



TOC-analyzer and TOD-analyser applications in the EX hazardous zone ATEX Zone 1 and Zone 2

ODS bv at Barendrecht Netherlands is the official dealer for LAR Process Analysers AG Berlin. The instrumentation department of ODS supplies complete TOC, COD and TOD analyser systems for the EX zone, ATEX zone 2 and zone 1.

In refineries and chemical factories it is common practice that analyser shelters are situated in the hazardous EX zone. The reason is that analyser sample lines should be as short as possible. Nowadays the regulations regarding ATEX certifications is very strict. Due to the complexity of a waste water analyser, these systems cannot be designed and built using all components EX-certified. COD, TOD and TOC-analysers have different inlets and outlets for fluids and gasses. So, the use of an EEx d housing is also not an option. Every single analyser system should be certified by a Certified Body. For these reasons ODS BV built these analysers in an EEx p cabinet. Using compressed air and a dedicated purge controller, the complete cabinet is kept under overpressure conditions. Prior to switching the power on, the complete cabinet and different analyser compartments are flushed during a calculated period.

Special care is taken for:

- Complete Exp certification documents
- Purge control and override
- Cooling of the cabinet
- Analytical aspects
- Easy access to the analyser parts for maintenance aspects
- Detection of Leakage of fluids
- Enough space for adding special "tailor made" solutions and components
- Capability of adding Full EX certified and air operated external analyser parts such as sample conditioning.

Exp Cabinet: Small or Large

Small: LAR Process Analyser supplies Analysers in ATEX cabinets. These cabinets have little space for extra components. Adding components implements that again a procedure needs to be started up to become a new EX certification.

Large: The physical composition of waste water is very divers. In some cases aspects like an extreme high carbonate- or TOC level, alkalinity, salts, particles, grease, oil, foam, particles, purgeable components, etcetera demand for special pre-treatment such as separation, filtration, homogenizing, addition of chemicals and dilution. It is unnecessary, unpractical and impossible to integrate these so called sample conditioning components into the EEx p cabinet. You simple wouldn't achieve to get an ATEX EX certification. Many components used are mechanical or air operated. A better solution is to add relays and actuators in the EEx p cabinet and these pneumatic operated exponents outside the cabinet in the EX zone. A medium size cabinet is not an option. The analyzer should have full access for maintenance. Visual control can be done via the big safety glass window.



The EEx p cabinet complete with a LAR Quick-COD analyzer



Short sample lines implements the use of Ex analyser houses



Good access for maintenance is "a must".



The EEx p Cabinet with hermetically closed door



A clear view via a window to the big display



The external mounted gas permeation box



Maintenance can be done easily.



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Purge air control unit

Via this "purge air control unit the complete EEx p cabinet is purged during a predetermined period. After this period the analyser and other internal equipment is switched on.

The EEx p control unit APEX 2003.002x controls and monitors the purging and operating cycle of standard EEx p enclosures. Purging gas input is via a digital valve up to NW 7.7 (74 m³/h) up to NW 6 (45 m³/h). The purge time is set at the control module via a turn switch. " Features are: voltage free contacts, 3 line LCD display, LED status display, modular design and failsafe control. The total solution is certified as Ex II 2G EEx p II T4 via certificate TUV 03A TEX2264.

Vortex cooler (synonym: vortec cooler)

Compressed air, normally 5 a 6 bar, is ejected tangentially through a generator into the vortex spin chamber. At up to one million roots per minute, this air stream revolved toward the hot end where some escapes through the control valve. The remaining air, still spinning, is forced back through the centre of this outer vortex. The inner stream gives of kinetic energy in the form of heat to the outer stream and exits the vortex tube as cold air. The outer stream exits the opposite end as hot air.

Leakage detection:

In case of any leakage of for example sample a thermal mass level switch will shut-off the sample pump. The sensor tips are positioned a few mm from the bottom of the cabinet.

Analytical aspects / gas preparation:

If any components of the analyser are sensitive to the absolute pressure then they can be placed out of the EEx p cabinet. For example, a permeation box will produce a higher base line when the pressure rises. ODS has placed this unit out of the cabinet in the EX zone and, of coarse, built the unit using all EX certified components.



Hazardous zone in the petrochemical Industry.



The purge air control unit

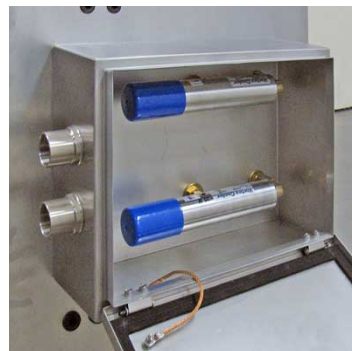


An FCI level switch shuts off the sample pump in case of a leakage

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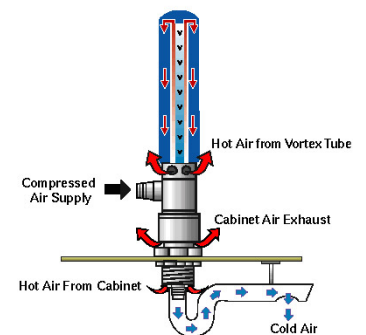
TOC/TOD-analysers are of great importance in the industry



Two big vortex tubes take care of cooling the analyser system.



Air inlets for cooling and purging



Principle of a vortex cooler

