



STORAGE WITH ACCEPTABLE RISK



YOUR **COMPETENT BUSINESS PARTNER** FOR INSPECTION, VERIFICATION AND TESTING

Storage of large quantities of hazardous substances entails risk for the population, the environment and the surrounding area. Spills of hazardous substances into the soil can lead to expensive decontamination processes. Leakage from storage tanks containing oil, gas or chemicals can be caused by the influence of weather on the external surfaces, or material can be affected by internal temperature variations. These situations could lead to a disaster. Periodic inspections, conducted in good time, can prevent such disasters from happening.

Headquartered in Geneva, Switzerland, the SGS Group is the global leader and innovator in inspection, verification, testing and certification services.

Founded in 1878, SGS is recognised as the global benchmark in quality and integrity.

Industrial Services as one of the largest business lines within the SGS Group is

a global provider of technical inspection, verification, testing and conformity assessment services for all industrial markets.

The core values of complete independence, transparency and integrity guide us in our mission to deliver first-class services on a constant high quality level to customers around the world.

Partnering with SGS guarantees access to unparalleled know-how and facilities. We eliminate uncertainty, enhance mutual confidence, and offer you the freedom to concentrate on the things that really matter: the growth of your core operations and the profitability of your enterprise.



STORAGE TANK **INSPECTION & AUDIT**

In order to assure your Storage Tanks compliance with Local Regulations as well as with the relevant Standards and Codes, SGS provides Technical Audits according to EN 14015, API 650 or 653, EEMUA 159 or Clients' Specifications.

These Inspections include

- Tank foundation and settlements evaluation
- Tank bottom evaluation
- Tank shell evaluation
- Tank roof evaluation
- Tank access evaluation
- Tank security instruments check
- Tank environmental study
- Survey of repairs

SGS has the experience, the accreditations and the equipment to carry out expert controls and inspections for owners of storage sites for hazardous substances and installations in all industrial sectors.

With the competence of a Notified Body, SGS performs independent assessment, testing and verification for storage tanks.

Besides periodic visual inspections, SGS is also a specialist in Non-Destructive Testing (NDT). By offering a complete range of Conventional NDT Techniques and Special Examinations, SGS is in the position to provide not just a list of standard techniques but solutions using a combination of multiple techniques.

FULL SERVICE

- Periodic visual external and internal inspections
- Fugitive emission and leak detection through infrared camera
- Mechanical integrity study
- NDT techniques
- Traditional NDT techniques
- Floorscan/Magnetic Flux Leakage
- Corrosion Mapping
- Tracing of system leaks and determination of material strengths
- Hydrostatic pressure tests
- Ultrasonic density tests
- Determination of water and sludge inside containers
- Determination of subsoil corrosiveness
- Safety systems control
- External thickness measurements and calculation reviews
- Adjustment and stamping of identification plates
- Welding procedures and welding qualifications for customary international standards, including ASME, ISO15614 and DIN EN 287
- Project Management and Supervision of Construction
- Environmental impact studies and risk analysis

SGS also monitors safety procedures for cleaning or welding activities of contractors during maintenance on-site. This applies for facilities such as

- Underground and aboveground flammable and hazardous product storage sites
- Storage tanks for compressed or liquefied gases

STANDARDS AND CODES

SGS inspects tanks for conformity with all international construction codes and standards, such as EN, API, BS, DIN, ASME, AD Merkbblätter, RTOD.

RECOGNITION AND ACCREDITATIONS

- Accreditation according to EN ISO/IEC 17020 and 17025
- NDT operators certified according to SNTC-1A and EN473 standards
- Recognised Third Party



NON-DESTRUCTIVE TESTING

The storage of dangerous goods in tanks must be executed in a safe way. In order to reduce the economical as well as the environmental risks, a thorough knowledge of the tank condition, and in particular the tank bottom and shells, is of outmost importance.

With the knowledge and inspection experience of SGS, Non-Destructive Testing (NDT) services provide your installation with added quality, cost reduction, business security and improved safety, for both existing and new installations. NDT gives a clear insight into the risk of leakage or other safety critical defects, which increases the integrity and safety within the installation, and hence avoids undue operating expenses.

Non-Destructive Testing of storage tanks includes several methods of examining materials, components and connections in order to identify and quantify material defects and degradations.

TANK BOTTOM INSPECTION

For the inspection of tank bottoms, SGS offers you a quick and above all reliable inspection by combining two techniques: Magnetic Flux Leakage (MFL) and Ultrasonic Testing (UT). By using these two techniques, corrosion is detected effectively (MFL) and reliably quantified (UT).

MFL is a detection technique, which detects volumetrically changes. A strong magnet induces a magnetic field in the material. On a corrosion spot, a leakage field will arise. The larger the corrosion the larger the field will be.

After the fast MFL inspection is done, the "suspicious" areas of the tank bottom surface will be quantified by the slow but more accurate UT.

TANK SHELL INSPECTION

To assess the accurate wall thickness of tank shells we use a rugged remote access ultrasonic crawler. The equipment is designed to allow cost effective ultrasound thickness measurements on above ground ferro-magnetic structures without the need for costly scaffolding or rope access.

The crawler system can be automatically or manually operated and transverses the tank shell either at equal distant points or 100 % around the tank circumference.

The multi-axis robotic inspection arm is capable of taking ultrasonic measurements and transmitting the wall thickness and A – and D-Scan inspection data in real time to the operator's remote panel. Different colours will visualise degradation levels and concentrations of corrosion during the scan and later in the report.

SPECIAL LEAK TESTING

Leaks in installations or vessels can cause environmental pollution and waste of expensive fuel and energy. Therefore, Leak Testing is performed to locate leaks and measure the leakage of pressurised (or decompressed) test products.

SGS performs the following Leak Test methods

- Ammonia Leak Test
- Helium Leak Test
- Bubble Leak Test
- Pressure Change Measurement Test



TANK CALIBRATION

Reliable quantity measurement is the critical basis of good contractual relationships in worldwide trading of chemicals, petroleum products and liquefied gases.

This can only be assured by accurate and regular calibration.

When you need to be sure of your tank calibration results, SGS has the leading solution. SGS innovative laser-calibration measurement technology helps companies to reduce time and costs of tank management, as well as offering precise storage tank calibration to ISO7504.

Our motorised laser technology and specialist software deliver results that are accurate, fast and safe to cost-efficient management for storage tanks, gas vessels and stockpile measurements. Not just volumes, but accurate roundness surveys, tank tilt and settlement and other construction measurements are straightforward.

What is the precise capacity of your tank? The difference can mean thousands of dollars to your business.

SGS' approach will replace the traditional 2-day turnaround with increased accuracy.

Features include

- Tank floor volume measurement that can save 300 % compared to alternatives
- Automated measurement to minimise human errors
- Faster results – just four hours
- Reduce down-time on your plant operations

The combination of accurate, fast and comprehensive calibration results helps companies to drive cost-efficiencies.

Our calibration engineers use the measurements to deliver comprehensive results, so you can

- Gain a more accurate picture of the current dimensions and state of your bulk storage containers
- See a visual guide to the condition of your plant using our 3D mapping of the results
- Enable long-term management of maintenance using trend analysis of historical results

SGS offers you a full-service approach, and provides regular measurement to reduce the total plant cost of ownership, and to

- Deliver volumes with calibrated and measured confidence over time
- Calibrate to constantly be within agreed limits
- Use our 3D modelling of tank floor and shell to plan future floor levelling and floating roofs installation
- Have 24/7 access to your data

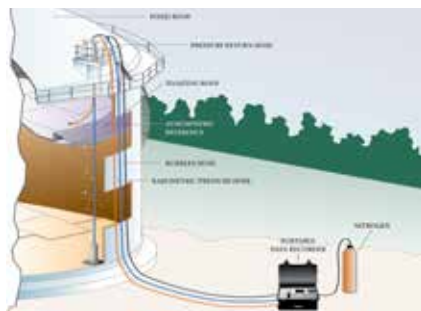
When you use one of our highly trained and professional calibration engineers, you are tapping into the SGS global network of the world's leading inspection, verification, testing and certification company. You will find our calibration experts have the years of experience needed to manage a wide range of measurement situations.



TANK LEAK DETECTION

Above ground, storage tanks are a key part of any distribution operation. From a commercial point of view, product leakage results in a direct loss of revenue. From an environmental view, product leakage can lead to contamination of soil and water courses leading potentially to punitive action from the Environmental Agency and negative corporate publicity.

SGS cooperates with Mass Technology Corporation (MTC) and offers a quantitative tank leak detection system, which does not require tank entry thereby dramatically reducing costs. Our tank leak detection system monitors the mass of liquid in the tank over a period of time in order to identify the presence and magnitude of any leakage. Liquid mass is derived from the head pressure at the bottom of the tank. This is measured using a differential pressure transmitter which is located along with the PLC outside of the tank.



The pressure head at the base of the tank is transferred to the transmitter using a nitrogen bubbler system.

The sensitivity of the system is impressive, with level changes of the order of 0.004 mm per hour detectable. This equates to a leakage rate of less than 3 litres per hour from a 30 metre diameter tank.

The SGS-MTC system has the potential to defer the need for the hazardous and costly entry to a tank for inspection purposes. Our system replaces automatic tank entry with a periodic "health check". Tank entry is only triggered when a health check identifies that the tank is leaking, thereby eliminating unnecessary spend, and allowing the maintenance budget to be focussed where it is actually needed. In cases a leak has been observed, but the offending tank cannot be identified, this system enables the operator to find the leaking tank without having to take them all out of service. Unnecessary expense is eliminated and the risk to personnel minimised as only leaking tanks will be entered.

ADVANTAGES

- Accuracy unaffected by fluid temperature changes
- Non-intrusive, non-hazardous and intrinsically safe
- Minimal tank preparation
- No tank stabilisation time
- Prompt, conclusive and quantitative results
- No capital investment by tank owner
- Not affected by water at tank bottom or product stratification
- Not influenced by roof or tank bottom structure
- Test of any viscous fluid at routine operating conditions and capacity

CAN BE USED TO

- Supplement alternative inspection plans for API 653
- Evaluate tank bottom integrity after internal inspections
- Perform periodic tank bottom assessments in accordance with API 653
- Classify and prioritise tanks for future repairs
- Document tank bottom integrity in conjunction with a hydrostatic test
- Determine the existence of a suspected leak
- Comply with or supplement company policies for leak detection programmes



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WHEN YOU NEED TO BE SURE

