Integrated Tank Services
Profiling - cleaning - inspection

COMPLETE PACKAGE
Whether the storage capacity of your tank has reduced due to accumulated sludge or you require an accurate estimate of your remaining tank bottom lifetime, A.Hak Industrial Services has the solution to seamlessly match your needs. From profiling to cleaning and inspections, our Tank Services offer you a full range of worry-free services. Our state-of-the-art methods, techniques and experienced specialists mean we provide one of the best and most cost-effective solutions for your tanks’ challenges.
Online Tank Sludge Profiler

Online tank sludge profiling provides a clear picture of the quantity and distribution of the sludge. While your tank remains in operation, we gather information to design the best possible cleaning program for your installation and calculate the amount of hydrocarbons you can recover.

A.Hak Industrial Services’ Online Tank Sludge Profiler uses an acoustic sensor, capable of scanning tank contents with the greatest precision. With the data gathered we calculate sludge volume and generate three-dimensional views of the sludge distribution. Our survey system measures the tank sludge volume with an accuracy of up to 95%. Based on information describing the sludge properties and distribution, you can determine the best strategy to desludge and inspect your tank while it stays online. Accurate tank profiling allows you to decide whether or not to invest further in desludging, cleaning, inspection or maintenance activities.

ATEX
A.Hak Industrial Services’ profiler is ATEX-certified which makes it suitable for all types of product. The profiler is inserted into the product through the roof support entry-point or manhole entry without the need for the tank to be emptied. Only a small team of our experts is required, minimizing the number of people on the tank roof. By using our advanced software the survey usually takes only just a day, which makes it fast and cost-efficient.

REPORTING
After processing the raw data we provide you with a clear report with the sludge distribution represented in a 3-D contour map. We calculate the sludge volume for the entire tank in cubic meters or cubic feet and present information on the actual pile height.

NO DOWNTIME
Our sludge survey is performed while the tank stays in service so you will experience no or minimal disruption to your tank operations. For optimal profiling the roof should be raised to the maximum height with the mixers turned off.

BENEFITS OF PROFILING:
- It quantifies sludge volume prior to cleaning.
- It creates an accurate 3D sludge map to ensure safe roof landing and manhole removal.
- It reduces unforeseen delays during maintenance.
- It offers verification of the desludging operation’s success.
- It allows for better asset management over the plant’s lifetime.
- It enables accurate sludge accumulation monitoring.

In addition we can offer you information about the composition of the sludge using our sludge sampler.
The final report includes a 3-D colored contour map of the sludge distribution present in the tank and the sludge volume in cubic meters or cubic feet.
ARCC system (ATEX Remote Controlled Cleaning)

**Optimal Remote Cleaning**
A.Hak Industrial Services’ innovative ARCC System eliminates the need for manual storage tank cleaning processes which could be hazardous to the health of staff members involved.

ARCC – an acronym of ATEX Remote Controlled Cleaning – is a self-contained system in which the pump, the generator and an operating and control room are all fitted into a single container. The ATEX certification and built-in gas monitoring detection unit makes the system suitable for working in explosive environments. This allows the system to clean every type of storage tank containing all kinds of products, from hydrocarbon to chemical products. HD cameras with recording functionalities allow us to visually control the entire cleaning process.

**ARCC - State of the Art Storage Tank Cleaning**
Whether your tank contains mineral oil, heavy fuel oil or chemicals, A.Hak Industrial Services has the right cleaning solution for your needs. Our externally controlled tank cleaning system is a highly valuable alternative to the previously common practice of manual cleaning, a method with high safety risks that puts a major physical and mental strain on staff. This non-man entry system still offers precise cleaning due to the HD cameras, which allow you to look inside the tank while cleaning and save your organization both time and resources. In traditional automated cleaning processes, the sludge levels need to be monitored again after each of the cleaning cycles to evaluate the cleaning progress, but the ARCC System’s live video control optimizes the cleaning process, increasing efficiency and minimizing delays.

**The ARCC-System:**
- is non-man entry.
- minimizes safety hazards.
- is ATEX certified.
- significantly reduces cleaning times.
- minimizes usage of water to reduce waste water and treatment costs.
- is suitable for all types of hydrocarbon and chemical products.

**Remote and Safe**
Each ARCC System includes two cleaning cannons, each containing a HD video camera equipped with lighting. The cannon is mounted on a shell or roof manhole. The system can be swiveled 225 degrees both horizontally and vertically, and ATEX certification makes the system suitable for all types of product. The system comprises an onboard gas monitoring system to ensure safe operation while cleaning the tank. Combined with our biodegradable Hak SafeGuard® emulsifier, the system allows for a protocol that helps to obtain low LEL values quickly and easily.

The system is remote controlled from a container which holds the pump room, engine room, hydraulic room (storage room for the spray cannons and hose reel during transportation) and a control and operating room. The engine supplies power for the high pressure pump and the hydraulics to operate the cannons. A small built-in generator supplies back-up power for the control room.

The complete cleaning process is controlled and performed from the control room inside the container, which minimizes safety hazards. The recordings of the cleaning process made inside the tank by the HD camera are at your disposal.

**Unique Features**
- Suitable for all types of products
- Integrated gas monitoring system
- System is automated and remote-controlled
- Cleaning process visually monitored
- HD cameras with lighting and recording
- Large cleaning angle (0° to 225° both horizontally and vertically)
- Roof and shell-mountable
- Low operating costs

**Performance Data**
- Pump rate: 55m3/h
- Operating pressure: max. 40 bar
- Products: All types of suitable products (such as crude oil, diesel, kerosene, chemicals, water etc.)
- Maximum fluid temperature: 70° Celsius
- For fixed or floating roof tanks with a diameter of up to 80 meters
Solids
Waste water
Recovered oil

Optional for large diameter tanks:
nozzle operation from tank roof

Roof lowered, maintenance position

Remote controlled nozzle
Including gas monitoring system and full-HD camera.

SAFE AREA
Pump room
Due to local regulation issues, tanks usually need to be taken out of service for a fixed time period for inspection, without knowing in advance if this is actually necessary. Our OTIS Robotic Tank Bottom Inspection Series provides inspection according to the API 653 standards, which allows you to avoid this fixed time interval. The autonomous tank bottom inspection device uses UT sensors to detect any variation in thickness of the bottom plate while your tank remains in service.

**API 653 CERTIFIED**

The A.Hak Industrial Services’ InTANK approach to tank inspection is a well-recognized and trusted method throughout the industry today. Tank owners can significantly reduce the costs of performing API 653 inspections by not having to remove their tanks from service, and by being able to plan out-of-service periods.

The A.Hak Industrial Services’ InTANK robotic system is efficient and cost-effective while it:
- eliminates the high cost of tank downtime.
- does away with the need for temporary storage.
- saves you the cost of cleaning.
- minimizes waste disposal costs.
- cuts inspection time to days instead of weeks.
- avoids disruptions in plant operations, keeping revenue constant.
- reduces environmental risks such as spills and VOC release.
- improves safety by eliminating confined space entry and personnel exposure to hazardous chemicals.

Our high quality robotic equipment ensures constant, controlled and proven conditions for tank bottom inspections. Robotic equipment is safer than manual inspection, and is unaffected by working conditions. Its advanced, computer-based ultrasonic technique makes data collection more accurate.

**GREAT ACCURACY**

A.Hak Industrial Services’ patented acoustic navigation system – equipped with navigation pingers on the robot and navigation transducers on the tank shell – is used to pinpoint the robot’s location. Using onboard UT transducers, developed with years of knowledge and expertise from our pipeline inspection services, the robot follows a predetermined digital inspection grid and can collect millions ultrasonic scans of the tank bottom in order to perform computerized data analysis. The robot is equipped with an onboard sonar system to detect objects in the tanks. When operating in clear fluids, we can equip the robot with HD cameras. The navigation allows us to reproduce our inspections in the future to determine corrosion rates with great accuracy.

Our robots can maneuver in tanks containing sludge of up to 30 centimeters (12 inches) in depth. We can also equip our robot with cleaning systems using spray nozzles and brushes. This way it simultaneously cleans and inspects the tank bottom, enhancing safety and reducing costs. Cleaning times may vary depending on sludge levels.

**SAFE AND COST-EFFECTIVE**

Inspections involving a human presence increase safety and environmental risks, and traditional tank bottom inspection technologies require tanks to be offline during inspection. They must be drained, cleaned, degassed and ventilated – all of which incur significant costs for owners. By using the OTIS robot, the tank bottom inspection takes significantly less time, and is safer and more cost-effective.

**BENEFITS OF TANK INSPECTION ROBOTS:**
- No downtime and no product waste
- API certified inspection
Quick Look®

The quicklook system allows you to inspect the internal mechanical roof construction and observes the robot progress where possible.

Robot umbilical

Your tank remains in operation during the inspection, so there is no downtime!

Navigation Transducers (up to 6)

Optional: vacuum unit can be mounted to remove low sludge volumes

OTIS System results

- A-Scans, x, y Coordinates
- B-Scans, x, y Coordinates
- Floor Elevation, x, y Coordinates
- Sludge Removal (optional)

OTIS TYPES

Different types of robots are available. Each designed according to specific specifications enabling them to cope with different demands.

Data Analyses/Final Reporting
SUCCESSFUL ROBOTIC TANK BOTTOM INSPECTION

A total of 5 AMINE tanks were successfully inspected in a period of 5 weeks. The AMINE tanks varied from a diameter of 3.5 meter up to a diameter of 15 meter which made a different approach for each tank necessary and challenging.

PLANNING
The available preparation time was around 4 weeks. Within this period several modifications were made to the E300 ROV to make it suitable for the job. A complete new camera-light-man- way assembly was designed and build to perform the visual roof inspection.

SCOPE OF WORK
The Scope of Work was to perform an ultrasonic tank bottom inspection and a visual roof inspection in each of the 5 tanks. The tanks had never been opened or inspected before since the construction of these tanks in 2006. This made it really challenging to convince everybody involved in the operation of the A.Hak Industrial Services procedures and safe work method.

EXECUTION
The inspection started with the manually operated ultrasonic probe in the tank with the smallest diameter. The probe was equipped with a camera system in addition to the ultrasonic data. Some high quality video footage of the tank bottom floor was collected.

JOB COMPLETION AND A LOT OF COMPLIMENTS
Even when there is limited time in the preparation phase and need for modifications during the project we managed to collect more than an sufficient amount of data in all tanks with extra video footage within the predicted timeframe. After the inspection of all 5 tanks we received great compliments.