hc hansaconsult Ingenieurgesellschaft mbH

Leak Detection
Tightness Control System TCS®

Pressure-Step- (PS-) Method
Pressure-Temperature- (PT-) Method

Product Info

The Challenge

- On modern airports refuelling of aircraft is carried out by using hydrant systems. These underground pipe networks are used to transport fuel (Jet-A1) to the individual aircraft pit.
- In the event of a leak, huge amounts of soil and ground water could be contaminated by fuel.
- Remediation measures and associated cost represent an almost unpredictable risk for operators and owners.
- Therefore, tightness of hydrant systems has to be monitored as accurately as possible.
- Leak detection systems that monitor the system during normal refuelling operation provide limited accuracy and are only suitable for detection of major leaks.
- Very small changes of fuel temperature result in large pressure changes (0,1 °C ~ 1 bar).

Main hydrant pipes disappearing into the ground

The Solution: TCS®

Tightness Control System

- **Approved by TÜV, American Petroleum Institute (API), Institute of Petroleum (IP)…**
- **Safe detection with Pressure-Step- (PS) and Pressure-Temperature- (PT) Method**
- **Maximum reliability of 0,04 lit/h per m³ section volume (guaranteed detectable leak) in PS-Method**
- **TCS® Automation for automated leak detection**
- **Fully automated test cycle**
- **Daily control of tightness during overnight non refueling periods**
- **Short analysis test cycle (approx. 45 min)**
- **Integration into all standard visualization and automation systems (SCADA) via OPC-interface**
- **TCS® Mobile for the accurate leak detection without automation**

Product Info

The TCS® Principle

Pressure-Step- (PS) Method

The world-wide patented PS-Method is the state-of-the-art leak detection procedure.

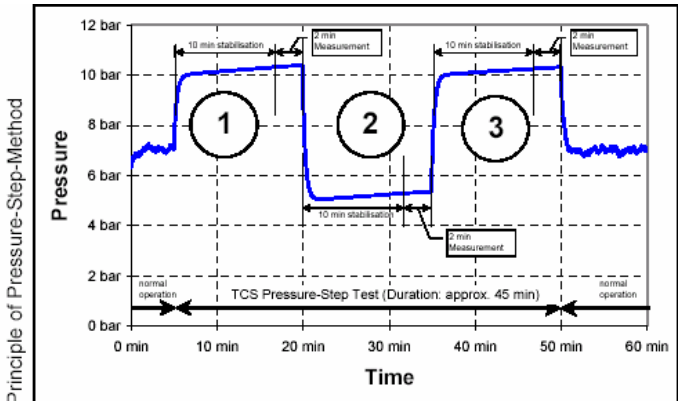
The pipeline is seperated in perfectly tight sections and pressurized at two different pressure levels. The volume of each single section limits the test accuracy. The change of pressure is recorded. Detection of leakage is based on the fact, that higher pressure results in a higher leak rate. Since the leak rate depends on test pressure, influence of temperature changes can be compensated.

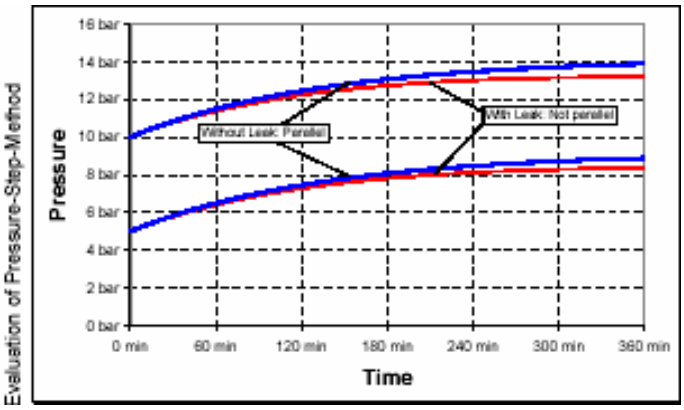
Benefits:

- ✈ Maximum accuracy (0,04 lit/h per m³ section volume)
- ✈ Short test cycle (approx. 45 min for all sections)

Typical application:

- ✈ Daily control





Pressure-Temperature- (PT) Method

The section of the pipe to be tested is pressurized. The changes of pressure and temperature during several hours gives evidence about the tightness of the system.

Typical application:

- ✈ Yearly tests

Benefit:

- ✈ High accuracy (4 lit/h per section)

Disadvantage:

- ✈ Long test cycle (no refuelling operation)
- ✈ Temperature along the pipeline has to be measured at numerous underground spots.

TCS® Tightness Control System

Product Info

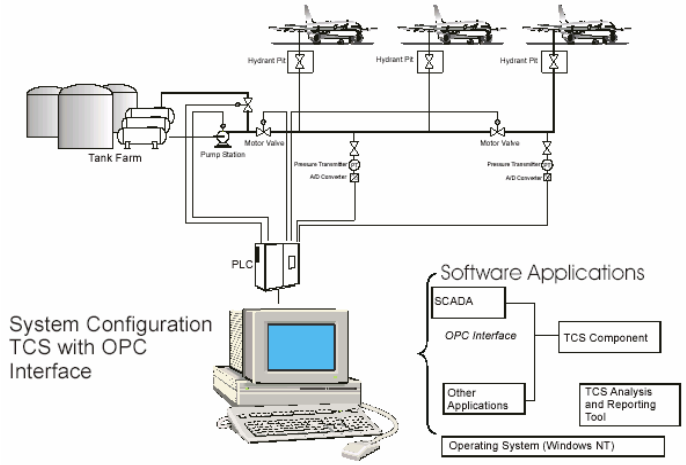
OPC to standardize data communication

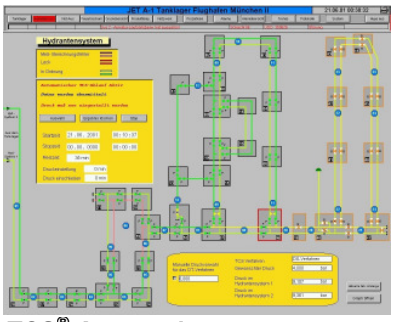
TCS® is built on Windows NT-Technology and features an OPC-interface.

OPC stands for “ole for process controls” and is an open interface standard.

OPC allows a standardized data exchange of applications and field instruments resulting in an easy integration of hard- and software products of different suppliers.

Applications are the process visualization (SCADA-systems) or a direct access from Microsoft Office™-applications to process data.





TCS® Automation

TCS® Mobile

References up to 2004

(extract)

- *Amsterdam Schiphol*
- *Anchorage*
- *Athens II*
- *Atlanta*
- *Cleveland*
- *Frankfurt / Main*
- *Geneva*
- *Inchon (Seoul)*
- *Kuala Lumpur*
- *London Gatwick*
- *London Heathrow*
- *London Stansted*
- *Milan Malpensa*
- *Munich II*
- *New Guangzhou*
- *New York JFK*
- *Osaka*
- *Perth*
- *Stockholm*
- *Sydney*
- *Tel Aviv*
- *Warsaw*
- *Washington DC Ronald Reagan*
- *Washington DC Dulles*
- *Vienna*
- *Zurich*

Product Info

Service spectrum TCS® (extract)

TCS® Software & Maintenance	TCS® Inspection & Auditing	TCS® Mobile Check
Software update and upgrade for existing hydrant sections	Regular tests (daily, weekly, monthly, quarterly, yearly)	Joint development and coordination of scheduling for mobile TCS®-test as multi- or single-section test
Extension of hydrant system (new sections or extension of existing sections) according to TCS®-licence agreement incl. configuration, implementation and calibration.	Interpretation of TCS® -test results (data base): - Evaluation of test results - Recommendation of measures	Performing TCS®-test cycle according to TCS®- test schedule
Adjustment of TCS®-parameter, section size and accuracy	Performing the TCS®-simulation Analysis of accuracy and sensitivity by means of an artficially created/simulated leak	Training of TCS®-staff (employees, clients, contractual partners)
Calibration of TCS®-parameter	Control of TCS®-parameter	Regular auditing of TCS®-staff and inspection of the mobile TCS®-trailer
Control of TCS®-PC and software; back-up of TCS®-database	On-site-Inspection of TCS®-hardware	Repair and standard maintenance of the mobile TCS®-trailer incl. necessary exchange of hardware components
Exchange of TCS®-hardware including coordination of necessary activities	Risk classification and reporting Risk evaluation based on TCS®-analysis (recorded data of min. 10 test cycles) A : minimum risk B : test results within acceptable limits, but extrapolation identifies potential risks C : test results out of specification (potential leak of hydrant pits or valves...) D : Leak warning; significant risk	
Maintenance of TCS®-database	TCS®-certification to confirm that TCS® works according to specification; risk classification incl. potential recommendations	
Scheduling, documentation & data maintenance of all TCS®-relevant activities with suitable IT-systems		

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