LASER SCANS and VIDEO INSPECTION TECHNOLOGY

COKE DRUMS
TANKS
CORRODED SURFACES
Coke Drum Bulge Measurement

Scale ±4” with ½” color bands. Labels show spot deviation measurements.
Laser Data Conversion / Comparison of Past Coke Drum Scans

2013 3D and 2D Laser Images
Bulge Severity Rating:
Export mesh or CAD files for FEA or other Engineering Assessment

Example: 1.5” Depth / 6.00” Height = 0.25 Severity. Note: Most severe rating would equal 1.00 (depth = height). Least severe would be 0.01.
The IRISNDT Advantage

- Stabilized Tripod, Stabilized Suspended System
- Repeatable
- Photo Quality Hi-resolution
- Distance Radial Measurements / Deviations Measurements
- No Blind Spot Locations
- Very Portable
- Multiple Scans Can Be Performed To Avoid Blind Spots Due To Obstructions
- Quick (30 Minutes Per Scan Locations) Depending On Drum
- Independent Of Owner Operator Assistance
- Economical
- 3D Modeling of any Vessel, Tank, Column or Piece of Equipment Requires Detailed Modeling Of Its Distortions
- Supports Finite Element Analysis
- Support Of API 510 And 653 For Inspections
- Volumetric Measurement

Deformation Diagnostics Laser Scan
A Panametric laser photo / image was produced with laser scan results showing the entire ID surface of the coke drum. This image shows top head nozzle and weld orientations. An as-scanned "unedited" (Raw) 3D image is shown of the drum scanned.
Tank External Laser Scan with Colour Imaging
Measurements: Tank Settlement, Diameter and Height Measurements
Measure Between Features, Nozzle or Pipe Diameter,

Measure between points (can be multiple)
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3D Rendition of Floating Roof Tank Floor Scans
Tank Point to Point Measurements
Deviation Measurement Relative to a Standard Shape (Cylinder, Cone, Plane)

3D laser model of tank

Reference cylinder (nominal tank diameter)

Colour deviation map (actual dimensions vs nominal cylinder)

Deviation (colour) scale +50mm to -200mm (+2” to -8”)

Deviation Measurement Relative to a Standard Shape (Cylinder, Cone, Plane)
Tank Cone Down Floor

Colour scale +50mm (edge) to -235 mm (centre). The object showing near the centre is part of the roof drain system.
Tank Small Shell Dents

West Elevation: the blue horizontal line is a wind girder. Scale +100 mm (red) to -100 mm (blue). This data is from external scans, part of the stair and attachments can be seen at the top-right of the image.
Fixed Roof Tank: N-E-S-W views showing shell distortions (scale +50mm to -200 mm (blue))
Tank Settlement Measurements

Floor and Shell Elevations

Elevations of floor to shell weld (left) and top of shell (right)
Laser Hand Scanner (High Resolution, High Accuracy, Examines Local Areas with Pitting)

Surface Acquisition: Real Time Surface Rendering

- Automatic surface generation
- Laser projected on the object is deformed according to the shape of the object. While scanning, the cameras record this particular shape and calculate it.
Reference Targets Allow the Hand Held Scanner to Track Its Position

**PREPARING THE PART**

- **Pipe Cleaning**
  - Remove dirt and rust scales (through sandblasting for instance)

- **Powder or Paint**
  - Use powder for shiny pipes or contrast paint
  - If a powder is used, make sure to apply it before to put the targets on so it doesn’t cover them
Through the Laser Scan (on the Left) and through a Camera (on the Right)

The Laser Scan Can Result in Numerical Spreadsheets Mapping Pit Depths
Corroded Pipe and Corrosion Map - Overall
Corrosion Analysis – Detail (B31G)

River bottom path

Profile views

Feature Details
Name: Feature 1
Axial Length: 135.538 mm
Circumferential Width: 19.88°
Pressure
Effective Area: 9.05 MPa
RPR (MOP): 0.51
RPR (MAOP): 1.18
B31G Modified: 8.79 MPa
RPR (MOP): 0.68
RPR (MAOP): 1.15
B31G 7.41 MPa
RPR (MOP): 0.74
RPR (MAOP): 0.97
Maximum Depth
Depth: 3.333 mm
Axial Position: -0.307 mm
Circumferential Position: 241.95°