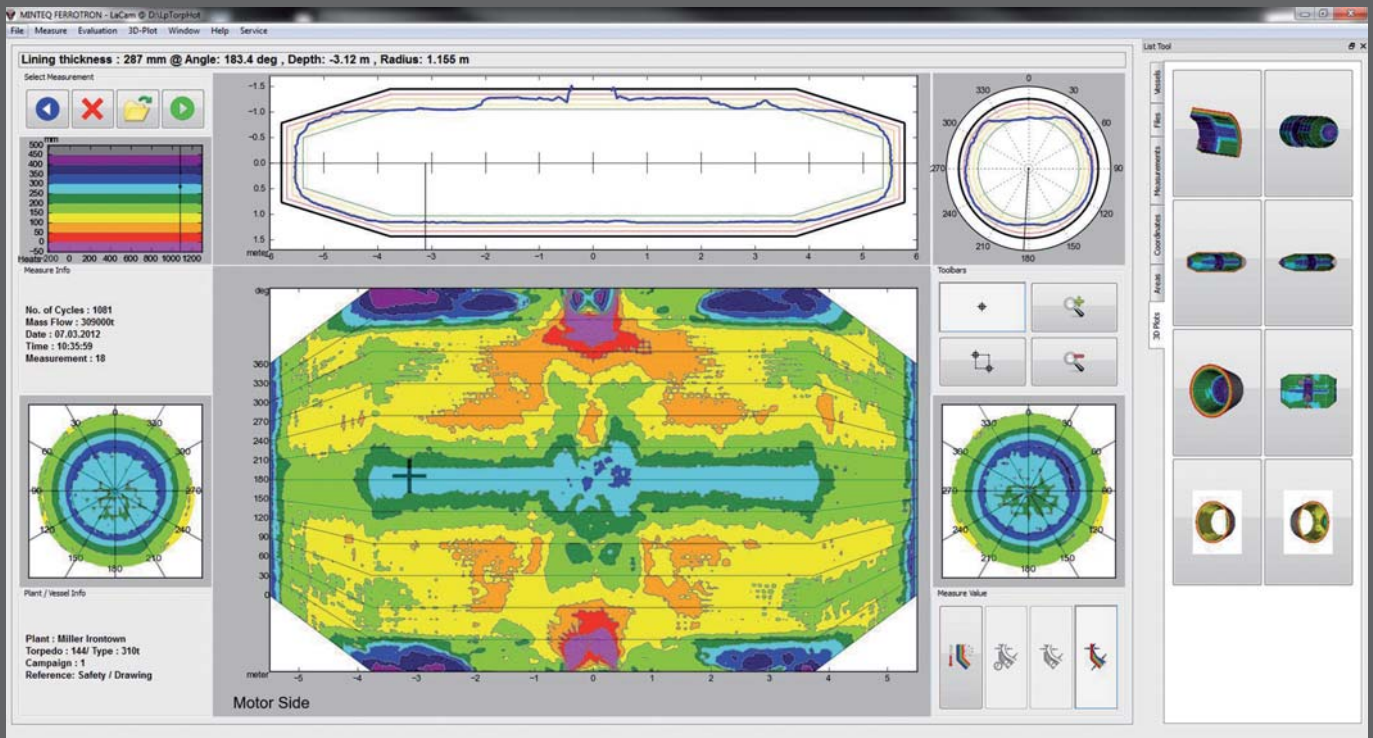
## Graphical User Interface

Ferrotron, a market leader of 3D-Laser Profile Measurement Systems for the steel industry, developed a new revolutionary technology: **LaCam® - Torpedo**.

The **LaCam® - Torpedo** is the newest product of the well-known LaCam® family. Its innovative but simple and rugged design allows the immersion of a laser head into a hot torpedo ladle with surrounding temperature up to 1100 °C (2012 °F).

The result, calculated with millions of data points, provides a reliable way of inspecting a torpedo ladle with minimal time. The advanced possibilities of evaluation allows for a wide range of presentations, from simple tabular reporting, up to a virtual walk-through of configurable 3D images.

**Discover more about the inner workings of your torpedo ladle!**



## 3D-Laser Profile Measurement System

Since the introduction of the first 3D-Laser Profile Measurement System for steel plant applications in 1980, the measurement of refractory lining thickness in converter vessels, electric arc furnaces, and ladles, has become more and more important. Today a 3D-Laser Profile Measurement System is a standard tool for reliable inspection in most steel making facilities.

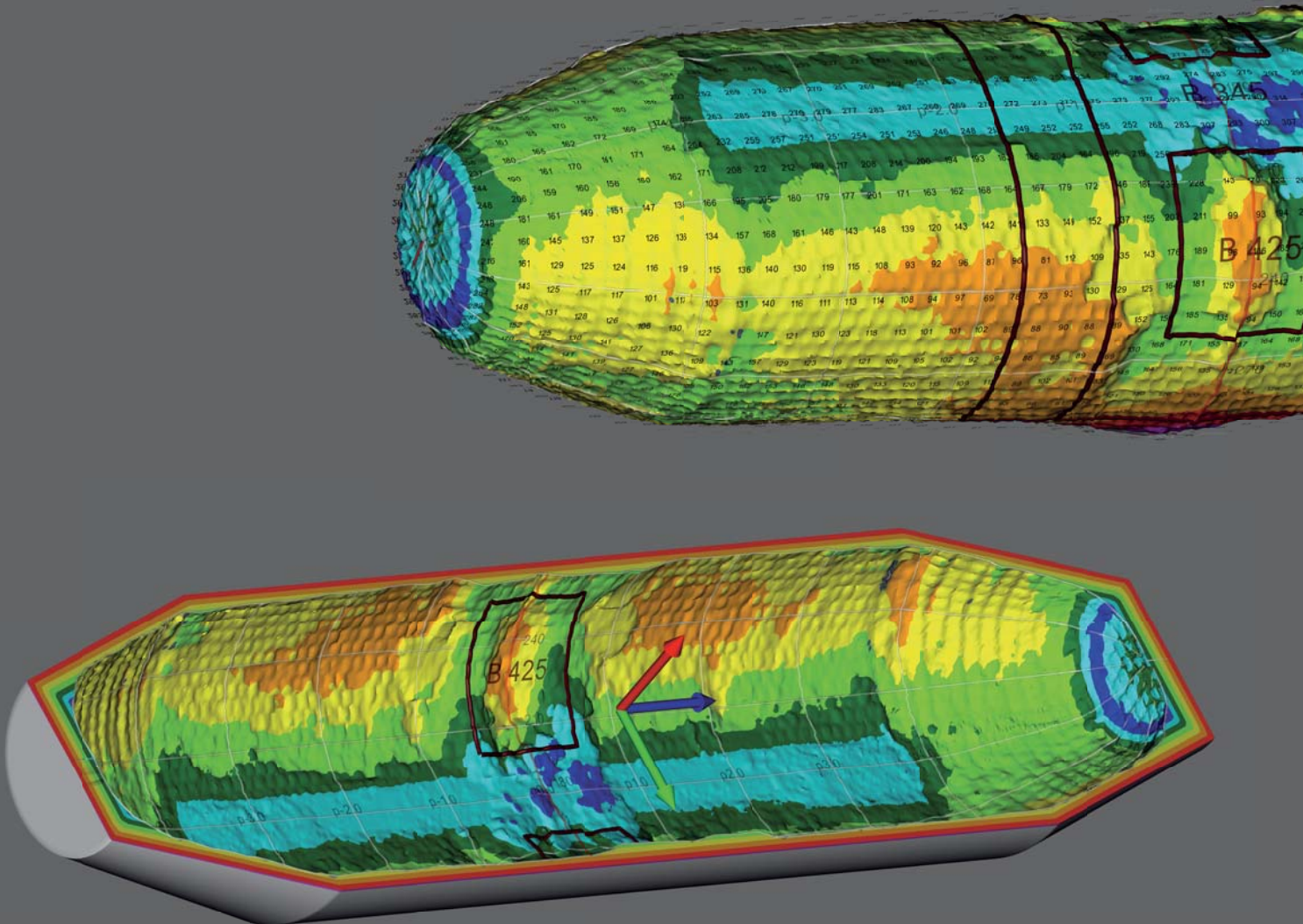
Ferrotron goes one step further with the introduction of the **LaCam® - Torpedo**. The world's first inspection system for hot torpedo ladles. The new developed scanner head is immersed into the center of a hot Torpedo ladle (~1100 °C/~2012 °F) and measures the lining thickness of the entire surface.

## Main Features and Characteristics:

The first step of a **LaCam® - Torpedo** measurement is to scan the outer shell of the torpedo ladle. By using our patented 3D-structure finding software, the exact position of the torpedo ladle is recognized and the impact area is measured. A boom with a mounted scanner head moves from a park position through the mouth of the ladle into the center to measure the entire torpedo lining. After measurement, the boom returns to the park position. The measuring data collected is processed by an industrial PC which displays the results immediately. A connection to the customer's intranet and level 2 system allows for immediate and efficient use of the measurement results. The entire procedure takes less than 3 minutes.

## Presentation of Measurement Results:

- 3D presentation of the measured lining surface
- Lining thickness indicated by colour



## Technical Highlights:

Scanning performance: 3.6 million points per full scan  
Accuracy:  $\leq 5$  mm  
Total measurement time including evaluation: less than 3 minutes

The measurement results are presented on the new LaCam® **G**raphical **U**ser **I**nterface

- All relevant information on one page
- Any user action will show the requested data in all plots simultaneously
- Powerful 3D-graphics allows viewing the refractory lining from all perspectives

## System Components:

- New developed coaxial compact laser scanner
- Powerful cooling system for extreme heat protection
- Easy to use operator terminal (single button operation)
- Significant 3D-evaluation software
- Industrial PC for data collection and data processing
- Connection to customer's level 2 system
- Fully automated mechanical manipulator designed to fit into customer's location

LaCam® 3D scanner head immersed into the center of a hot torpedo ladle. The advanced cooling system protects the head from the 1100 °C (2012 °F) hot environment.



Complete measuring system consists of the laser, manipulator, cooling and evaluation systems.



For comprehensive information about the LaCam® - Torpedo, please contact us.

**LINK to TORPEDO film**



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