robecco

PREVENTIVE EXPLOSION PROTECTION

Monitoring | Control | Inerting

TURNKEY SYSTEMS – MADE IN GERMANY

SAFETY FOR PERSONNEL, EQUIPMENT & PRODUCTION

Explosions and fires create a significant risk to people, the environment and production.

With over 25 years' experience, robecco has become a specialist in preventive explosion protection and can provide complete packages of equipment for monitoring, control and CO_2 / N_2 inerting systems from a single source and one interface according to the relevant international and European norms and rules. The company maintains long-established business relationships with customers worldwide providing preventive explosion protection solutions and automation services for the integration of solutions into customers' systems.

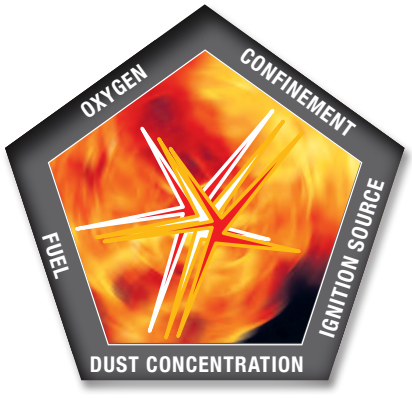
Explosions and fires create a significant risk to people, the environment and production. The consequences are significant developments of heat and pressure.

WHERE AND WHEN IS THERE A RISK OF EXPLOSION?

- The explosion and fire safety of an installation is determined by risk factors associated with the process and products.
- High temperatures and material product characteristics can create dangerous smouldering fires in the production process.
- A proven technology is the use of Carbon Monoxide (CO) analysis for early fire-detection and Oxygen (O_2) analysis to monitor the inert atmosphere. This is recommended according to CEN 15281 and VDI guideline 2263/2.
- Early detection of smouldering fires allows the operators to mitigate fire propagation with the help of technical measures. Continuous Carbon Monoxide (CO) and Oxygen (O_2) monitoring is essential to ensure prevention against fires and explosions.
- INERTING is an effective method to prevent explosions and fires. The use of inert gases effectively prevents spontaneous combustion of flammable dust, liquids and gases.

The prevention of a dust explosion is only possible if one condition in the pentagon is eliminated.

The only effective method is the reduction of Oxygen!



EXPLOSION

RISK!

EXPLOSION HAZARDS in

- □ Mills
- □ Separators
- □ Filters – Dust Collectors
- □ Conveyors
- □ Silos
- □ Spray Dryers
- □ Dryers
- □ Mixers

IGNITION SOURCES

- □ Smouldering Nests
- □ Hot Surfaces
- □ Mechanically-Induced Sparks
- □ Sparking Electrical Equipment
- □ Flames
- □ Electrostatic Discharges

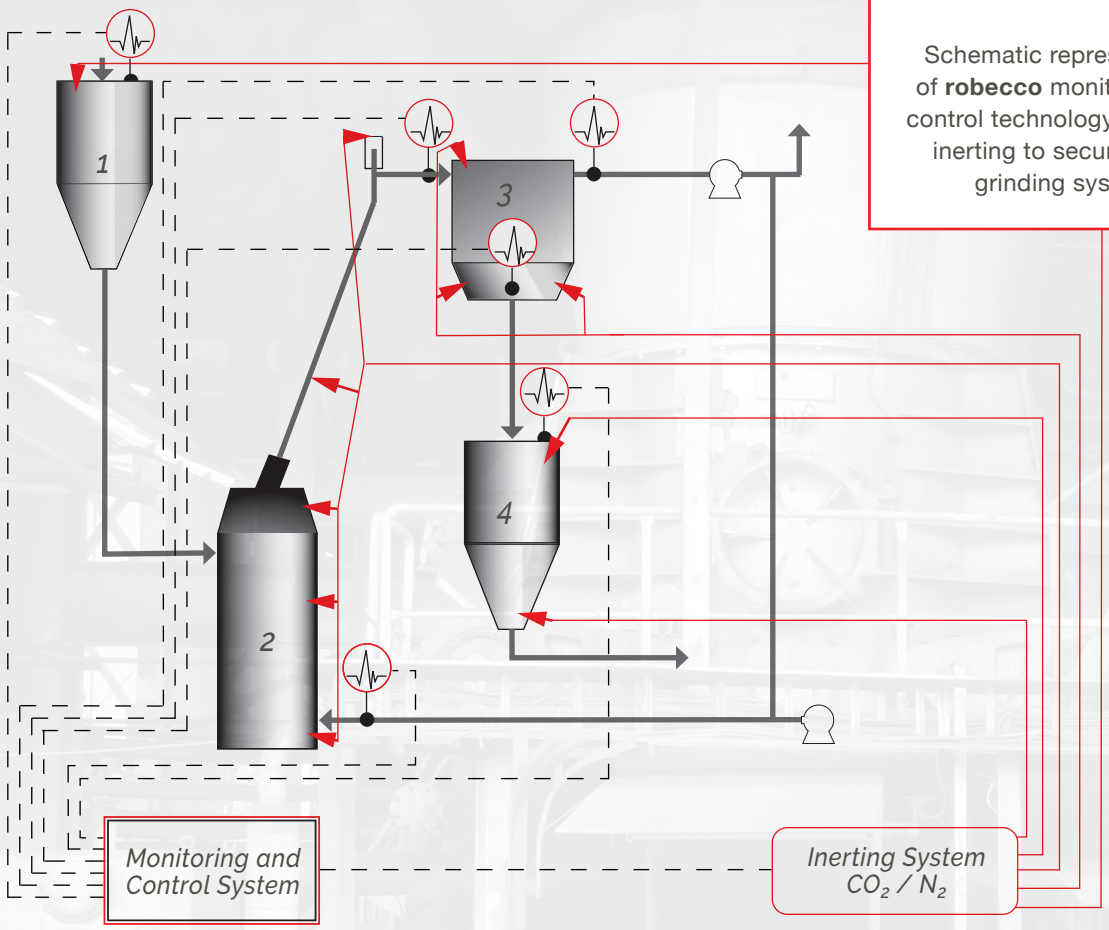
RISK POTENTIAL with

- □ Combustible dust in powder-air mixtures
- □ Combustible and explosive gases

MONITORING, CONTROL & INERTING CONCEPT

EXAMPLE CONCEPT

Schematic representation of **robecco** monitoring and control technology, including inerting to secure a coal grinding system.



1. Raw coal silo
2. Mill
3. Bag filter
4. Coal dust silo

CO/O_2-Measurement
Injection point CO_2 / N_2

AREAS OF APPLICATION:

- Coal grinding / storage
- Sewage sludge processing
- Biomass
- Power plants
- Minerals
- Cement industry
- Chemistry
- Food industry

WHAT DOES INERTING MEAN?

The target of inerting is the reduction of O_2 in explosive atmospheres. Inert gases like CO_2 / N_2 have a low level of reactivity and reduce the Oxygen below the limiting Oxygen concentration.

robecco provides turnkey, automatic CO_2 / N_2 - inerting systems including monitoring and control.

By using robecco products, gas and dust explosions are prevented effectively. For all components and systems the regulations of ATEX and CEN 15281 are complied with.

robecco PREVENTIVE EXPLOSION PROTECTION

COMPONENTS

HIGH-PRESSURE CO_2- INERTING

robecco INERT

LOW-PRESSURE CO_2- INERTING

robecco INERT

HIGH-PRESSURE N_2- INERTING

robecco INERT

robecco GAS ANALYSER SYSTEM

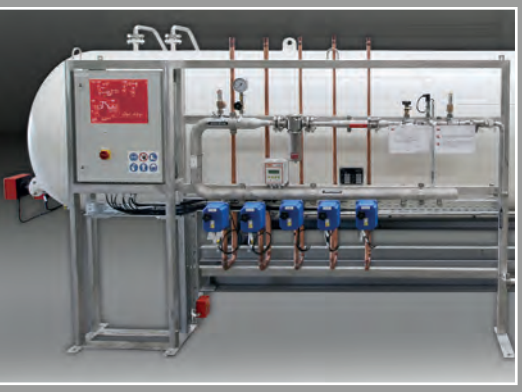
robecco GAS

robecco SECURE CENTER

robecco RSC

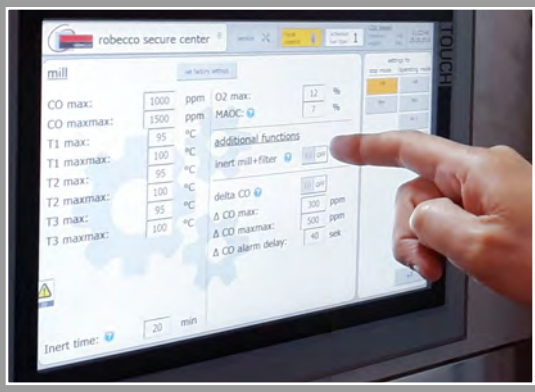
robecco provides SAFETY

HIGH-PRESSURE CO_2-INERTING



CO_2 Valve station

CO_2 high-pressure tank



Visualised operation

Technical characteristics:

Operating data inert gas tank:
- Operation pressure: 50 - 70 bar
- CO_2-temperature: +15/+28° C
- Max. pressure: 80 bar

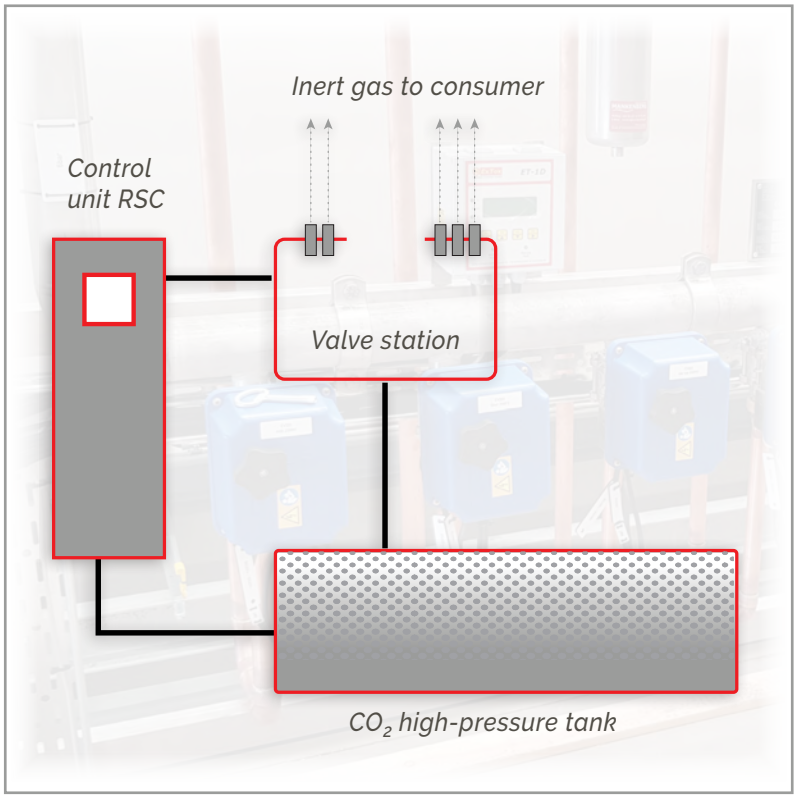
Pressure control:
- Pressure build-up by ambient temperature and tank-heating elements
- Water-sprinkling system or installation in an air-conditioned room

Gas generation:
- With highly-pressurised gas directly
- Electrical tank-heaters

Refilling:
- With road tanker and integrated high-pressure pump

- Separate high-pressure pump

HIGH AMOUNTS OF CO_2-GAS DIRECTLY FROM THE TANK



LOW-PRESSURE CO_2-INERTING

CO_2 low-pressure tank

Vaporiser

Technical characteristics:

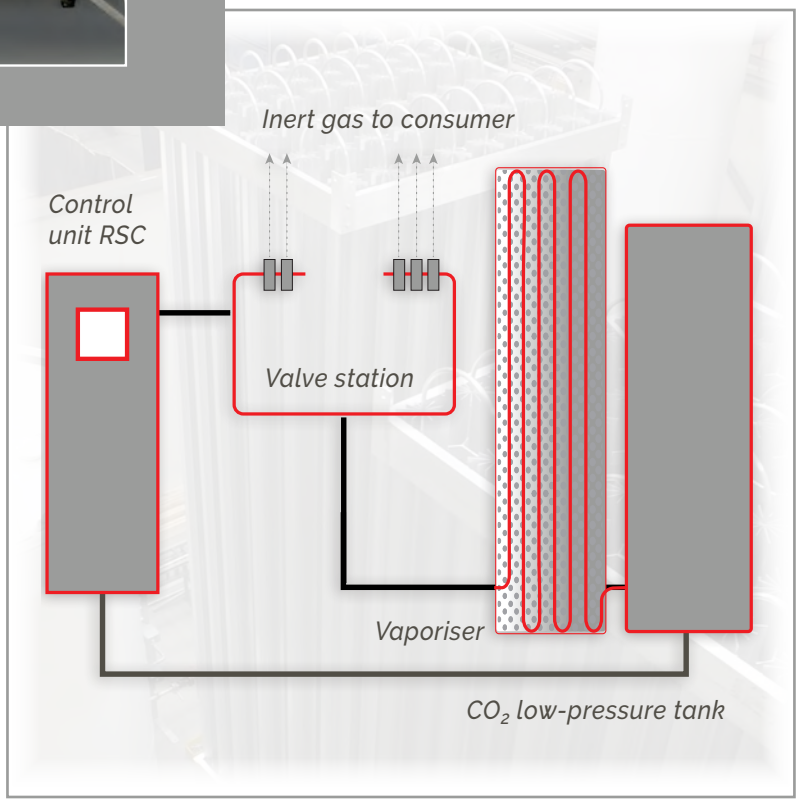
Operating data inert gas tank:
- Operation pressure: 22 - 23 bar
- CO_2-temperature: -16/+15° C
- Max. pressure: 25 bar

Insulation:
- Vacuum insulation

Pressure control:
- Pressure build-up heater
- Cooling by refrigeration unit

Gas generation:
- Liquid CO_2 storage in vertical tanks
- Gas generation with ambient air vaporiser
- At lower ambient temperatures <+5°C heated with integrated electrical heater

Refilling:
- With road tanker and integrated pressure pump



HIGH-PRESSURE N_2-INERTING

N_2 Valve station

N_2 high pressure bottles

Technical characteristics:

Operating data N_2 bottles:
- Very compact packs
- Operating-pressure 200–300 bar
- N_2 packs with 8–12 bottles

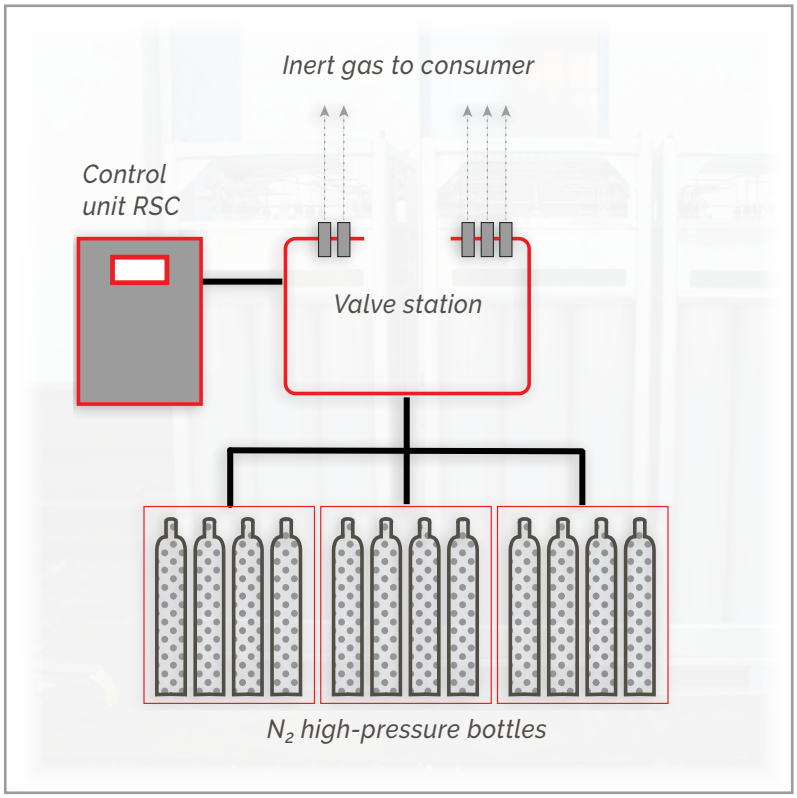
N_2-Storage:
- N_2 packs on rental basis or directly-owned

Pressure control:
- No direct pressure control necessary

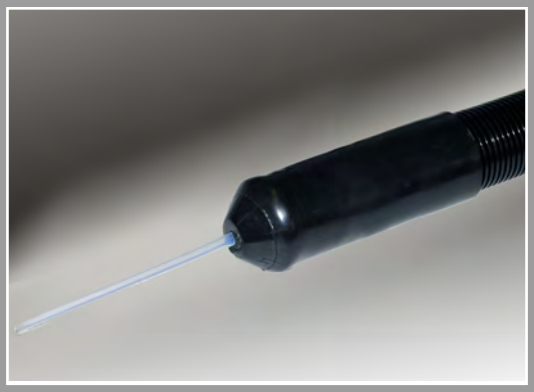
Gas generation:
- N_2 gas directly available in N_2 bottles

Refilling:
- By a local gas supplier

N_2 GAS AVAILABLE DIRECTLY FROM THE PACKS



Gas analyser cabinet



Sample line RSL

Gas analyser RGA CGM-5

Technical characteristics:

- Measurement systems, monitoring and control units for different gases (e.g. O_2, CO, CH_4, etc.)
- Extractive gas sample systems with sample probes and sample lines
- Measurement of process safety-related parameters
- Flexible sample lines
  -lengths
  -power
  -heated and non heated version
- ATEX certified equipment for explosive areas

Service:

- Full Services
  -Project engineering
  -Manufacture
  -Commissioning and
  -Training

robecco reliably undertakes the measurement of safety-related parameters during the operation of explosive processes.
Oxygen, CO and CH_4 measurements are indispensable for operating inert gas systems. The use of safety-related parameters is essential for applying preventive explosion control. Taking action requires information on the limiting Oxygen concentration and the CO/CH_4 concentration of air-dust mixtures. Measuring and control systems have to fulfil certain requirements (**ATEX Directive**).

SYSTEM FOR MEASUREMENT AND MONITORING

Sample probe RSP-1

robecco SECURE CENTER

robecco secure center is a central fully-automatic control system, which guarantees the inert atmosphere during chemical and physical processes.
Sensors and actuators are connected to the system which prevents effectively dangerous process situations.
robecco secure center controls and regulates the following components:

- ☐ Gas Analyser Systems
- ☐ Temperature Sensors
- ☐ Inerting Systems
- ☐ Valves and Flaps

FULLY AUTOMATIC INERTING

Technical characteristics:

- Fully-automatic monitoring and control system
- Visualisation of the complete inerting process
- Fully adaptable at operator CCR
- User friendly operation
- Service and Maintenance monitoring
- Remote maintenance available
- Failure indication in plain text messages
- Trend view and data memory
- Self-sufficient system functions without upper PLC control
- Exact CO2- or N2- dosing regarding effectiveness and environment
- Monitoring of CO2- or N2- storage guarantee the procurement and stock
- Monitoring of system-relevant functionalities of the inerting system, gas analyser systems and temperature sensors
- Automatic determination of maintenance intervals of single components independent of operation duration or malfunctions

Service:

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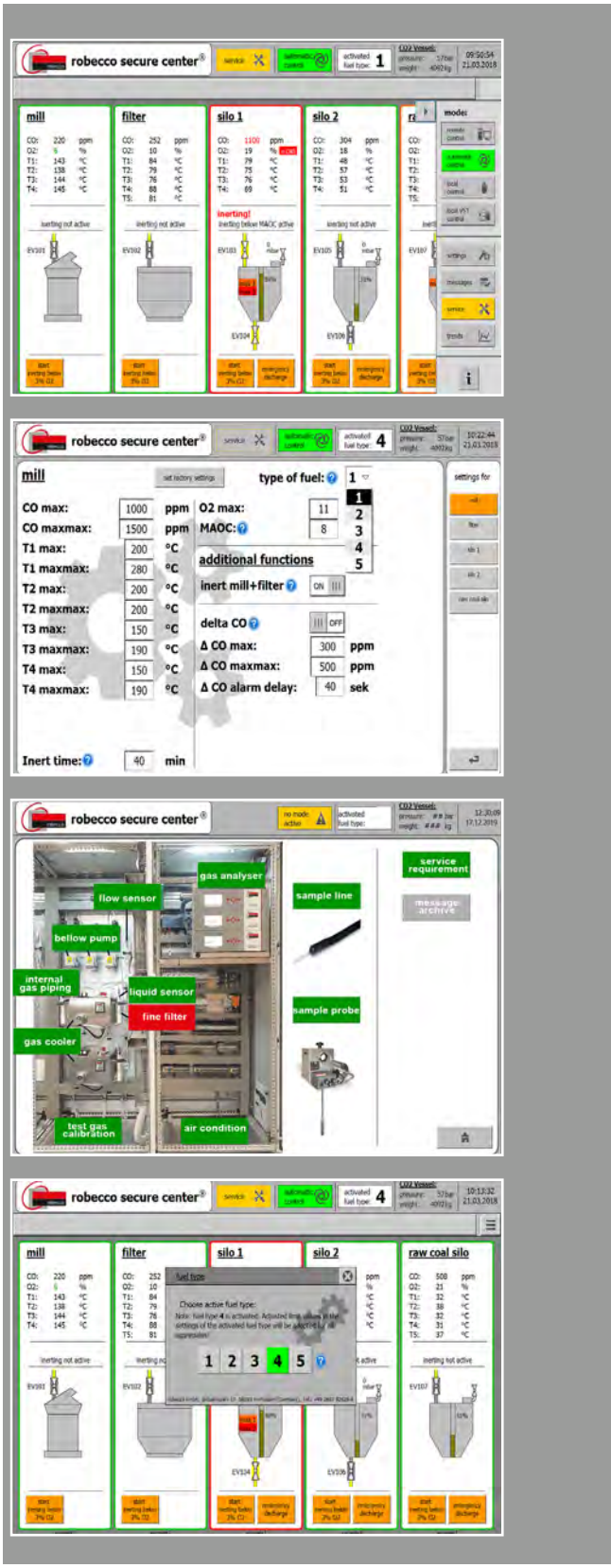

Visualisation and Human-Machine Interface

Innovative

MONITORING, CONTROL & INERTING-SYSTEMS

for

PREVENTIVE EXPLOSION PROTECTION

made in germany.

according to the standards:

European Inerting guideline CEN 15281
German Inerting Guideline VDI 2263/2
German VDE regulations
German TRBS 2152 part 2
ATEX Regulations 2014/34/EU
Gas Analyser Directive IEC60079-29
European low-voltage regulation 2014/35/EU
European Machine Regulation 2006/42/EG
European Pressure Equipment Directive PED 2014/68/EC

robecco generates

QUALITY | SAFETY | PRODUCTIVITY

TURNKEY SYSTEMS – MADE IN GERMANY

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