

# REFERENCE CASE REFINERY



## In-Service Non-Destructive Testing of Spherical Tanks in Egypt

To ensure the safety and reliability of any kind of storage tank, periodic inspections are necessary. After 12 years of service, the spherical tanks of a major oil refinery in Egypt had to be assessed. Comprehensive, timely and cost-efficient assessment of storage tanks provided by TÜV Rheinland proved to be the right solution for the Egyptian refinery reaching safety compliance and meeting requirements defined in the ASME Code Standards.

### Basic Facts

Client	Middle East Oil Refinery
Timeframe	June – August, 2013
Project location	Alexandria, Arab Republic of Egypt
Main services	Non-destructive testing services by means of time of flight diffraction and acoustic emission using Rope Access (RA)
Involved regulations/standards	ASME Code Standards

### Initial situation and requirements

Middle East Oil Refinery (MIDOR), located in the Ameriya Free Zone Alexandria in the Arab Republic of Egypt, is one of the largest, most modern and sophisticated refineries in the Middle East / North Africa Region. After 12 years of service, the remaining lifetime and integrity of spherical tanks at the refinery needed to be assessed. The assessment included the inspection of all welding joints and metal plates in order to detect possible defects.



## Solutions, results

TÜV Rheinland performed time of flight diffraction (TOFD), an advanced non-destructive (NDT) testing technique to detect any possible welding defects such as cracks, slag and/or lack of fusion in the welding joints. TOFD is an improved version of the conventional ultrasonic testing method, providing a fully computerized system able to scan, store, and evaluate indicators in terms of height, length, and position. Another technique, known as acoustic emission (AE) was used to inspect metal plates in order to test the spherical tanks in accordance with ASME Code Standards.

To access the inspection location, TÜV Rheinland experts decided to use the rope access method instead of building complete scaffolding around the spherical tanks. This reduced both client costs and inspection preparation times. It also enabled to inspect the legs and the nozzles, which are usually hardly accessible. Inspections were carried out by an IRATA level I Rope Access expert, who is also UT level II technician, under supervision of an IRATA level III expert.

Upon completion, inspection data was presented in an easily understandable format and stored in digital form for future reference. Inspection findings enabled MIDOR authorities to make grounded maintenance decisions.



### Did you know?

Sphere tanks are very strongly structured. Because a sphere lacks corners, there are no weak points and stresses are evenly distributed among both the internal and external surfaces.

### Benefits for the client

- Certified inspector in accordance with the TOFD certification program based on ISO 9712.
- Fast inspection times due to rope access technique instead of building complete scaffolding.
- Reduced costs, through inspection during normal day-shift production.
- Accurate inspection data and clear inspection reports.
- Meeting requirements established in the ASME Code Standards.

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### About TÜV Rheinland:

TÜV Rheinland is a global leader in independent inspection services, founded more than 140 years ago.

We inspect technical equipment, products and services, vendors, oversee projects and assist in the development of company processes. Since 2006, we have been a member of the United Nations Global Compact to promote sustainability and combat corruption.

TÜV Rheinland Sonovation is part of the TÜV Rheinland Group specialized in providing a complete range of advanced non-destructive testing (NDT) services. In addition to operating a competence center for advanced NDT based in the Netherlands, it maintains branches in the United Kingdom, and Germany with access to a worldwide office network through TÜV Rheinland. Acknowledged as leaders in the field, TÜV Rheinland Sonovation invests heavily in R&D and operates an accredited training school for advanced NDT while offering its expert services globally.