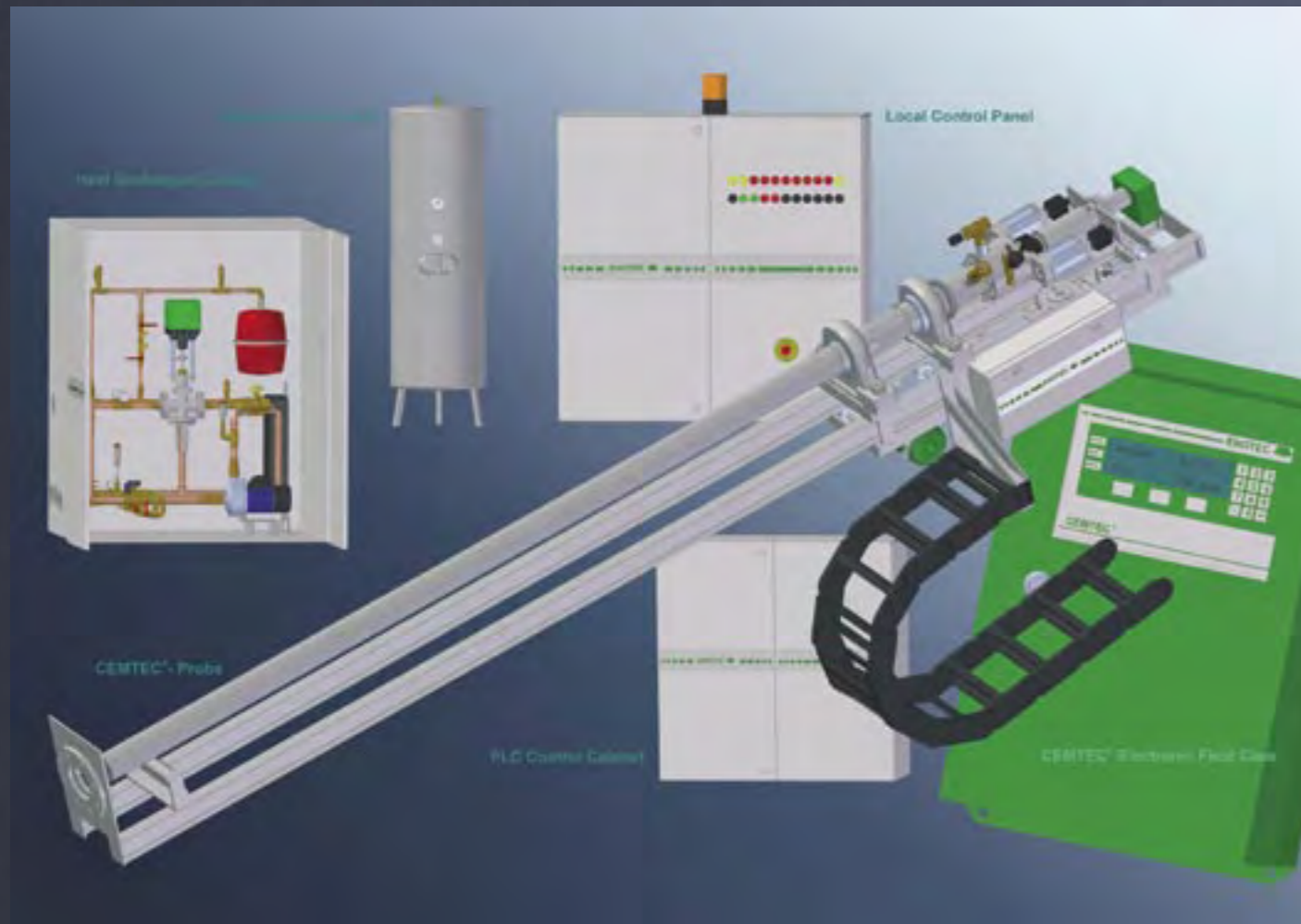


CEMTEC® - The System Configuration

The whole system consists of following components:

- The InSitu measuring probe with an automatic retracting device, dust filter and compressed air blow back unit
- The CEMTEC® control cabinet with programmable control unit for probe purging, monitoring routines and water cooling
- The CEMTEC® Electronic Field Case to measure O₂ and CO_e
- The Local Control Panel
- The Heat Exchanger Cabinet

The system components, which are shown below illustrates the whole system. The process gas to be analysed is extracted from the cement rotary kiln into the InSitu probe to measure O₂ and CO_e. Additional dust free flue gas is available to provide other analyser measurements as required.



The CEMTEC®-InSitu probe system eliminates condensation in the sampling equipment by operating at high temperatures and from the continuous movement of the probe. Additionally, a highly effective automatic cleaning

system using pressurised air, ensures that the probe with its dust filter, and the gas channels remain clean. Dust deposits will be detected early and blow away.

Technical Data

Maximum flue gas temperature: 1400°C
 Maximum dust loading: Any concentration in a cement plant
 Type of fuel: Oil, Coal, Gas or other Fuels
 Probe length: 2000 mm up to 4500 mm
 Probe diameter: 120 mm
 Probe material: 1.4571, others on request
 Probe cooling: Water – Drinking Quality, others on request

Probe propulsion: Pneumatic
 Emergency retraction: Pneumatic
 Turning mechanism: +/-45° up to +/-90° Alternating Rotation

Gas analysis: O₂/CO_e InSitu measurement
 SO₂, NO_x, CO₂ etc. for extractive sampling analyser use

Measuring range: 0-2% O₂ up to 25% O₂
 0 – 500 ppm CO_e to 0 – 10,000 ppm CO_e
 Oxygen +/- 0.2% of reading, min. 1 ppm O₂
 CO_e (Combustibles) +/- 2 % of reading or max. +/- 25 ppm CO_e

Signal output: 2 x 4-20mA (Isolated)
 Potential free contacts: Limit values and alarms
 Cooling water: 100-300 l/h
 Water quality: Ordinary drinking water quality
 Compressed air: 4-6 bar, dry & oil free
 Power Supply: 115 V – 230 VAC 50/60 Hz
 Ambient temperature: + 5°C to 50°C, others on request
 Total weight: 1,2 t
 (depending on probe length and options)

Detectable gases: O₂

CO_e

H₂O

SO₂

CO₂

NO_x

HCL



Headquarter:

ENOTEC GmbH
 Höher Birken 6
 D-51709 Marienheide
 Germany
 Tel.: +49 22 64-4578-0
 Fax: +49 22 64-4578-31
 E-mail: info@enotec.de
 www.enotec.de
 www.enotec.com

(and 50 International Distributors)

ENOTEC Inc.
 6206 Sandy Ridge Circle NW
 North Canton
 OHIO 44720 - 6686
 USA
 Tel.: +1 330 498 0202
 Fax: +1 330 497 9802
 E-mail: enotec.inc@enotec.com
 www.enotec.com

ENOTEC UK Ltd.
 PO BOX 9026
 Dumfries
 DG1 3YH
 United Kingdom
 Tel.: +44 8703 500 102
 Fax: +44 8703 500 302
 E-mail: enotec.uk@enotec.com
 www.enotec.com

ENOTEC ASIA PTE. Ltd.
 Pasir Panjang Distripark
 Block 1
 #02-11 Pasir Panjang Road
 Singapore 118480
 Tel.: +65 6100 2188
 Fax: +65 6399 2780
 E-mail: enotec@singnet.com.sg
 www.enotec.com

CEMTEC® is registered trademark of ENOTEC GmbH

ENOTEC policy is one on continuous product improvement, and therefore, reserves the right to change specifications and information as required without prior notice.

W104-05

CEMTEC® Multicomponent- InSitu-Analyser System



Maximum Efficiency and Supreme Quality
for the World Market

ENOTEC

CEMTEC® The World's First InSitu High Temperature O₂ & CO_e (Combustibles) Probe for Cement Plant Rotating Kiln Inlet

The continuous measurement of oxygen and combustibles in cement plants has always been a challenge for any type of analyser probe. Up to now, it's been nearly impossible to extract measuring gas for continuous analyser systems, because of the severe dust and wet particulate conditions. This makes any InSitu device inoperative because the probe becomes "cemented over and sealed" very quickly, resulting in extremely high maintenance costs and kiln production down time.

Now ENOTEC has solved these special analysing problems in

Measuring principle of the ZrO₂-sensor for O₂ measurement

The mV signal produced by a temperature-stabilised Zirconium cell indicates the amount of oxygen concentration. Measurement is made direct and InSitu, i.e. the measuring cell is inside the flue gas duct at the end of the CEMTEC® probe.

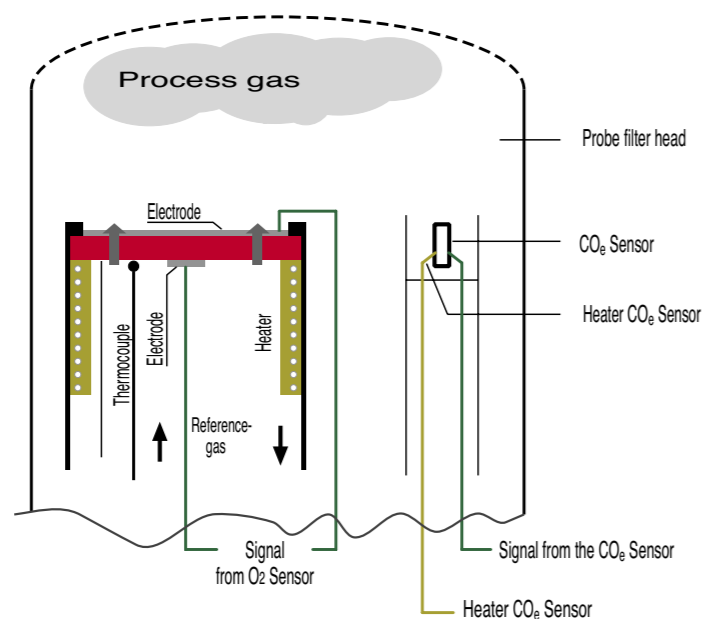
The measuring cell consists of a small zirconium-oxide disc, which is coated with porous layers of platinum on both sides and soldered with a gas-tight seal into the end of a steel tube cell holder. The temperature of the measuring cell is stabilised by a built-in heater whose temperature is kept constant by a temperature controller. At a constant measuring cell temperature the mV-output of the cell correlates - in accordance to the Nernst equation - with the O₂ content.

the cement industry with the new analyser system called CEMTEC®. Now Cement plants are able to significantly reduce their maintenance costs to a fraction of their previous costs.

Mounted in a water-cooled outer jacket, the measuring probe is continuously turning +/- 90°. This keeps the gas inlet area free of cement and prevents the dust build up on the probe filter. Additionally, a highly effective automatic cleaning system using pressurised air, ensures that the probe with its dust filter, and the gas channels remain completely clean and clear.

Measuring principle of the Ga₂O₃-sensor for CO_e measurement (CO_e = total combustibles)

In general, a metal oxide sensor consists of an active layer, who's resistance changes when exposed to the gas being measured. This change of resistance is detected by electrodes and is proportional to the CO_e concentration. This unique semiconductor gas sensor is operated at high temperature, approx. 750°C. Ga₂O₃ sensors show faster response times and lower cross sensitivities than other sensors. Additionally, Ga₂O₃ based sensors show stable long-term sensor properties even in flue gases containing sulphur and dirt. Furthermore, the sensor has an excellent measurement performance and repeatability.



Probe filter head

CEMTEC® System Components

The CEMTEC®-Probe with insertion, retracting and rotating device

The water-cooled InSitu probe serves as an automatic and continuous sensor in hot, aggressive and dust-laden flue gas from rotary kilns and comparable installations.

The InSitu probe measures oxygen using a ZrO₂ cell and uses a Ga₂O₃ sensor to measure the CO_e concentration. The system provides two continuous measuring signals with a response time less than one second and a T90 time of five seconds. In addition, it is also possible to extract approximately 60 l/h flue gas for an extractive type flue gas analyser (SO₂, NO_x, etc.).

The InSitu probe comprises:

- the measuring chamber behind a sintered metal filter
- the cooling protection tube with cooling water return
- the air pressure connections for the purging device
- the sensors for O₂ and CO_e measurement
- the pneumatic drive for pushing, turning and traversing

The InSitu probe is mounted inside a cooling protection tube. The patented, continuous turning of the probe prevents both, the deformation of the cooling protection tube due to thermal impact, filling of the rotary kiln, and the



The dust filter with the tip of push plate



The CEMTEC®-terminal box with the pneumatic devices of the probe

sealing of the probe. The mounting flange is the mechanical connection between the measuring probe and the rotating kiln inlet.

The great advantage, compared to all other measuring systems, is the patented pushing device, which moves the dust filter with its butt plate axial, inside the cooling protection tube, so that deposits at the opening can be blasted. Therefore the interruption of measurement value recording, because of air pressure purging, can be reduced substantially.



The tip of push plate inside the cooling protection jacket



CEMTEC® benefits at a glance:

- Fast responding InSitu O₂ and CO_e analysis
- Precise measured value with proven InSitu sensors
- High reliability by monitoring of all system parameters
- Automatic calibration
- Cost reduction resulting fewer components
- Low maintenance costs by automatic self cleaning
- Reduction of process downtime
- Closed loop control of any air fuel ratio requirement
- Reduced fuel costs by optimising the excess air
- Consistently high product quality by optimising the firing process temperature
- Lowest environmental impact of emissions through better combustion efficiency



Heat Exchanger Cabinet



ENOTEC