TOKHEIM

ProGauge

Environmental and wetstock management solutions

LSR-3D LASER SCAN

Tank Calibration System

TOKHEIM QUALITY

ProGauge

PATENTED

3D LaserScan Automatic Tank Calibration System

The 3D laser system calculates the volume of underground tanks

Features

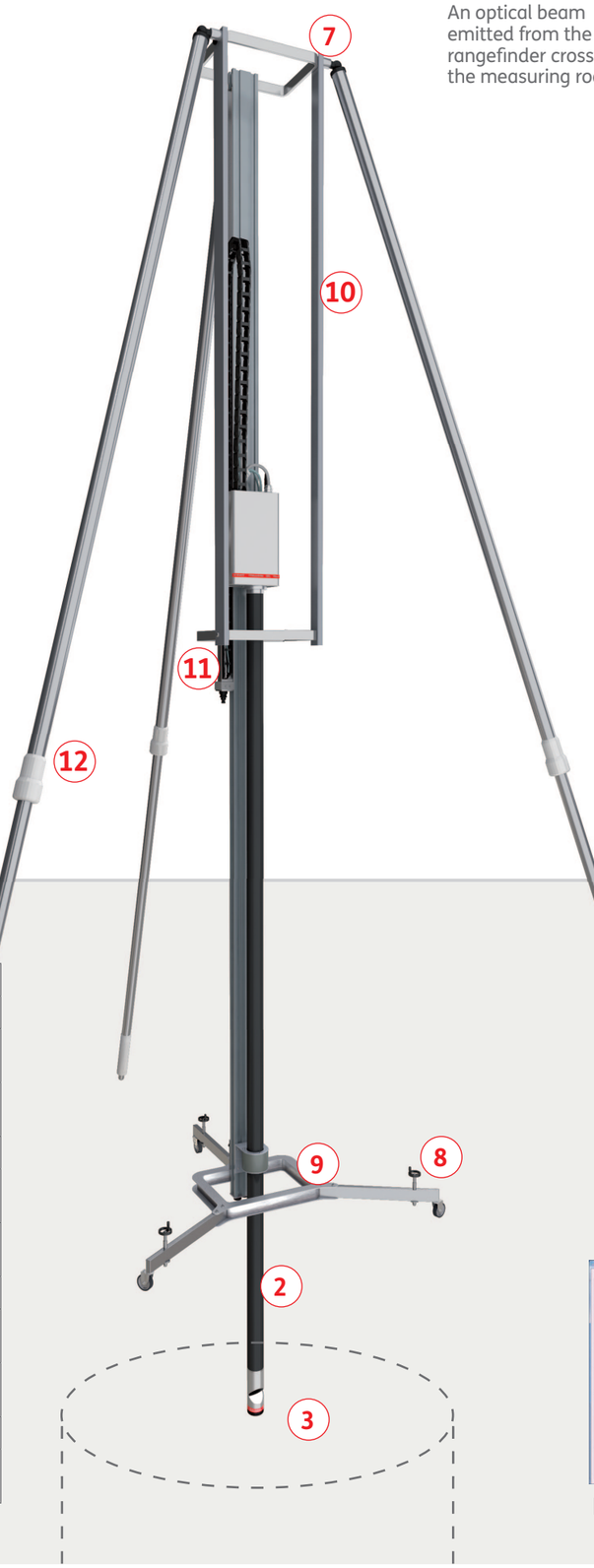
- **AUTOMATIC strapping table creation.**
- **LASER points cloud technology.**
- **ACCURATE metrological strapping table in accordance with OIML R71, accuracy ≤ 0,5%.**
- **HIGH SPEED scanning speed in comparison with the traditional method (wet calibration).**
- **SAFE ATEX no need to de-gas the tank.**
- **EASY to manage & setup.**
- **ENVIRONMENTAL FRIENDLY: no need to use fuels or other liquids to perform calibration.**
- **VERSATILE: suitable for any underground tank with min. 2” hole.**

Working principle

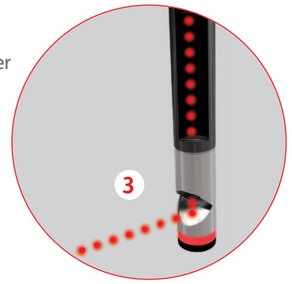
The LSR-3D is an innovative system to measure the volume of tanks. The LSR-3D laser is a laser distance measurement system.
A high accuracy laser measuring device enters the tank performing an helical scan to detect a series of axial and radial values.
These polar coordinates when processed determine the capacity of the tank inspected. The absence of electrical components inside the inspected tank allows the use of the equipment in the presence of flammable liquids or vapours, hazard area.
The optical guide is inserted in the empty tank through the manhole or other available 2” hole and is adjusted to be vertical with respect to the position of tank.
In this way the effect of any inclination in the calculation of the volume of the tank is taken into account.

Certificates

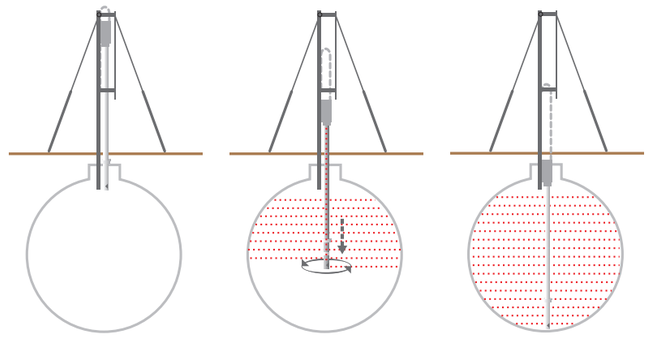
CEC 13 ATEX 074 Ex II 2 G Ex px IIC T6 Gb
(Tamb -20 °C +60 °C)
Compliance with OIML R71, edition 2008
Issued by **Hellenic Institute of Metrology (EIM)**



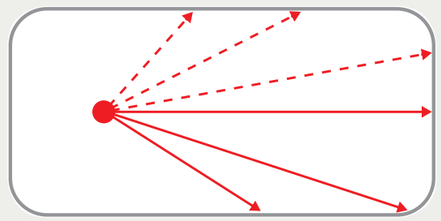
An optical beam emitted from the laser rangefinder crosses the measuring rod



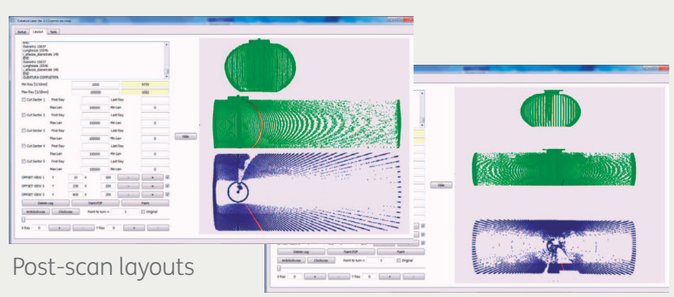
1	LASER METER
2	OPTICAL GUIDE
3	OPTICAL MIRROR
4	MOTOR
5	ENCODER
6	CONTROL UNIT
7	STRUCTURE SYSTEM
8	STABILIZER SUPPORT
9	ADJUSTABLE TROLLEY
10	OPTICAL GUIDE PROTECTION
11	CONNECTION FLANGE
12	EXTENSIBLE SUPPORTS



Starting position — Scanning — Complete scanning



Schematic representation of the distances between the laser and the tank wall being measured during a scan of a horizontal cross section of the tank.



Post-scan layouts

3D Laser Scan

METROLOGICAL RESULTS

Degree of Equivalence, En*(1)	**Average En = 0.3** *The result is considered equivalent if En ≤1.0 (1) Cox M. G., 2002, Metrologia 39, pp 587-8
Accuracy of the method (% of the indicated volume)	**± 0.2 %** (over the complete calibration table of the storage tank) Accuracy is calculated with respect to the “true” value corresponding to the volume obtained by the reference volumetric method.
Expanded uncertainty of measurement (% of the indicated volume)	**0.26 % - 0.1 %** This uncertainty is entirely due to the measuring method/ instrument used. No allowances are made for contributions due to interpolation uncertainty or height uncertainty in the storage tank.
Compliance with OIML R71 with respect to the MPU (paragraph 7) (% of the indicated volume in the calibration table)	**≤0.5 %** The method, as applied to calculate the volume of a storage tank and produce a calibration table (by interpolation), complies with the MPU requirement over the complete table. The uncertainty in volume takes into account the uncertainty of the method and the uncertainty due to interpolation.

TECHNICAL CHARACTERISTICS

Power supply	230 Vac
Consumption	125 VA
Longitudinal measure range	10 mt
Standard diameter lenght	2750 mm
Laser accuracy	± 1 mm
Scanning speed	5 ÷ 20 sec/turn (standard 6 sec)
Measured points x turn	100 ÷ 400 (standard 200)
Optical guide	3 mt
Working temperature	-10 °C ÷ +40 °C
Dimension	350 x 30 x 30 cm (version standard)
Weight	35 Kg (including trolley)
Minimum entry hole	2”

TOKHEIM®

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