



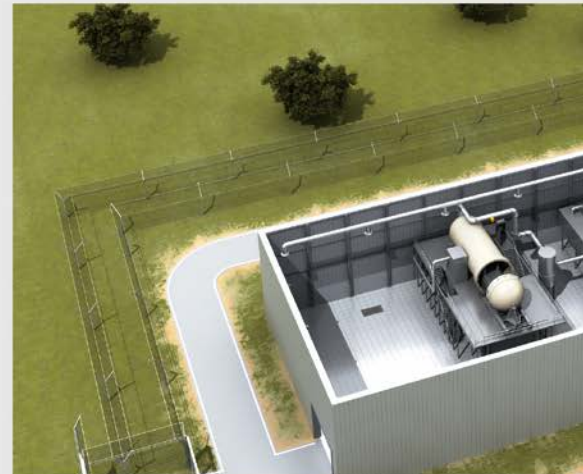
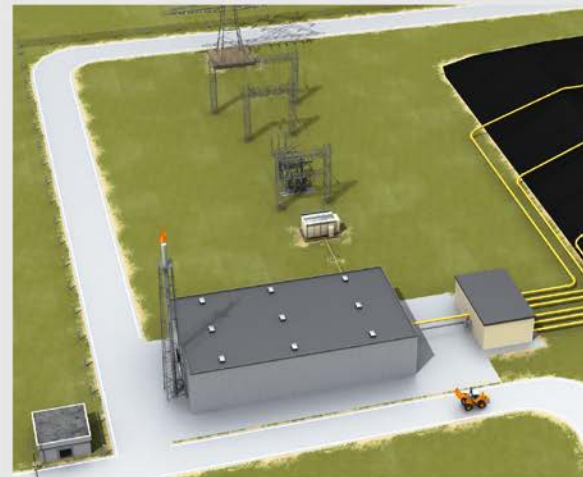
Waste & Recycling Industry

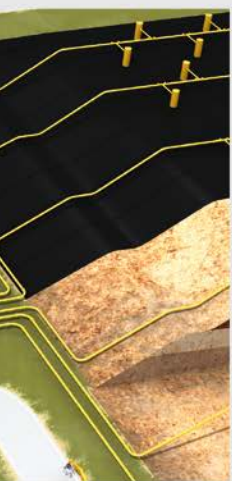
IN AN EXCELLENT POSITION TO FACE THE FUTURE.

SICK
Sensor Intelligence.



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TASKS IN THE WASTE AND RECYCLING INDUSTRY

Waste recycling is becoming increasingly important as more and more energy is being gleaned from waste components during incineration. During this process, the emissions released are subject to strict limits. For example, the limits laid down in the European Waste Incineration Directive (WID) 2000/76/EU apply to waste incineration plants. SICK analyzer systems are used for incineration optimization, during gas purification processes, in order to continuously monitor emissions. SICK offers a full range of measuring technology and data evaluation from a single source.



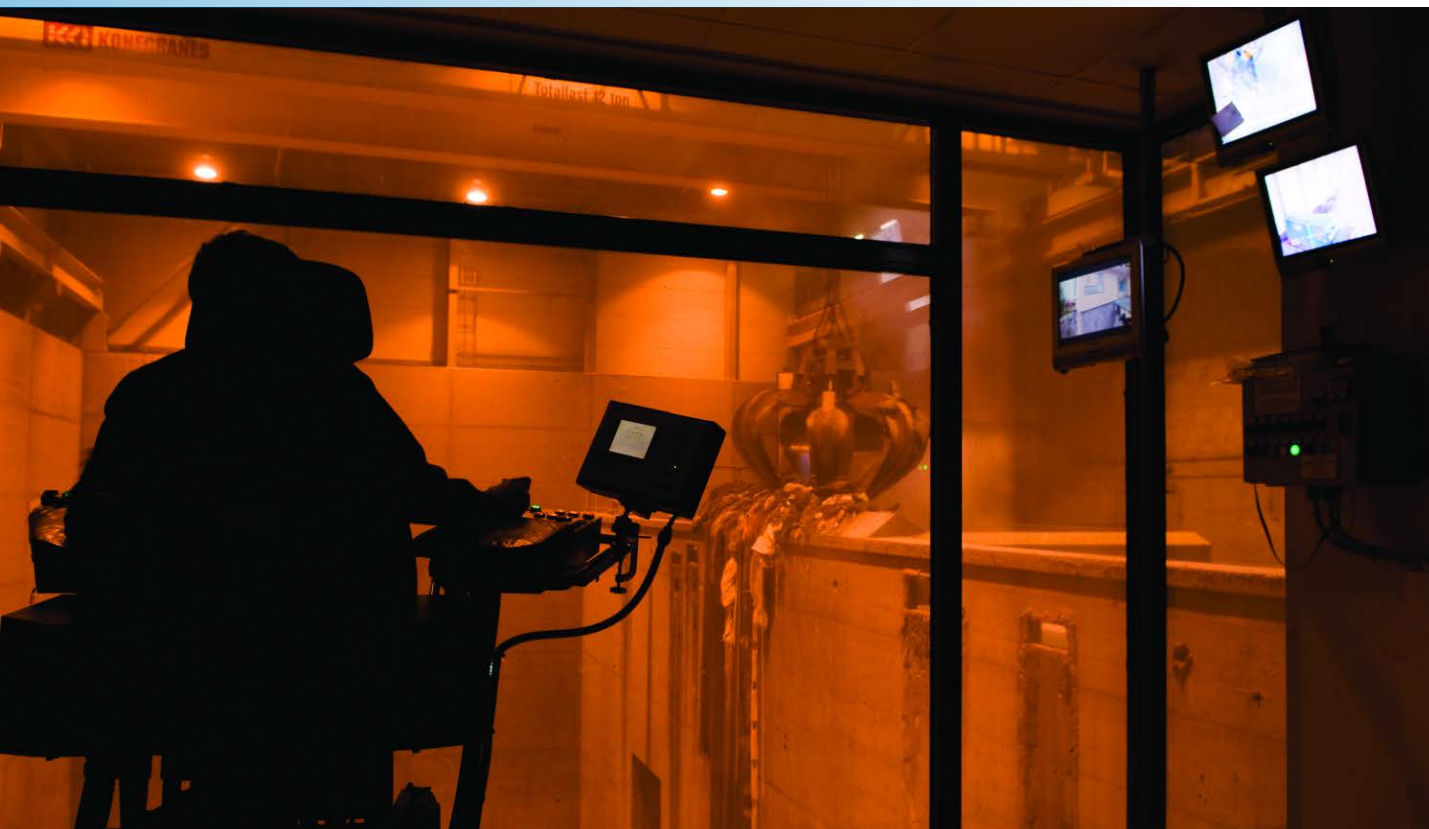
Emissions monitoring

The regulatory requirements for emission monitoring and reporting are becoming more stringent in nearly every country in the world. SICK analyzers and system solutions monitor and check emission limit values, contaminant emissions and the release of other substances into the environment.



Flue gas treatment

Scrubbers, catalytic reactors and particulate filters all remove gaseous pollutants from the flue gas. Process gas analyzers provide real-time measurement to optimize removal efficiency. This leads to significant savings of material and to less maintenance for plant operators.



Plant safety

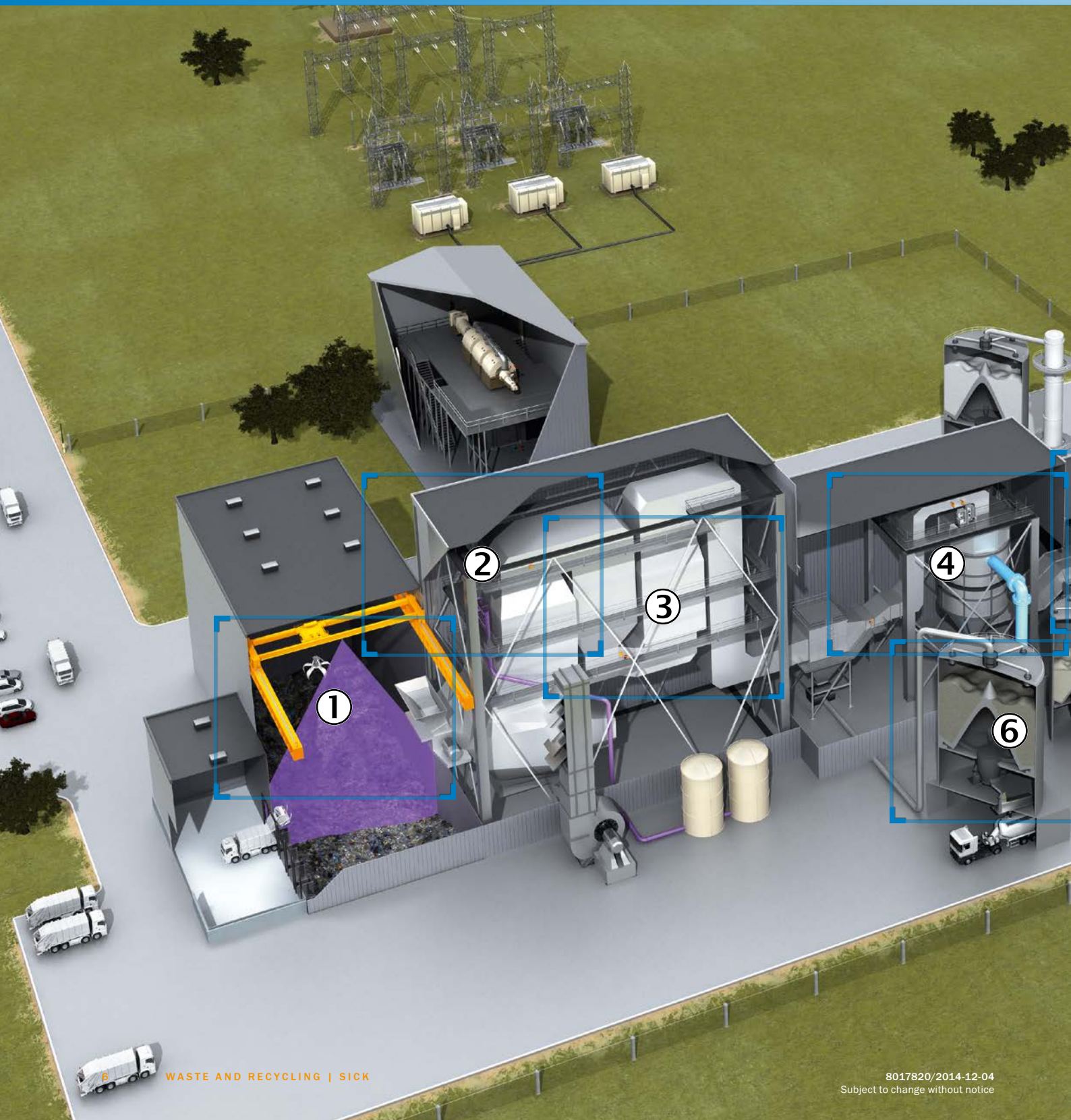
Gas analyzers, dust monitors and level sensors ensure plant operation and safety. They monitor e.g. biomass bunker. SICK sensors monitor electrostatic precipitators, bag filters and control the stock of necessary reagents.

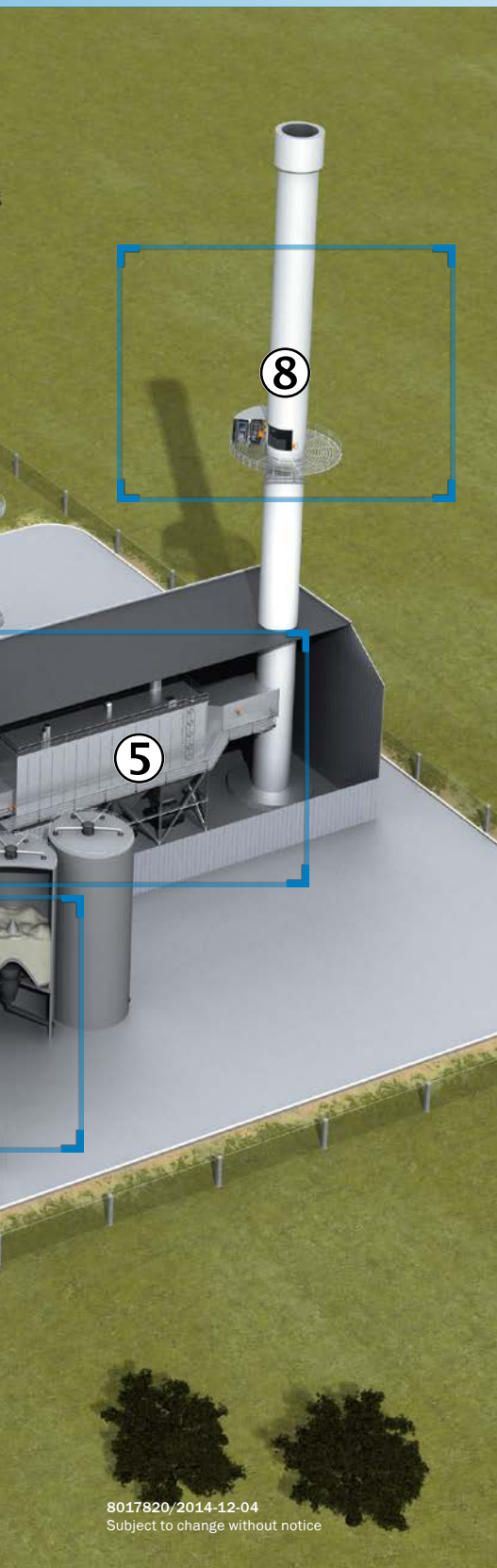


Service

Competent consulting, qualified planning support, detailed project planning and engineering, installation and start-up – SICK provides all of these services by its own personnel. SICK also provides service support of equipment.

APPLICATIONS IN FOCUS WASTE INCINERATION PLANTS (WASTE TO ENERGY)





Waste incineration plants (waste to energy)

This also includes hazardous waste and sewage sludge incineration plants and the incineration of hospital waste.

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① Level measurement and crane operation in waste bunkers

The LMS511 2D laser scanner quickly detects changes to peaks in bulk materials. This makes it possible to measure the heap much more accurately; improving the working procedure and performance of the crane system.

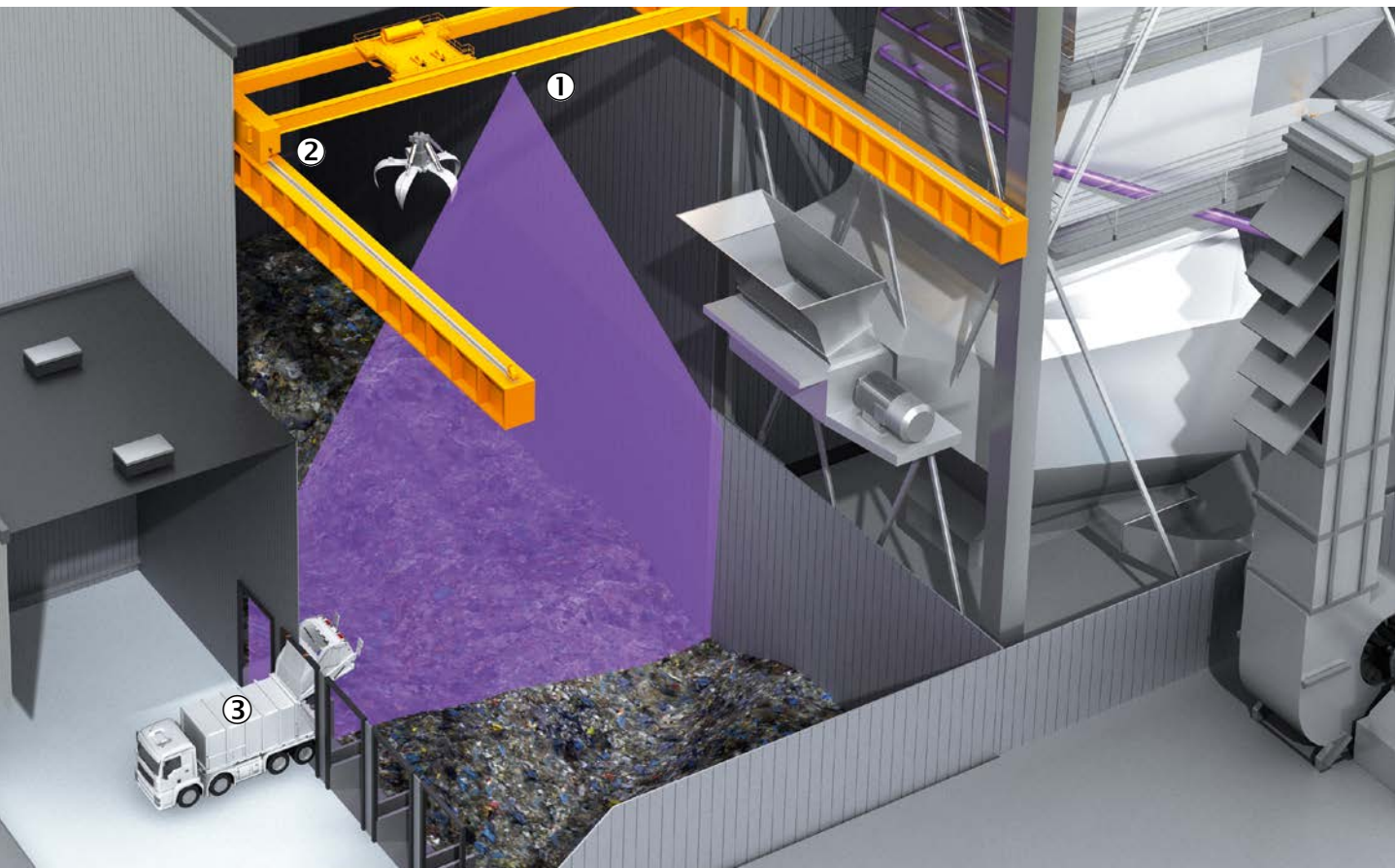


② Industrial crane positioning in waste bunkers

Two DL100 Pro long range distance sensors are installed per crane. The sensors ensure exact positioning of the crane and crane trolley, and prevent them from colliding with the walls of the waste bunker. Their durable construction, in connection with laser measurement, guarantees high availability with minimum maintenance required. By installing two parallel sensors it is also possible to monitor the synchronization control of the industrial crane.

Under these harsh ambient conditions, the KH53 linear encoder can also be used as an alternative for the purpose of industrial crane positioning.





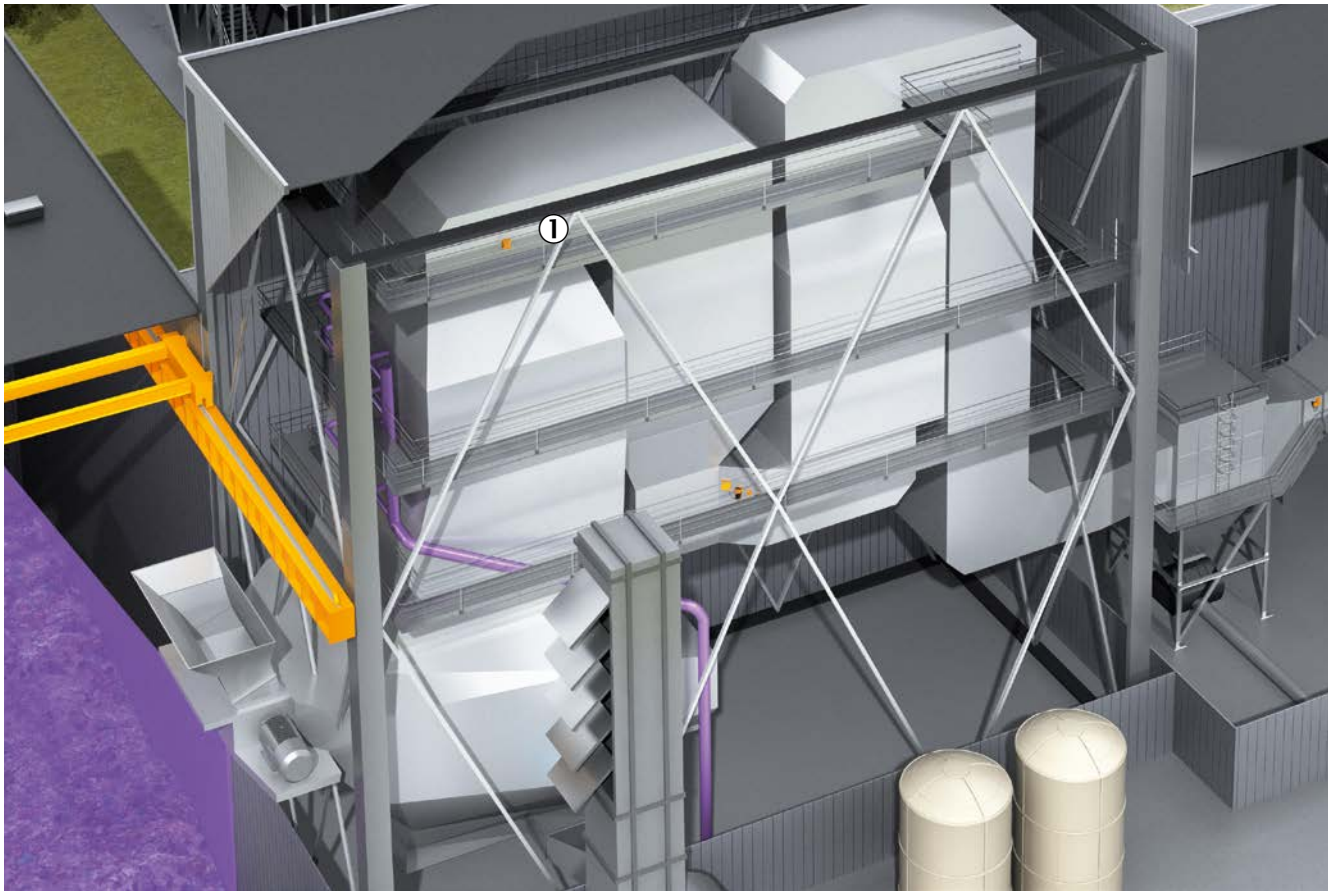
③ Garbage truck gripper positioning

Today, the process of collecting and emptying industrial and household waste containers is already partially automated. This is possible with the help of the LMS111 laser scanner from SICK. The laser scanner offers the necessary resolution and scanning precision to support 3D gripper positioning and loading onto the truck. With enclosure rating IP 67 and double-echo technology, the LMS111 can also be used under poor weather conditions.

It monitors the working areas of the gripper before, during, and after container emptying. Additionally, for garbage truck identification and automatic gate opening, the RFID device RFU620 can be used.



LMS1xx → p. 76
RFU62x → p. 79



Incineration optimization

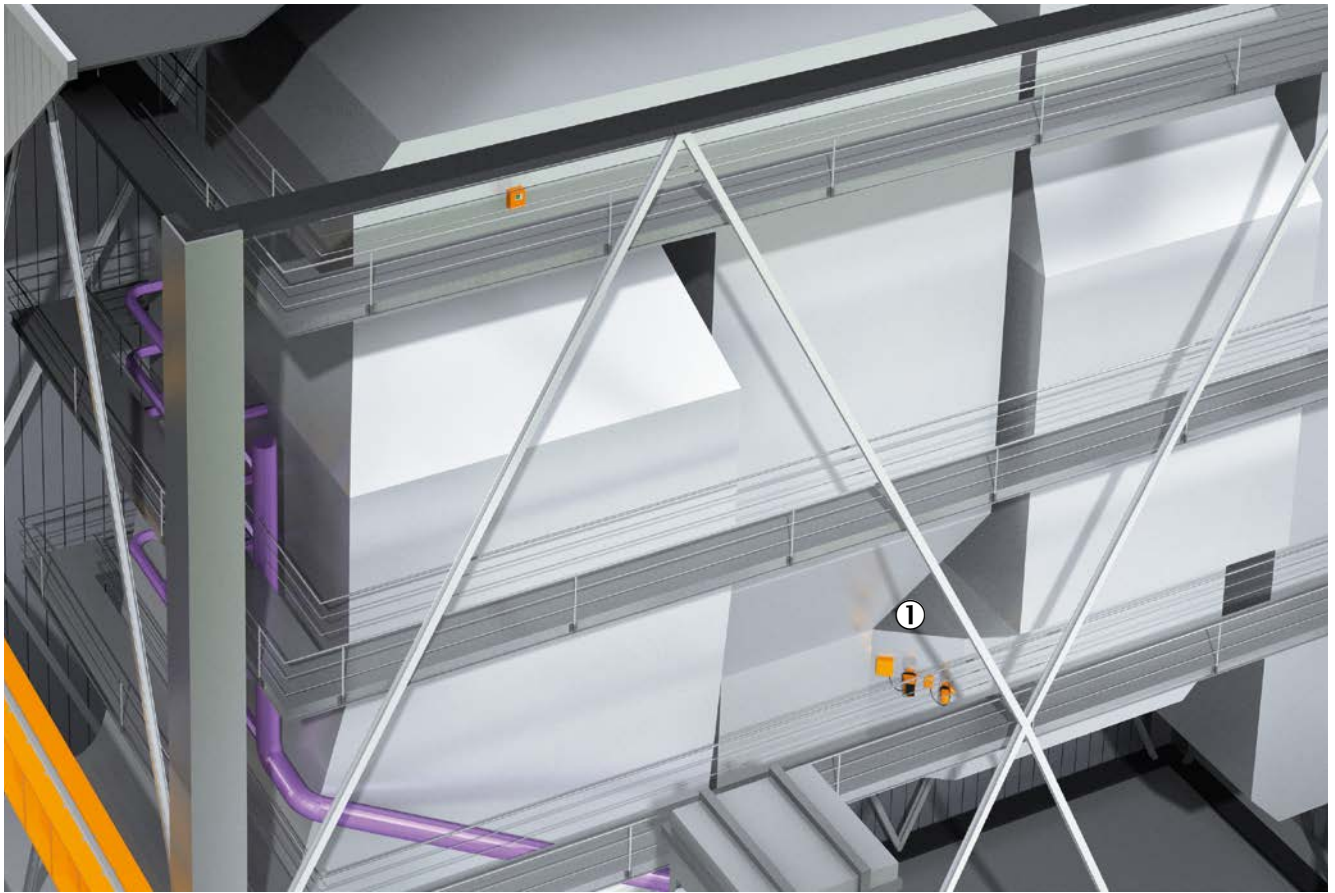
Incineration processes require O_2 , which chemically reacts with the fuel. Measurement of the O_2 concentration at the combustion chamber outlet is an important variable when it comes to optimizing incineration, which is regulated by feeding in primary and secondary air.

① Monitoring incineration efficiency (O_2) in waste incineration plants

The ZIRKOR302 in-situ gas analyzer is used to measure O_2 . It quickly, reliably, and continuously measures the oxygen concentration during incineration. This allows optimal regulation of oxygenation from primary and secondary air, achieving permanent monitoring for the purposes of combustion optimization.



ZIRKOR302 → p. 64



① Operation of an SNCR denitrification system (selective non-catalytic reduction)

For gas purification through selective non-catalytic reduction, ammonia or an aqueous urea solution is directly injected behind the combustion chamber at a temperature of 900 to 1100 °C. This causes the nitrogen oxides to react with the ammonium compounds and turn into nitrogen and water. This reduces NO_x emissions. At the combustion chamber outlet, the GM32 continuously measures NO , and the GM700 measures NH_3 slip.

At low NO and CO concentrations, the MCS100E HW can also be used for this process application.

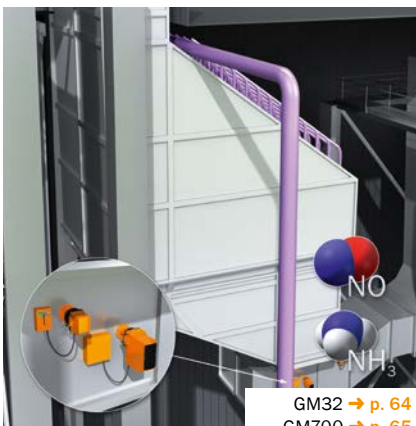




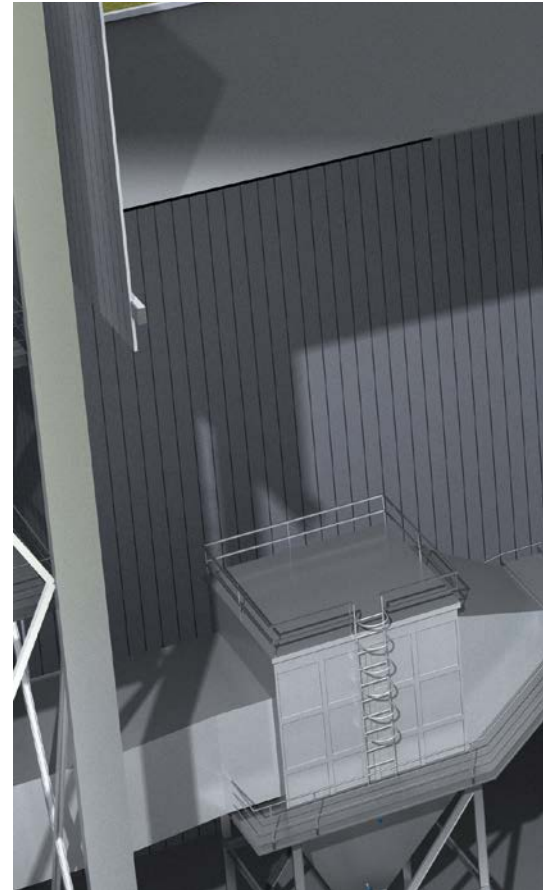
② Operation of an SCR denitrification system (selective catalytic reduction)

Selective catalytic reduction removes nitrogen oxides (NO) from flue gases with the aid of a catalyst and the injection of aqueous ammonia. NO is converted into water and nitrogen at 200 to 400 °C. At the catalyst inlet, the NO concentration can be measured in order to regulate the quantity of ammonia. At the catalyst outlet, NO and NH₃ are measured.

The NH₃ concentration, in connection with the NO concentration, determines the efficiency of the denitrification process. The GM700 continuously measures what is called “NH₃ slip” in-situ.



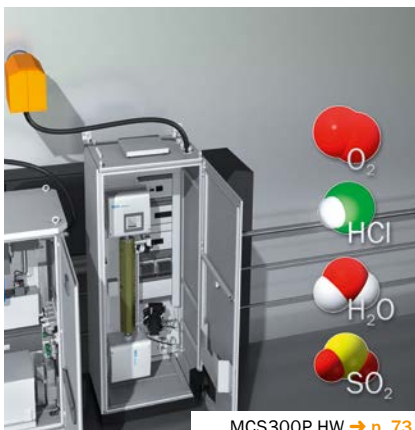
GM32 → p. 64
GM700 → p. 65



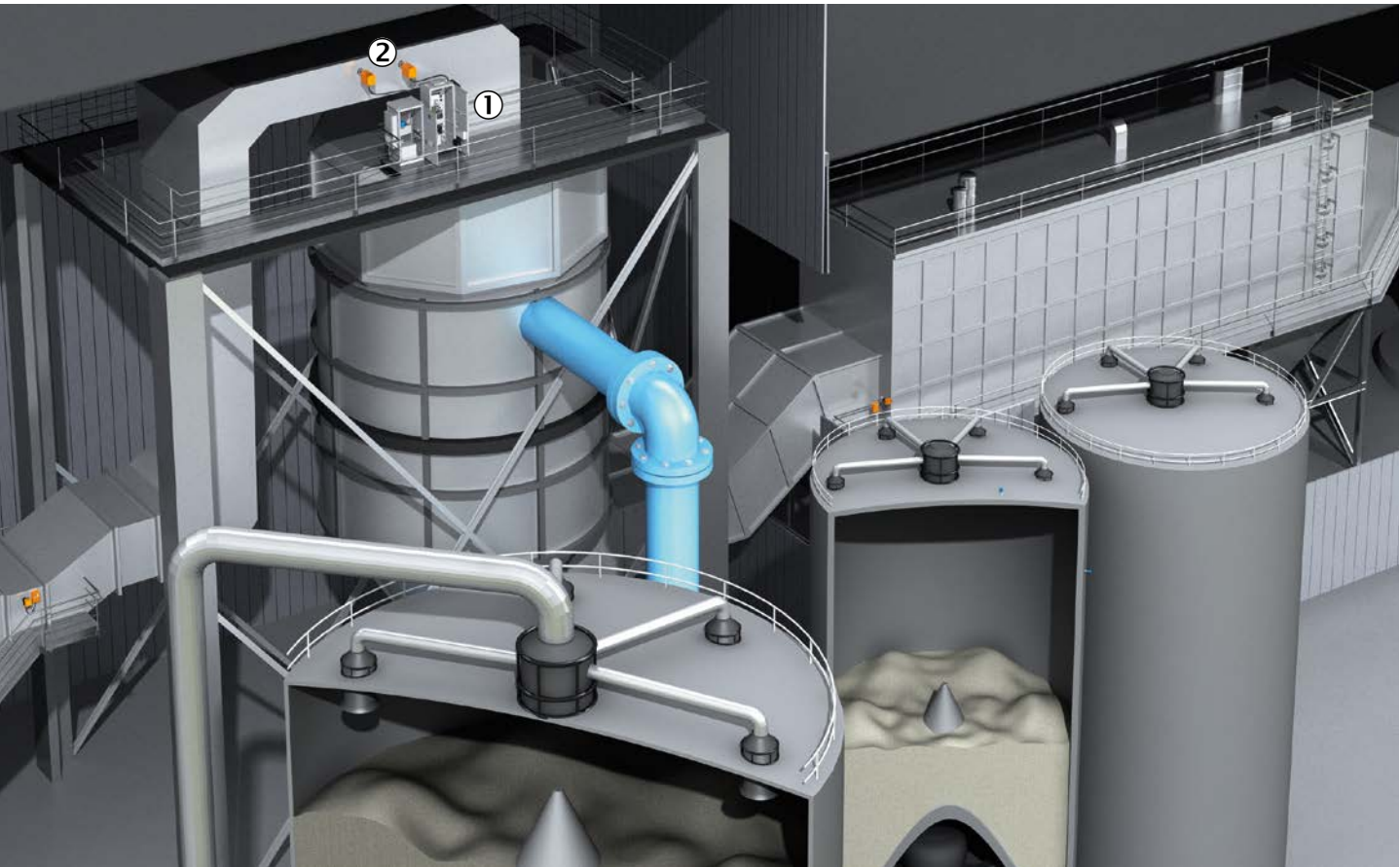
① Process measurement at flue gas scrubber inlets

Flue gas scrubbers reduce HCl and SO₂. Wet scrubbers spray a cleaning solution into the scrubbing tower, counter-current to the gas. In the case of the dry scrubbing process, lime powder or milk of lime is used. In order to then remove any heavy metals and organic pollutants, activated carbon is added during dry absorption. The MCS300P HW simultaneously measures the SO₂, HCl, H₂O, and optionally the O₂ components.

These measurements can help to significantly reduce the consumption of reagents, thereby lowering operating costs. Peaks in concentration can also be quickly and reliably recorded.



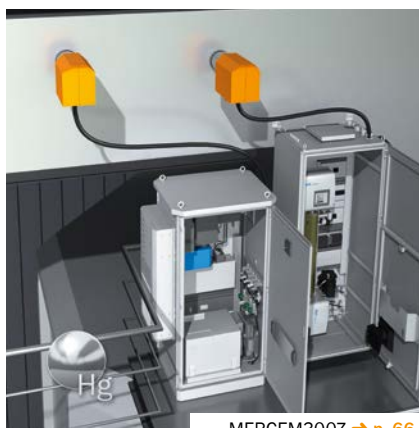
MCS300P HW → p. 73



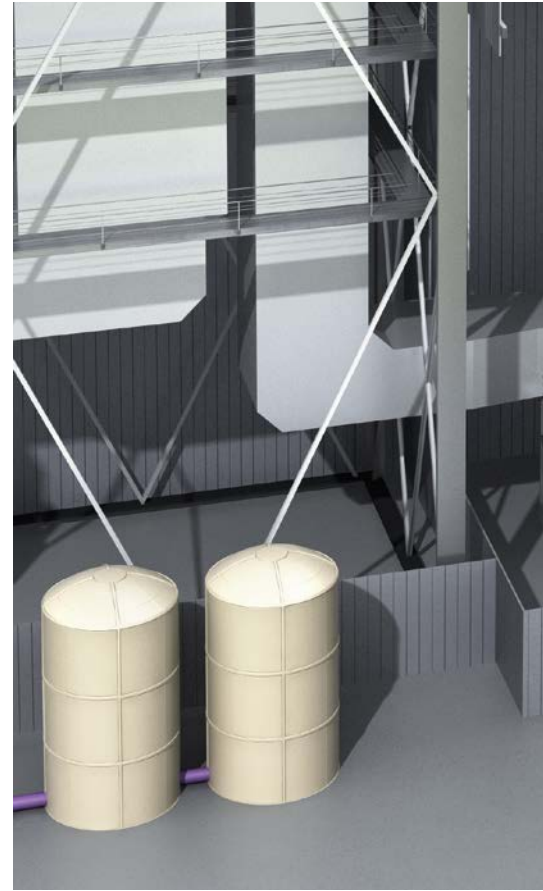
② Monitoring mercury separation in the scrubber

The purpose of the mercury process measurement is to monitor high Hg concentrations (Hg and HgCl_2) when incinerating waste of unknown composition. If the gas purification system is overloaded with very high Hg concentrations ($>3000 \mu\text{g}/\text{m}^3$), counter measures must be promptly taken in order to ensure that emissions thresholds are respected.

Due to the new measuring method with Zeeman measuring technology, this can be done using the MERCEM300Z in a safe and low-maintenance manner, without cross-sensitivity, even at higher SO_2 concentrations in the raw gas.



MERCEM300Z → p. 66



① Filter monitoring during dedusting with electrostatic precipitators or fabric filters

The flue gas is dedusted using electrostatic precipitators and/or fabric filters. In addition to dust, the fabric filter also separates out bicarbonate and activated carbon during dry flue gas purification. The dust concentration can be monitored behind the dust filter, but must be monitored at the emissions measuring point on the stack.

The DUSTHUNTER, which uses laser diodes to take measurements following the scattered light method, is suitable for this purpose. The measuring conditions and dust concentration will determine which DUSTHUNTER should be used.



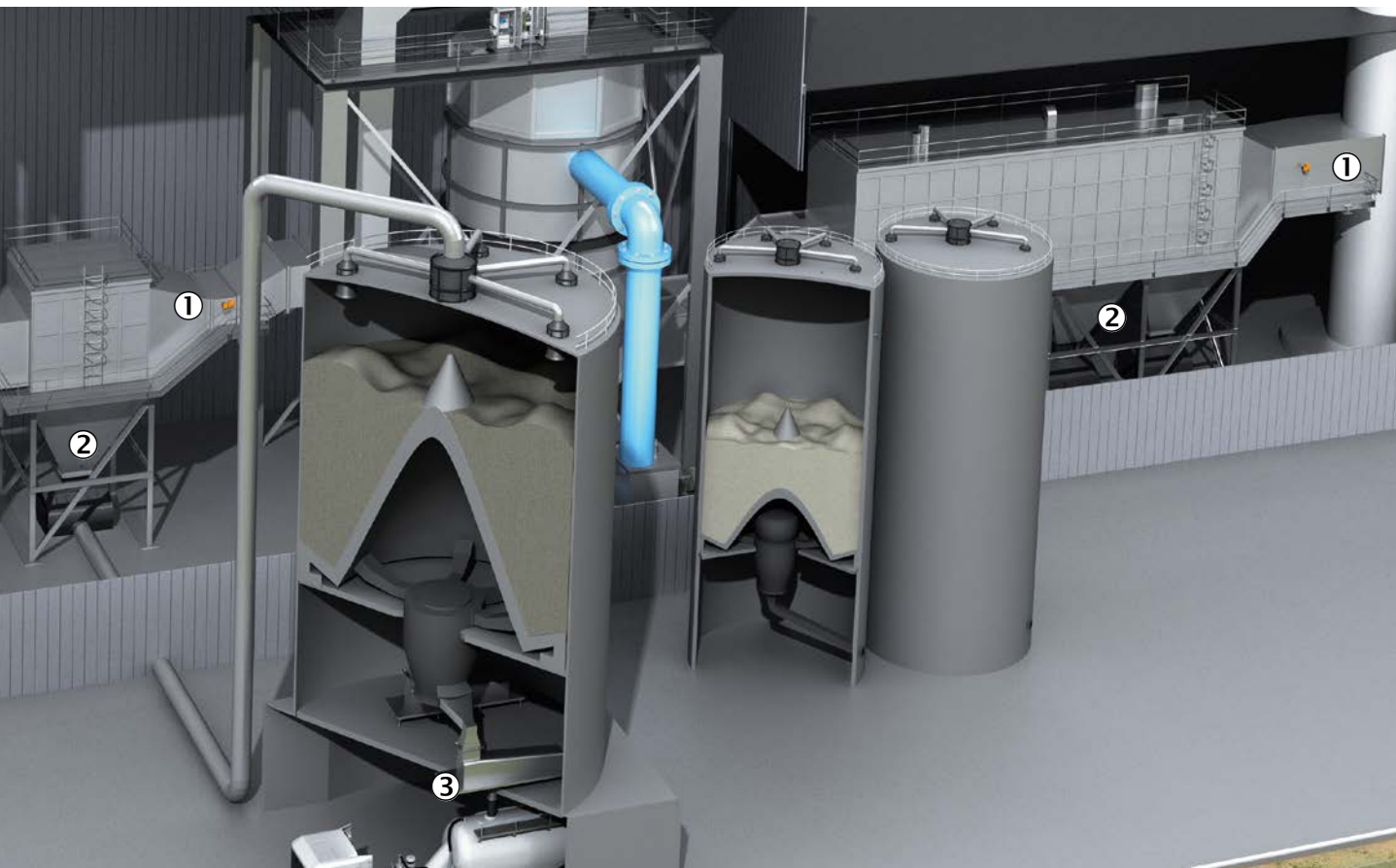
DUSTHUNTER SB50 → p. 69

② Ash hopper level monitoring

The dust particles which pass through the bag filter are collected on the surface of the bag filter. The fly ash is shaken off and falls into the collection hopper. In order to determine whether the hopper is full, point level measurements are taken. The particularly rugged LBV310 vibrating level switch is ideal for this purpose. It operates with no mechanical moving parts, and is immune to deposit formation.



LBV3xx → p. 79



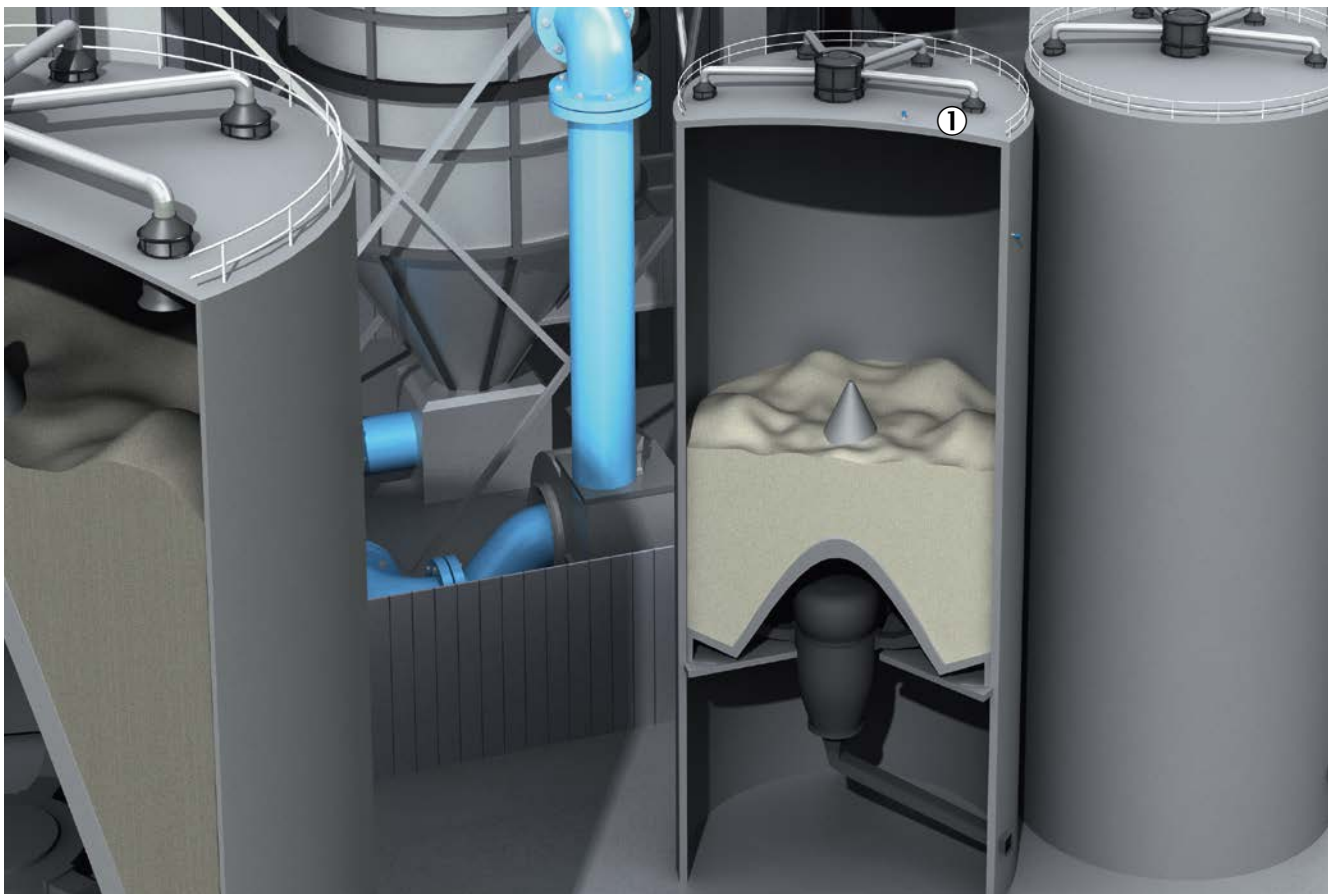
③ Positioning the fly ash transporter for filling

The fly ash is removed from the collection hoppers and transported by truck to the landfill site. Sensors ensure that the loading hose is correctly positioned and that no fly ash ends up in the surrounding area during loading. The LMS511 2D laser scanner determines the position of the truck under the collection hoppers. This high-performance and efficient 2D laser scanner is suitable for measuring ranges of up to 80 m. The rugged housing with enclosure

rating IP 67 protects the sensor against harsh weather conditions and the large amount of dust deposit that builds up when loading the ash.

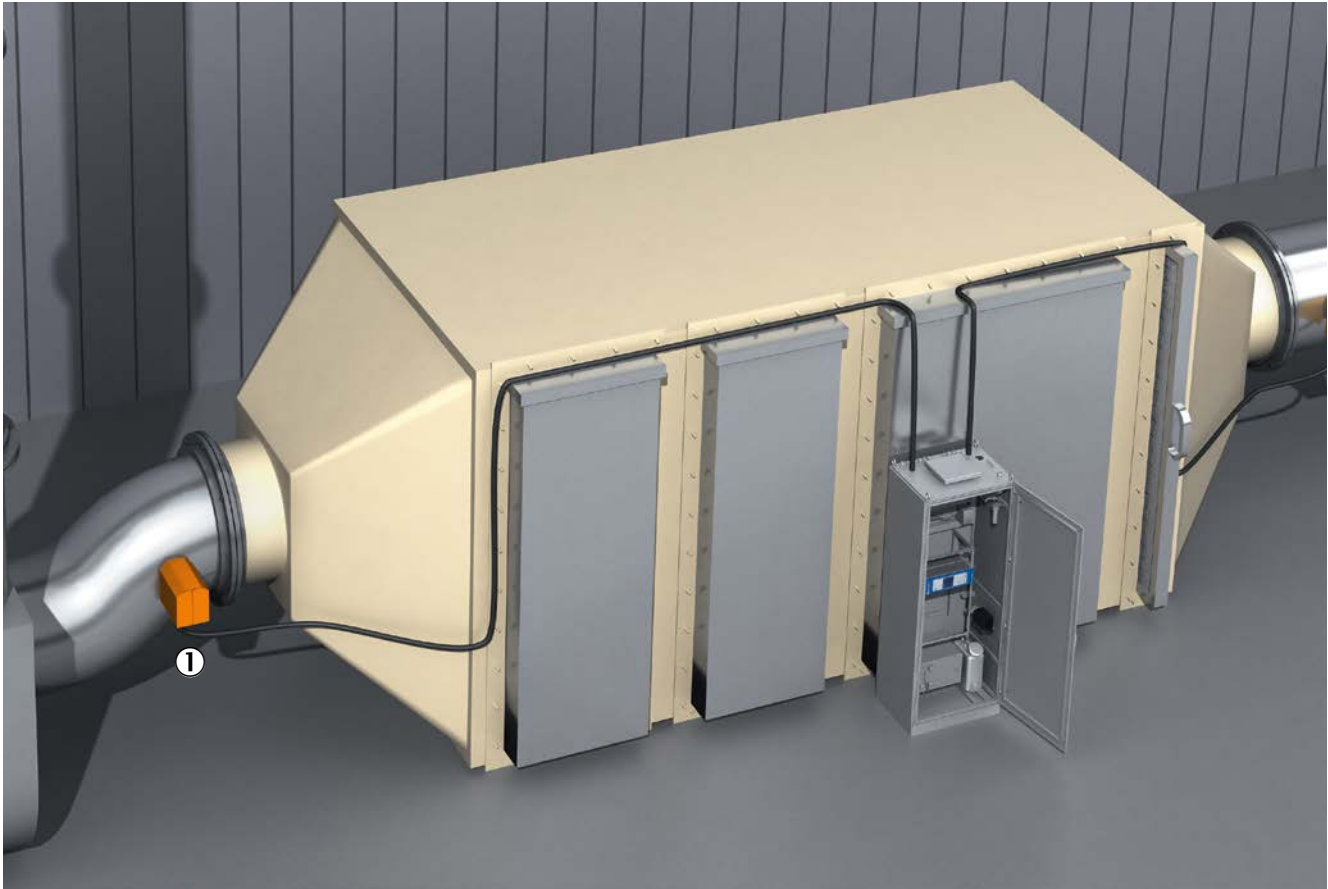


LMS5xx → p. 77



The LBV311 vibrating level switch monitors the level of solid bulk materials such as bicarbonate, lime, or activated carbon. For liquid reagents such as aqueous ammonia and milk of lime, the LRV311 vibrating level switch is the ideal solution. The tuning fork in these sensors always accurately records the level of each of the reagents regardless of the silo construction or tank material used.





① **Delta CO measurement at the activated carbon filter**

Delta CO measurement can prevent fires in the activated carbon filter bed. The MKAS Twin multi-component analyzer system with the SIDOR modular gas analyzer is ideal for this purpose. In the case of newer systems using dry or semi-dry flue gas cleaning, the activated carbon is added at the same time as the other materials. This means that such monitoring is usually no longer necessary.



SIDOR → p. 66
MKAS → p. 74

Emission measurement

In the stack, the pollutants HCl, HF, CO, NO_x (NO and NO₂), SO₂, NH₃, TOC, dust, and the reference values gas velocity, pressure, temperature, O₂, and H₂O are continuously measured. In some countries, such as Germany, continuous measurement of the total mercury content is also required. In order to further process this information and transmit it to the authorities, the measured values are transferred to a data acquisition system.

The measurements must be taken in accordance with the relevant regulations, such as those laid down in the EU Waste Incineration Directive (WID) 2000/76/EC, transposed in Germany by the 17th German Federal Emission Protection Directive (BImSchV).



① Continuous emissions monitoring of all pollutant components in exhaust gases

The MCS100FT can continuously measure the following components using one single extractive heated gas sample: HCl, CO, NO_x as the sum of NO and NO₂, SO₂, NH₃, O₂, H₂O, CO₂, TOC, and HF. If regulations do not request HF as a measuring component, the MCS100E HW is sufficient. In this case, too, one single heated gas sample is all that is needed. For normalization, the pressure and temperature parameters are also measured.

QAL3 check can be performed using the certified internal filter function without calibration gas.



② Monitoring of dust emissions

Dust can be measured extractively in the case of moist exhaust gases, or continuously in-situ under dry stack conditions. SICK has a fitting solution for both applications. For the standard application with dry flue gas (above the acid dew point), a DUSTHUNTER S (scattered light measurement principle) is best suited. In the case of wet flue gas (under the acid dew point), the FWE200 is used.





Here, the gas to be measured is removed from the stack superisokinetically, heated to above the acid dew point, and continuously measured. In some markets (e.g., Hong Kong, China), not only dust concentration, but also opacity is continuously measured using the DUSTHUNTER T.

③ Monitoring mercury in emissions

The MERCEM300Z extractive gas analyzer has the smallest certified measuring range of all measuring systems suitability tested in accordance with EN 15267-3, with a range from 0 to 10 $\mu\text{g}/\text{m}^3$ total mercury content. It is also suitable for continuously monitoring the annual threshold of 10 $\mu\text{g}/\text{m}^3$, which is set to come into force in future.

The greatest advantage of the MERCEM300Z is that it transforms oxidized mercury into metallic mercury without the addition of chemicals or converters, which significantly reduces the amount of maintenance required in comparison to all other measuring systems. This system is the only certified measuring assembly that can be operated with a heated sample gas line of a maximum of 35 m.



MERCEM300Z → p. 66

④ Gas flow measurement in the stack

The FLOWSIC100 volume flow measuring device continuously measures gas flow in the stack with no contact needed. The device requires minimal maintenance due to the ultrasonic technology used. Ultrasonic measurements are particularly reliable because the volume flow is measured over the entire stack cross-section. High quality of measurement is key, as pollutant concentrations are given in relation to the volume of flue gas measured and are indicated in kg/h. This is a legal requirement under the applicable EU standard (WID 2000/76/EC) which all Member States of the EU must implement.



FLOWSIC100 → p. 74



Space-saving solution for measuring dust, flow, pressure, and temperature

With the CP100 combined probe, dust, flow, pressure, and temperature can be measured in the stack with minimal usage of space. This solution involves installing a DUSTHUNTER SP100 (scattered light method), a FLOWSIC100 PR (ultrasonic measuring principle as a probe), and a PT100 temperature sensor and pressure sensor on a combination flange (DN250 PN6). This renders additional couplings or flanges unnecessary.

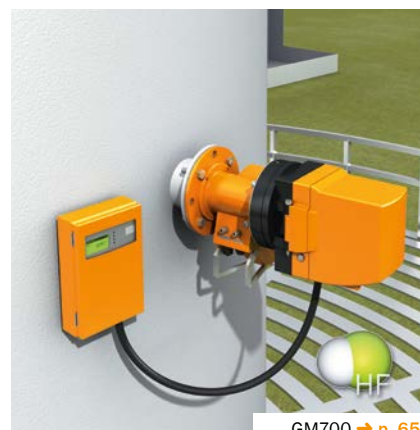
This space-saving solution especially proves its worth where redundant design of the measuring devices is required.



Combiprobe CP100 → p. 71

Single in-situ measurement for HF emissions monitoring

The GM700 in-situ gas analyzer with TDLS laser technology (Tunable Diode Laser Spectroscopy) is used for taking single HF measurements. The gas analyzer has been suitability tested in accordance with EN 15267-3. It should preferably be used for retrofitting HF measurement systems.



GM700 → p. 65



Emissions calculator

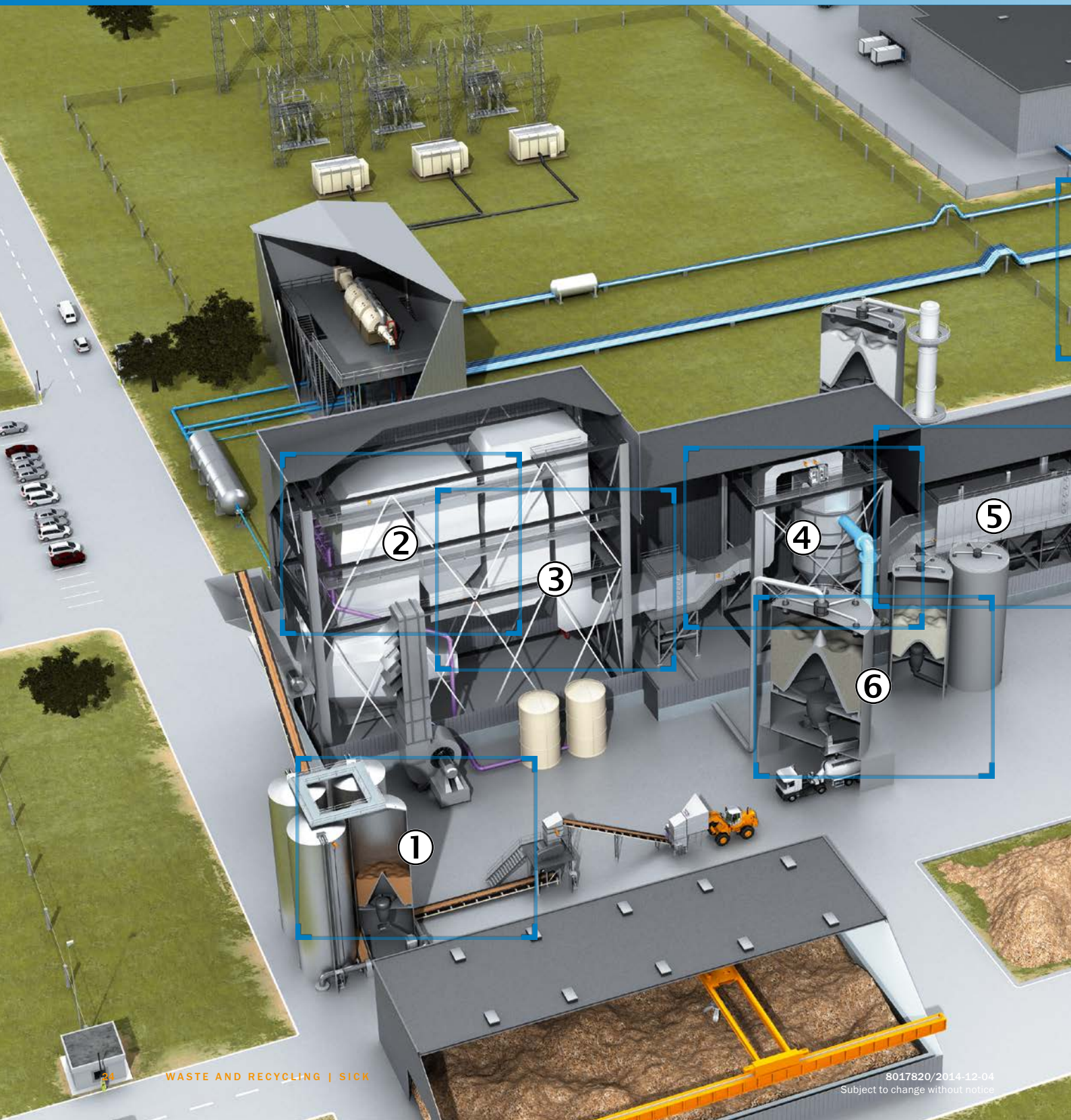
The MEAC emissions calculator is ideal for recording, saving, normalizing, analyzing, displaying, and forwarding a continuous flow of data. It is available in several different models, which perform reporting in accordance with the applicable local legislation. The MEAC is TÜV-tested and certified, and provides data analysis that takes into account QAL3 data on drift control, amongst other elements.

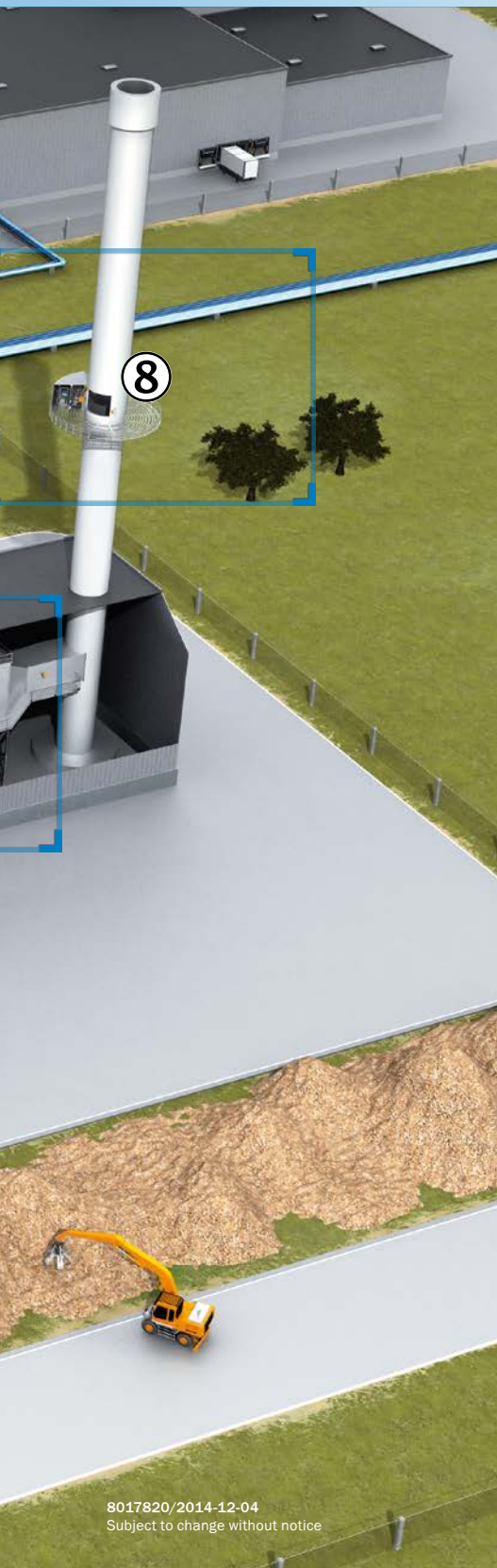
SICK also provides solutions involving the MEAC for redundant operation. For digital data transfer to the control system, all standard data transmission protocols are available: Modbus, PROFIBUS, and OPC. Wired, analog signal transmission is also possible.



MEAC → p. 73

APPLICATIONS IN FOCUS ORGANIC WASTE INCINERATION (BIOMASS TO ENERGY)





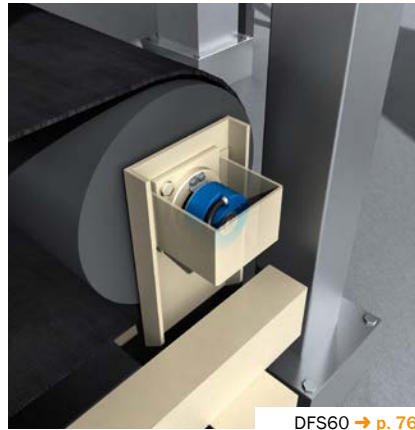
Organic waste incineration (biomass to energy)

The term biomass covers all kinds of organic compounds such as food and agricultural waste. This also includes contaminated wood waste, which may contain organic, halogenated compounds or metals.

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⑧ Emission measurement	

① Conveyor belt speed of the biomass belt in organic waste incineration

The conveyor belt speed at which the biomass is transported to the shredder and then to the storage location is very important when it comes to managing the material flow. The DFS60 incremental encoder calculates the speed and running direction of the belt. The DFS60 can either be configured via a PC or a separate programming tool, thus offering comprehensive programming flexibility for all industrial requirements.

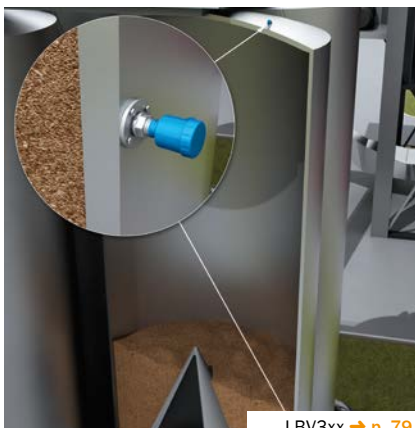


DFS60 → p. 76



② Overflow protection for biomass bunkers and silos (organic waste incineration)

Biomass is usually stored in silos until it is used as a primary fuel in the burners. In order to prevent the silos from overflowing, level measurement is necessary. The LBV310 vibrating level switch is the ideal choice for monitoring biomass levels due to its rugged construction, amongst other features. The LBV310 operates with no mechanical moving parts, and is immune to deposit formation.

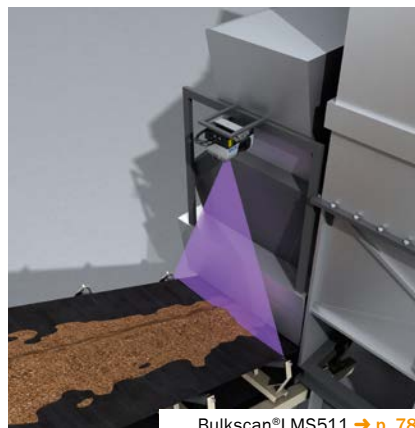


LBV3xx → p. 79

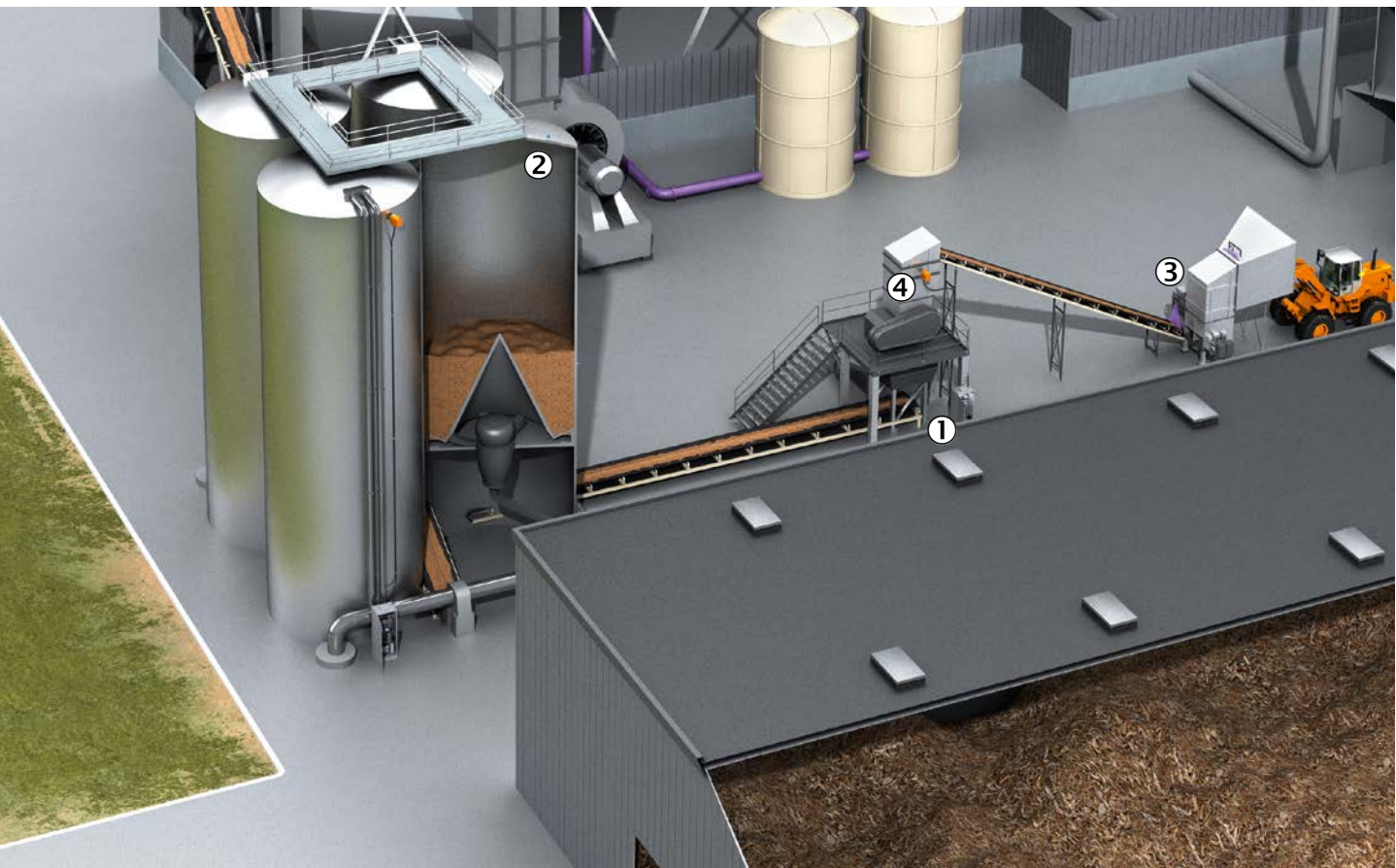
③ Conveyor belt control and shredder monitoring in organic waste incineration

Conveyor belts transport biomass from the waste heap to shredders or transfer stations. During this process, volume measurement systems regulate the rate at which biomass is fed to the shredders, optimize throughput, and reduce loading time. Using laser "time of flight" technology, the Bulkscan® LMS511 records the volume flow on conveyor belts with no contact required. The Bulkscan® LMS511 is particularly rugged, reliable, and wear-free.

The built-in center of gravity calculator maximizes transportation performance and detects one-sided or unequal loading of the conveyor belt. The advantages: reduced belt wear and lower maintenance costs.



Bulkscan®LMS511 → p. 78



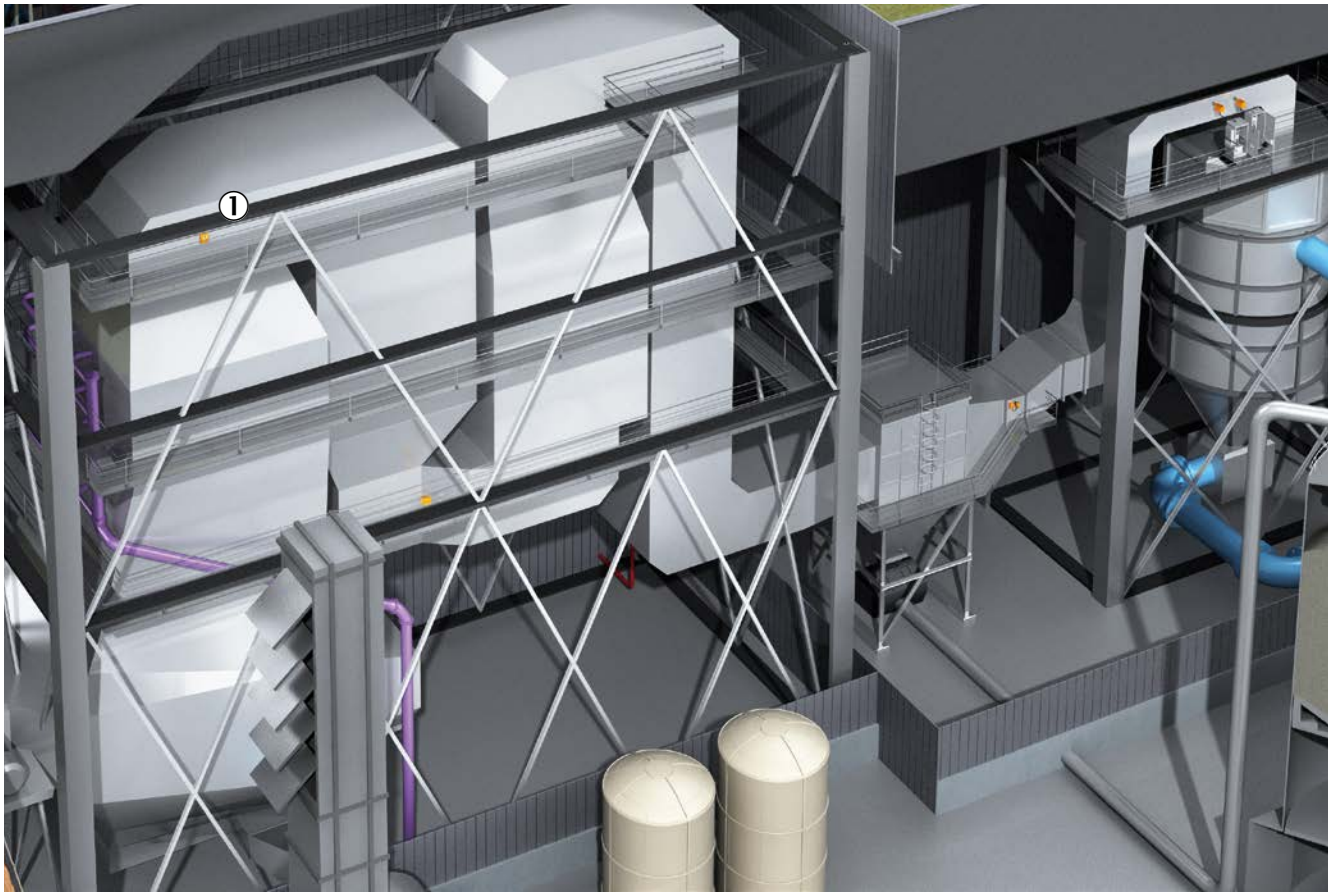
④ Protection of biomass bunkers and wood shredders in organic waste incineration

CO and O₂ measurement in biomass bunkers and wood shredders is required in order to ensure early detection of smoldering fires and/or leakages in the inertization system. The MKAS multi-component analyzer system with explosion-protected sampling probe is ideal for this purpose. Using measuring point switchover, it can be configured to monitor several bunkers or shredders. The SIDOR gas analyzer simultaneously measures O₂ and CO.

The stability of the measuring system allows routine adjustments to be made solely using inert gas or ambient air. The SIDOR gas analyzer is ideal for safety-related measurements.



SIDOR → p. 66
MKAS → p. 74



Incineration optimization

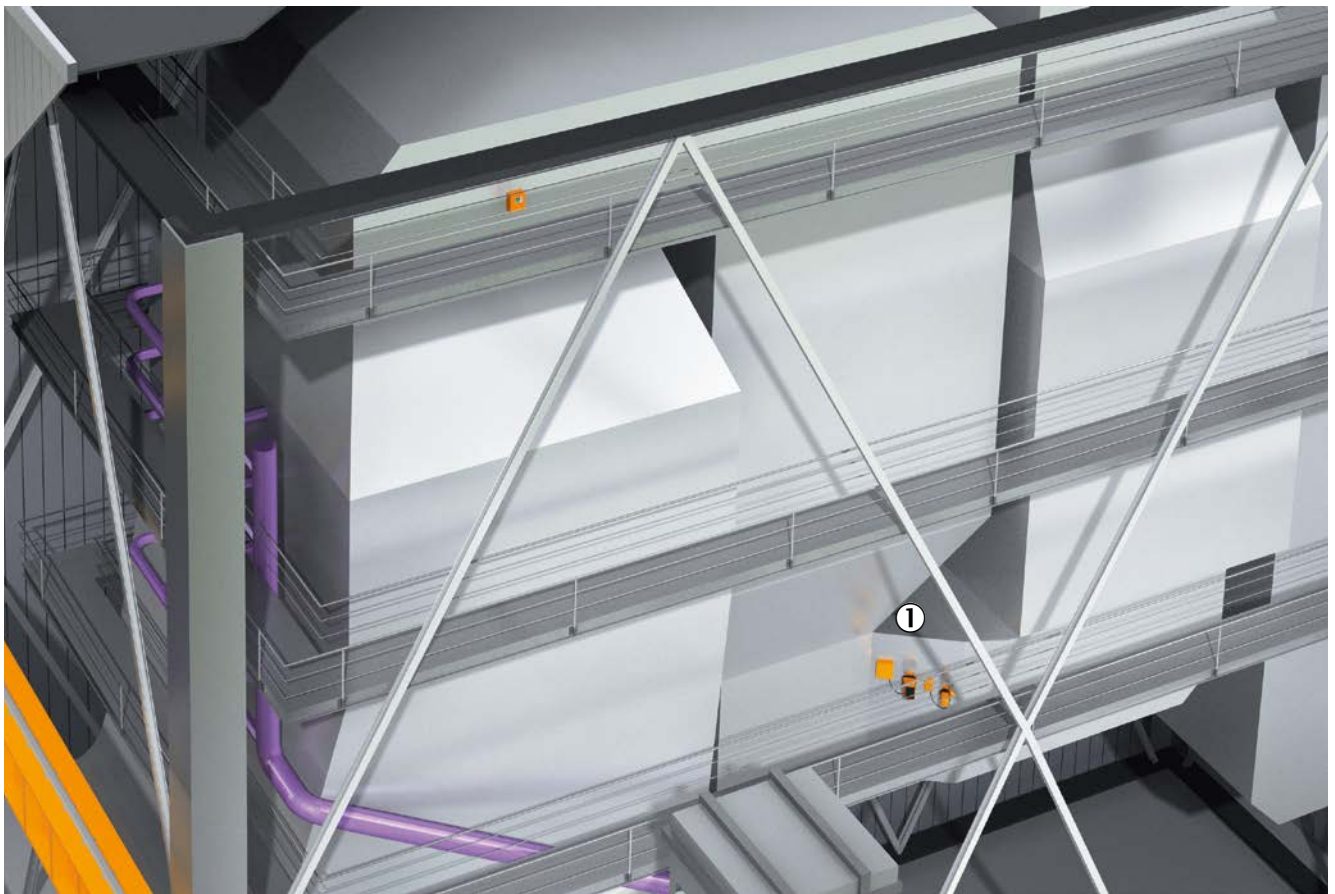
Incineration processes require O_2 , which chemically reacts with the fuel. Measurement of the O_2 concentration at the combustion chamber outlet is an important variable when it comes to optimizing incineration, which is regulated by feeding in primary and secondary air.

① Monitoring incineration efficiency (O_2) in organic waste incineration

The ZIRKOR302 in-situ gas analyzer is used to measure O_2 . It quickly, reliably, and continuously measures the oxygen concentration during incineration. This allows optimal regulation of oxygenation from primary and secondary air, achieving permanent monitoring for the purposes of combustion optimization.



ZIRKOR302 → p. 64



① Operation of an SNCR denitrification system (selective non-catalytic reduction)

For gas purification through selective non-catalytic reduction, ammonia or an aqueous urea solution is directly injected behind the combustion chamber at a temperature of 900 to 1100 °C. This causes the nitrogen oxides to react with the ammonium compounds and turn into nitrogen and water. This reduces NO_x emissions. At the combustion chamber outlet, the GM32 continuously measures NO, and the GM700 measures NH₃ slip.

At low NO and CO concentrations, the MCS100E HW can also be used for this process application.

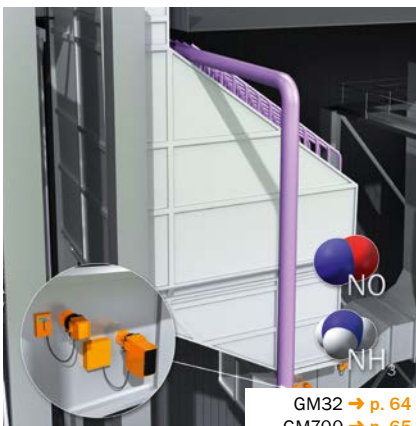




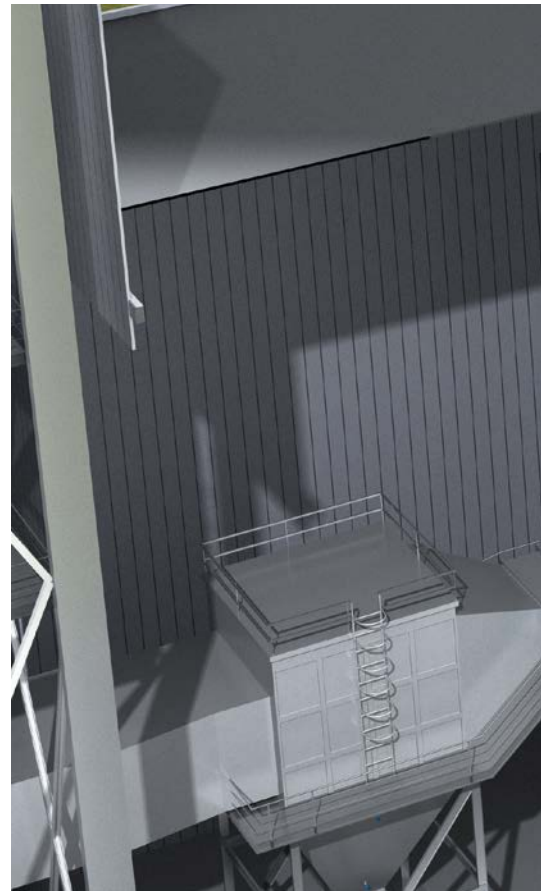
② Operation of an SCR denitrification system (selective catalytic reduction)

Selective catalytic reduction removes nitrogen oxides (NO) from flue gases with the aid of a catalyst and injection of aqueous ammonia. NO is converted into water and nitrogen at 200 to 400 °C. At the catalyst inlet, the NO concentration can be measured in order to regulate the quantity of ammonia. At the catalyst outlet, NO and NH₃ are measured. The NH₃ concentration, in connection with the NO concentration, determines the efficiency of the denitrification process.

The GM700 continuously measures what is called “NH₃ slip” in-situ. In the case of emissions measurement at the chimney, NO_x and NH₃ are recorded to check for compliance with legal thresholds.



GM32 → p. 64
GM700 → p. 65

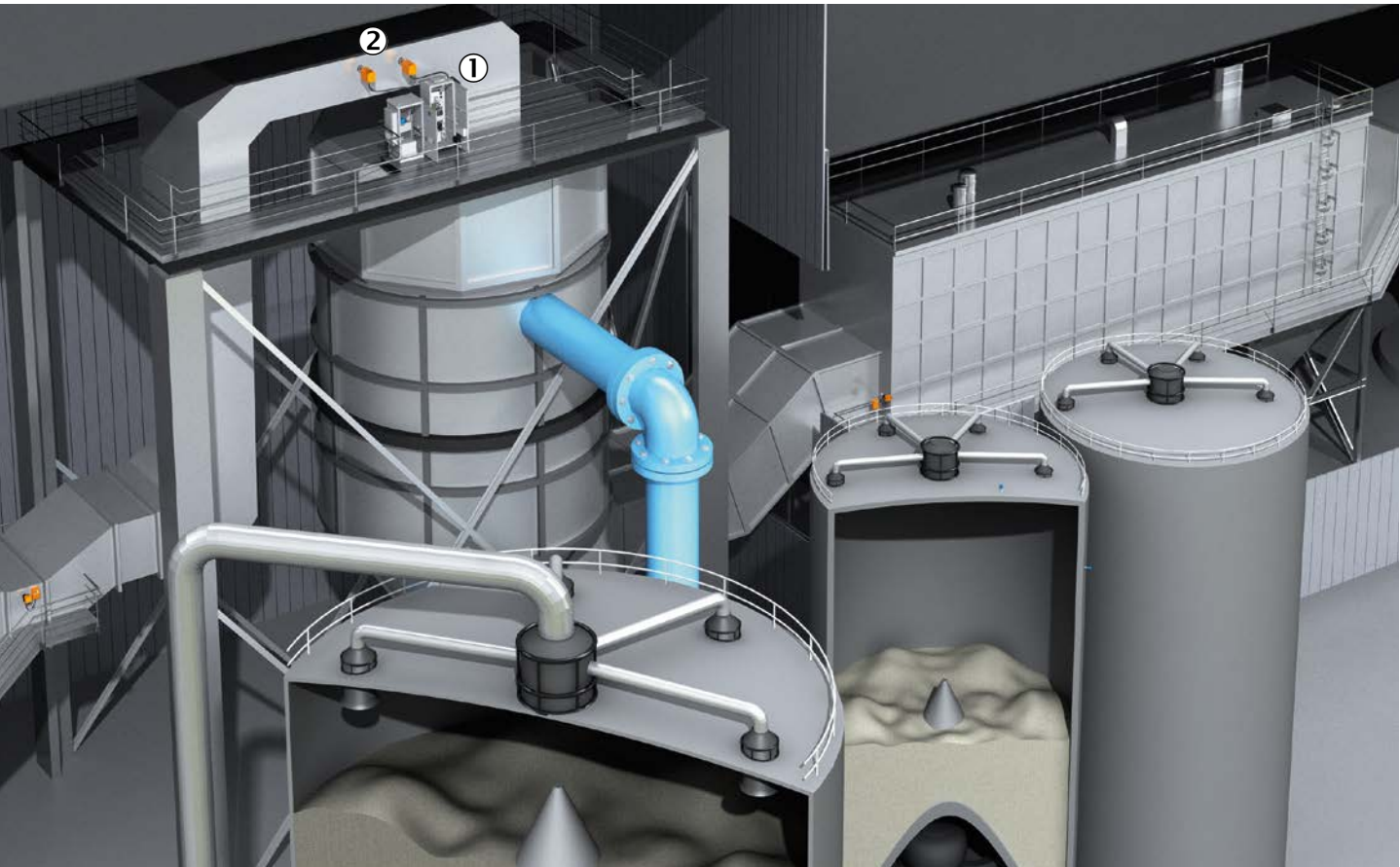


① Process measurement at flue gas scrubber inlets

Flue gas scrubbers reduce HCl and SO₂. Wet scrubbers spray a cleaning solution into the scrubbing tower, counter-current to the gas. In the case of the dry scrubbing process, lime powder or milk of lime is used. In order to then remove any heavy metals and organic pollutants, activated carbon is added during dry absorption. The MCS300P HW simultaneously measures the SO₂, HCl, H₂O, and optionally the O₂ components.

These measurements can help to significantly reduce the consumption of reagents, thereby lowering operating costs. Peaks in concentration can also be quickly and reliably recorded.

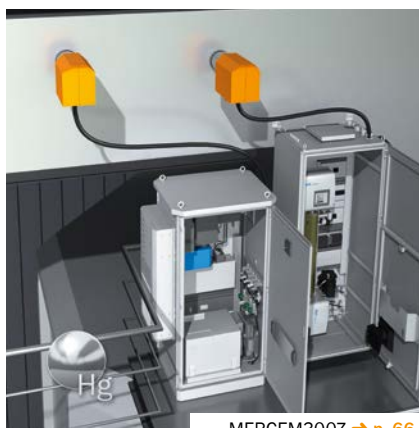




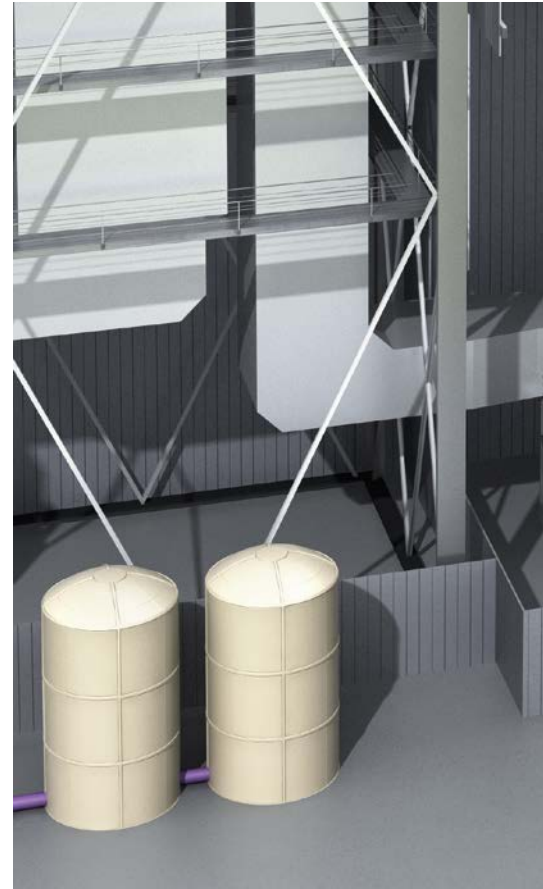
② Monitoring mercury separation in the scrubber

The purpose of the mercury process measurement is to monitor high Hg concentrations (Hg and HgCl_2) when incinerating waste of unknown composition. If the gas purification system is overloaded with very high Hg concentrations ($>3000 \mu\text{g}/\text{m}^3$), counter measures must be promptly taken in order to ensure that emissions thresholds are respected. Due to the new measuring method with Zeeman measuring technology, this can be done using the MERCEM300Z

in a safe and low-maintenance manner, without cross-sensitivity, even at higher SO_2 concentrations in the raw gas.



MERCEM300Z → p. 66



① Filter monitoring during dedusting with electrostatic precipitators or fabric filters

The flue gas is dedusted using electrostatic precipitators and/or fabric filters. In addition to dust, the fabric filter also separates out bicarbonate and activated carbon during dry flue gas purification. The dust concentration can be monitored behind the dust filter, but must be monitored at the emissions measuring point on the stack.

The DUSTHUNTER, which uses laser diodes to take measurements following the scattered light method, is suitable for this purpose. The measuring conditions and dust concentration will determine which DUSTHUNTER should be used.



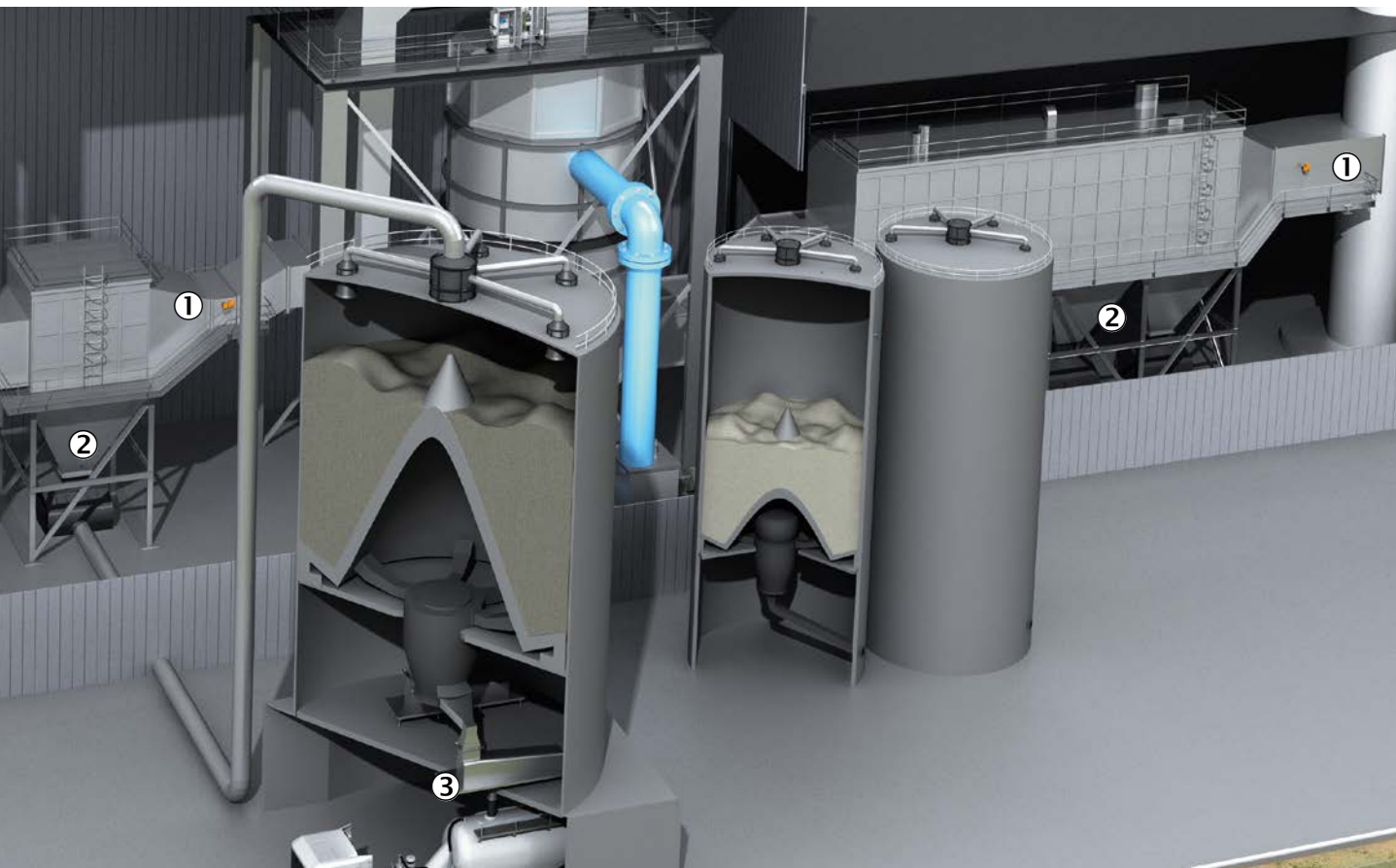
DUSTHUNTER SB50 → p. 69

② Ash hopper level monitoring in organic waste incineration

The dust particles which pass through the bag filter are collected on the surface of the bag filter. The fly ash is shaken off and falls into the collection hopper. In order to determine whether the hopper is full, point level measurements are taken. The particularly rugged LBV310 vibrating level switch is ideal for this purpose. It operates with no mechanical moving parts, and is immune to deposit formation.



LBV3xx → p. 79



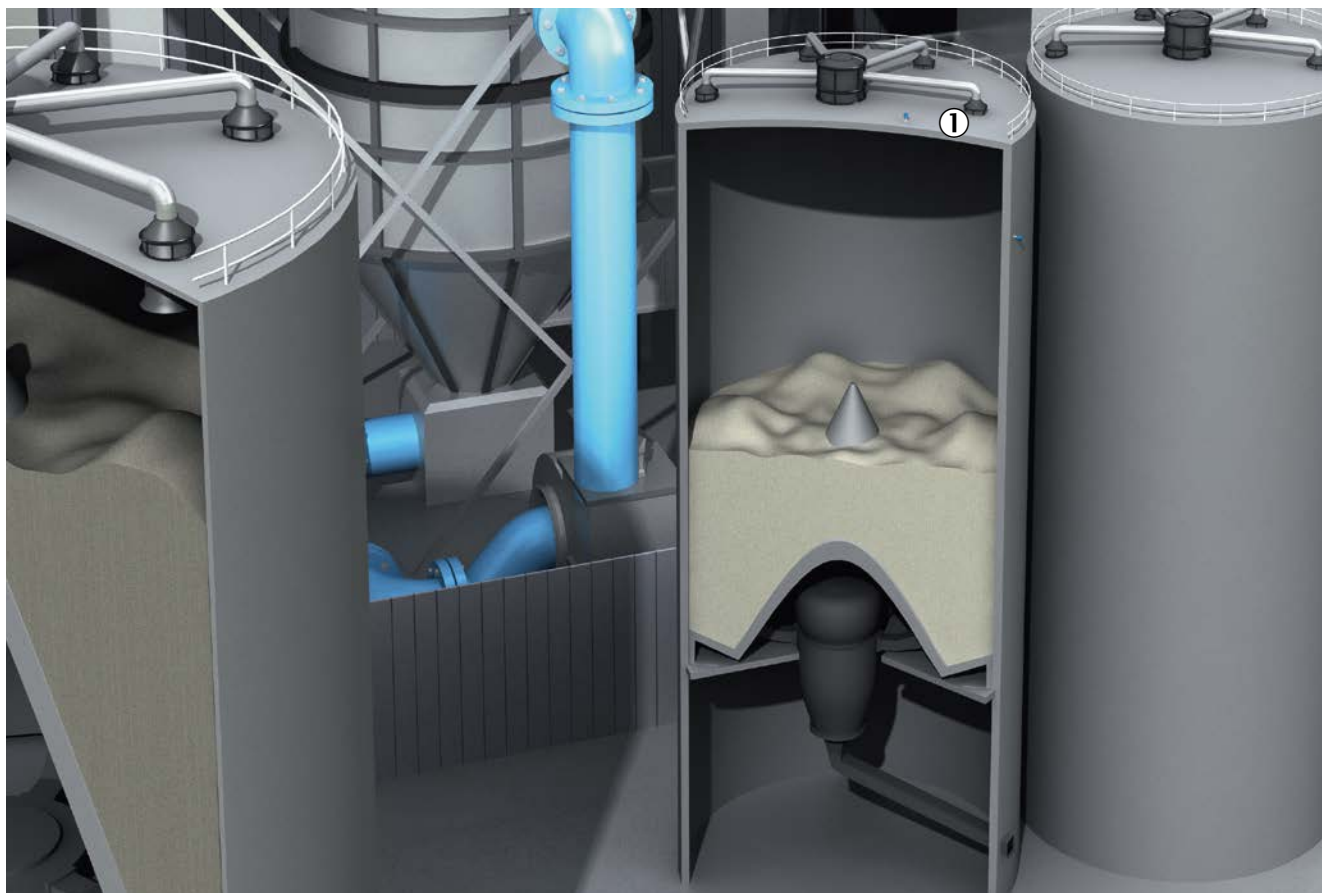
③ Positioning the fly ash transporter for filling

The fly ash is removed from the collection hoppers and transported by truck to the landfill site. Sensors ensure that the loading hose is correctly positioned and that no fly ash ends up in the surrounding area during loading. The LMS511 2D laser scanner determines the position of the truck under the collection hoppers. This high-performance and efficient 2D laser scanner is suitable for measuring ranges of up to 80 m.

The rugged housing with enclosure rating IP 67 protects the sensor against harsh weather conditions and the large amount of dust deposit that builds up when loading the ash.



LMS5xx → p. 77



① Overflow protection when stocking reagents for flue gas purification

The LBV311 vibrating level switch monitors the level of solid bulk materials such as bicarbonate, lime, or activated carbon. For liquid reagents such as aqueous ammonia and milk of lime, the LFV311 vibrating level switch is the ideal solution. The tuning fork in these sensors always accurately records the level of each of the reagents regardless of the silo construction or tank material used.



LFV3xx → p. 78
LBV3xx → p. 79



① Delta CO measurement at the activated carbon filter in organic waste incineration

Delta CO measurement can prevent fires in the activated carbon filter bed. The MKAS Twin multi-component analyzer system with the SIDOR modular gas analyzer is ideal for this purpose. In the case of newer systems using dry or semi-dry flue gas cleaning, the activated carbon is added at the same time as the other materials. This means that such monitoring is usually no longer necessary.



SIDOR → p. 66
MKAS → p. 74

Emission measurement

In the stack, the pollutants HCl, HF, CO, NO_x (NO and NO₂), SO₂, NH₃, TOC, dust, and the reference values gas velocity, pressure, temperature, O₂, and H₂O are continuously measured. In some countries, such as Germany, continuous measurement of the total mercury content is also required. In order to further process this information and transmit it to the

authorities, the measured values are transferred to a data acquisition system. The measurements must be taken in accordance with the relevant regulations, such as those laid down in the EU Waste Incineration Directive (WID) 2000/76/EC, transposed in Germany by the 17th German Federal Emission Protection Directive (BlmSchV).



① Continuous emissions monitoring of all pollutant components in exhaust gases

The MCS100FT can continuously measure the following components using one single extractive heated gas sample: HCl, CO, NO_x as the sum of NO and NO₂, SO₂, NH₃, O₂, H₂O, CO₂, TOC, and HF. If regulations do not request HF as a measuring component, the MCS100E HW is sufficient. In this case, too, one single heated gas sample is all that is needed. For normalization, the pressure and temperature parameters are also measured.

QAL3 check can be performed using the certified internal filter function without calibration gas.



MCS100E HW → p. 72
MCS100FT → p. 72

② Monitoring of dust emissions in organic waste incineration

Dust can be measured extractively in the case of moist exhaust gases, or continuously in-situ under dry stack conditions. SICK has a fitting solution for both applications. For the standard application with dry flue gas (above the acid dew point), a DUSTHUNTER S (scattered light measurement principle) is best suited. In the case of wet flue gas (under the acid dew point), the FWE200 is used.



FWE200 → p. 68
DUSTHUNTER SB100 → p. 69
DUSTHUNTER SP100 → p. 70
DUSTHUNTER T100 → p. 70
DUSTHUNTER T200 → p. 71



Here, the gas to be measured is removed from the stack superisokinetically, heated to above the acid dew point, and continuously measured by a scattered light measuring cell. In some markets (e.g., Hong Kong, China), not only dust concentration, but also opacity is continuously measured using the DUSTHUNTER T.

③ Monitoring mercury in emissions in organic waste incineration

The MERCEM300Z extractive gas analyzer has the smallest certified measuring range of all measuring systems suitability tested in accordance with EN 15267-3, with a range from 0 to 10 $\mu\text{g}/\text{m}^3$ total mercury content. It is also suitable for continuously monitoring the annual threshold of 10 $\mu\text{g}/\text{m}^3$, which is set to come into force in future.

The greatest advantage of the MERCEM300Z is that it transforms oxidized mercury into metallic mercury without the addition of chemicals or converters, which significantly reduces the amount of maintenance required in comparison to all other measuring systems. This system is the only certified measuring assembly that can be operated with a heated sample gas line of a maximum of 35 m.



MERCEM300Z → p. 66

④ Gas flow measurement in the chimney in organic waste incineration

The FLOWSIC100 volume flow measuring device continuously measures gas flow in the chimney with no contact needed. The device requires minimal maintenance due to the ultrasonic technology used. Ultrasonic measurements are particularly reliable because the volume flow is measured over the entire chimney cross-section. High quality of measurement is key, as pollutant concentrations are given in relation to the volume of flue gas measured and are indicated in kg/h. This is a legal requirement under the applicable EU standard (WID 2000/76/EC) which all Member States of the EU must implement.



Single in-situ measurement for HF emissions monitoring

The GM700 in-situ gas analyzer with TDLS laser technology (Tunable Diode Laser Spectroscopy) is used for taking single HF measurements. The gas analyzer has been suitability tested in accordance with EN 15267-3. It should preferably be used for retrofitting HF measurement systems.



Space-saving solution for measuring dust, flow, pressure, and temperature

With the CP100 combined probe, dust, flow, pressure, and temperature can be measured in the chimney with minimal usage of space. This solution involves installing a DUSTHUNTER SP100 (scattered light method), a FLOWSIC100 PR (ultrasonic measuring principle as a probe), and a PT100 temperature sensor and pressure sensor on a combination flange (DN250 PN6). This renders additional couplings or flanges unnecessary.

This space-saving solution especially proves its worth where redundant design of the measuring devices is required.





Emissions calculation in organic waste incineration

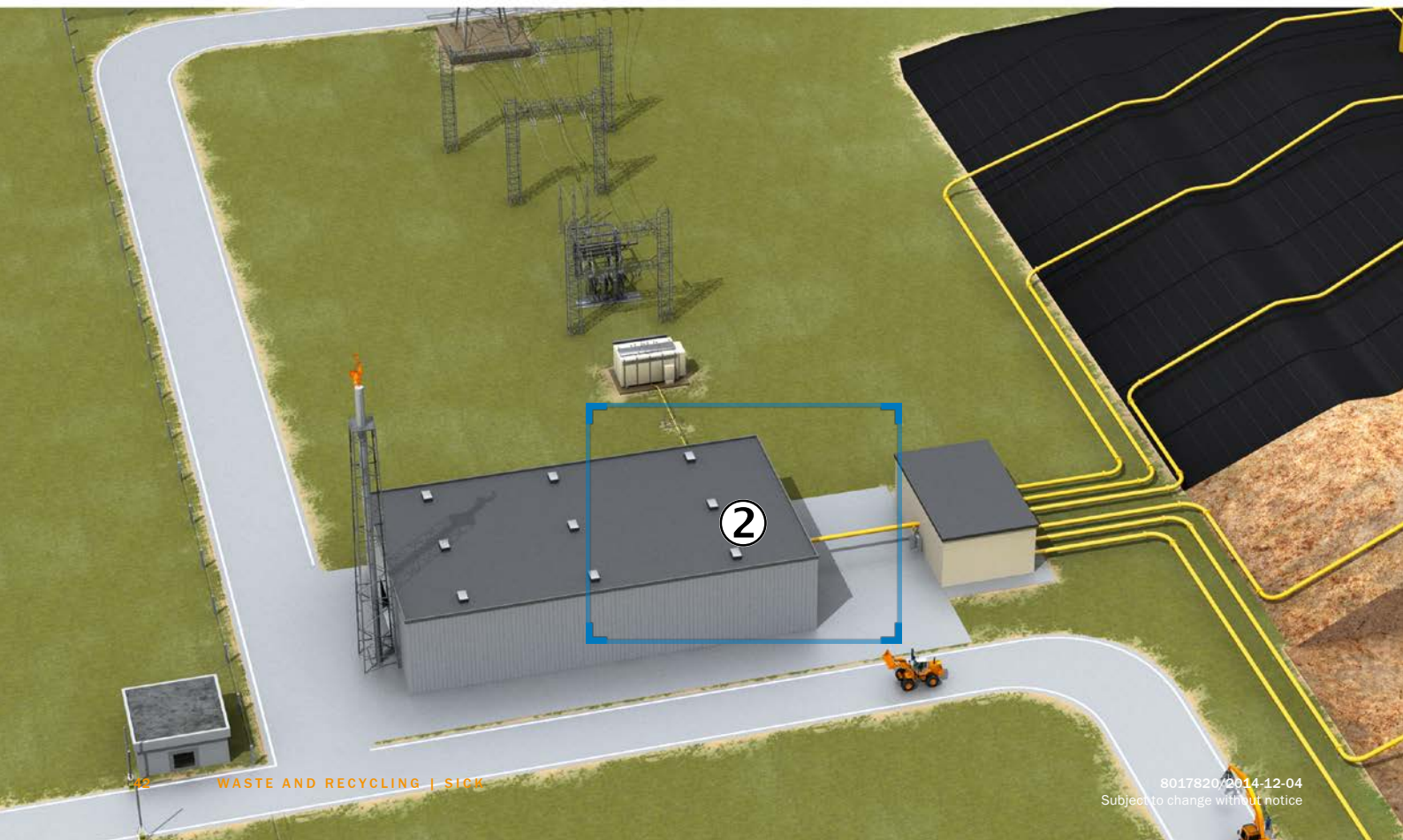
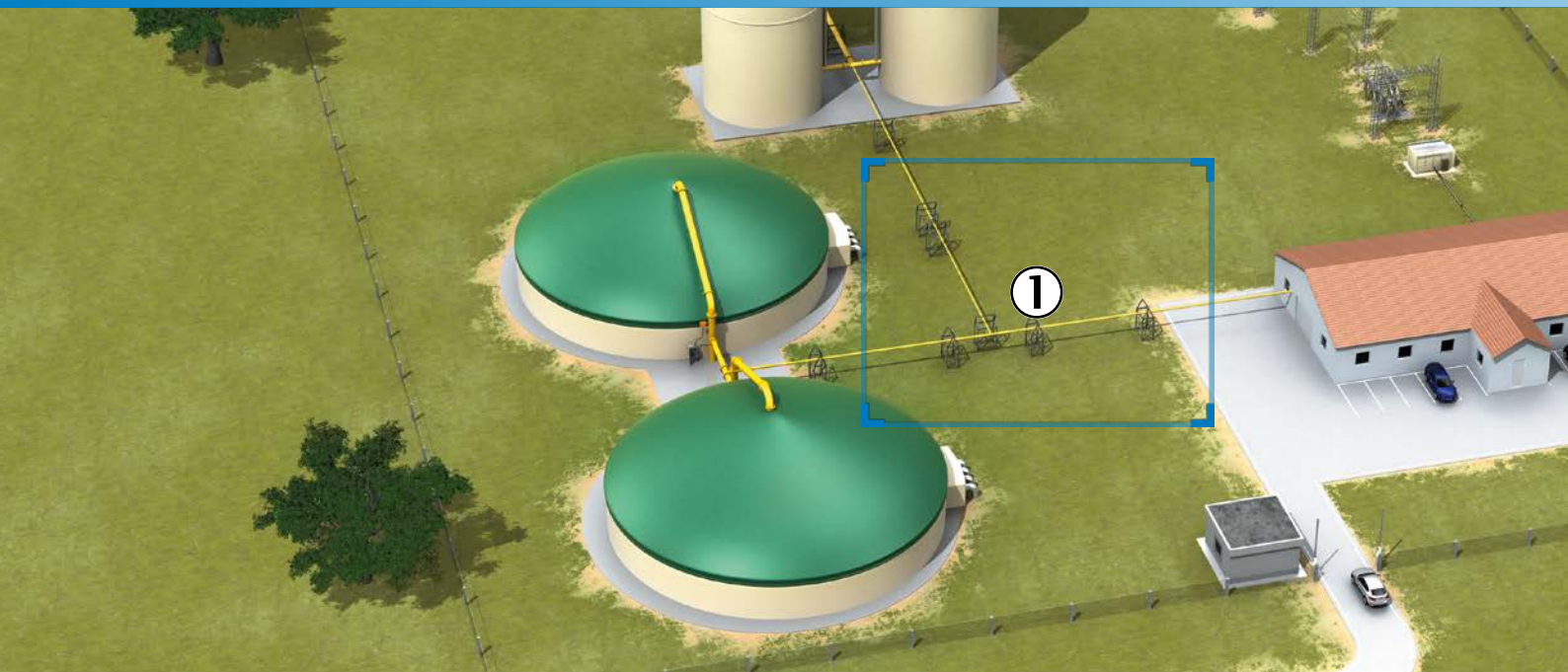
The MEAC emissions calculator is ideal for recording, saving, normalizing, analyzing, displaying, and forwarding a continuous flow of data. It is available in several different models, which perform reporting in accordance with the applicable local legislation. The MEAC is TÜV-tested and certified, and provides data analysis that takes into account QAL3 data on drift control, amongst other elements.

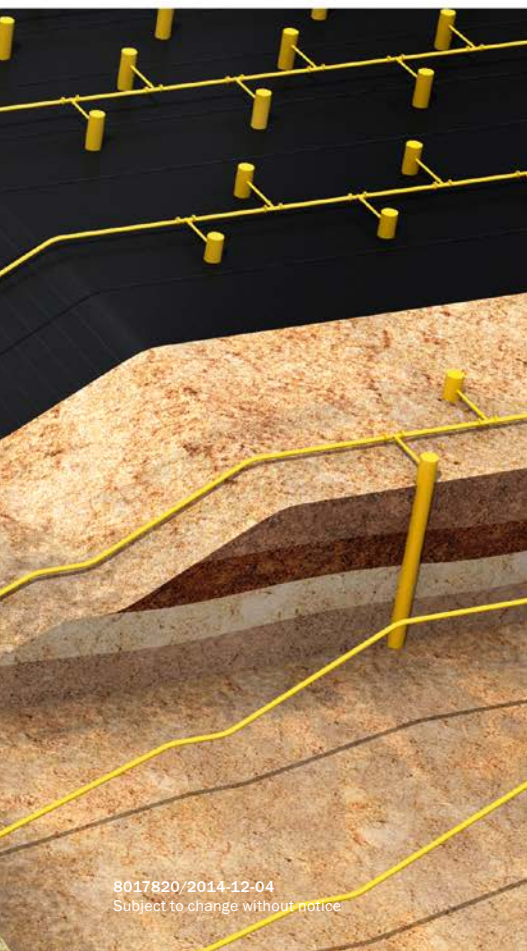
SICK also provides solutions involving the MEAC for redundant operation. For digital data transfer to the control system, all standard data transmission protocols are available: Modbus, PROFIBUS, and OPC. Wired, analog signal transmission is also possible.



MEAC → p. 73

APPLICATIONS IN FOCUS BIOGAS PLANTS





Biogas plants

Focus 1

44

① Fermentation

Focus 2

46

② Landfill gas

Fermentation

The fermentation of agricultural and organic waste and of digested sludge produces gas containing methane. An additional purification process can increase the methane concentration even further, until the gas has reached

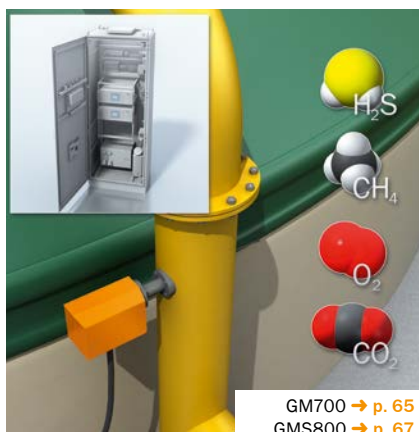
the natural gas quality required for use. SICK offers operators of small and large biogas plants the right products for measuring gas quality and flow after fermentation.



① Gas analysis after the fermentation process

In order to record the sample gas components after fermentation, the concentrations of CH_4 , H_2S (after technical clarification), O_2 and CO_2 are determined. This is necessary in order to determine the gas composition and therefore the quality of the fermentation. For this purpose, SICK offers the GMS800 modular gas analyzer, which is integrated into a measuring cabinet. Gas sampling for measurement is done extractively. Flame arresters at the sample gas inlet and outlet protect the plant against explosions.

The GM700 with laser technology is ideal for monitoring low concentrations of NH_3 of between 3 and 4 mg/Nm^3 behind the biofilter.



GM700 → p. 65
GMS800 → p. 67

② Biogas flow measurement

When measuring gas flow, the FLOWSIC600 or the FLOWSIC600 Bio records all process steps from fermentation up to feeding in to the natural gas network. For applications using raw biogas at a low pressure and flow, the FLOWSIC600 Bio can be used. For measuring gas flow at a high pressure and for feed-in, the FLOWSIC600 is used. Thanks to its high level of measurement accuracy of $\pm 0.2\%$, the FLOWSIC600 is an officially certified measuring device for feed-in to the natural gas network.



FLOWSIC600 → p. 75



③ Methane quality measurement

Methane is enriched in a gas conditioner before being fed in to the gas network. In order to determine the quality and calorific value of the methane before feed-in, methane (CH_4) concentration is measured at the outlet of the gas conditioner system.



SIDOR → p. 66
MKAS → p. 74

④ Flare gas measurement in biogas

When it comes to continuous process monitoring and optimization as well as detecting tiny leakages in the flare gas network, the FLOWSIC100 Flare is used. The primary area of application involves calculating greenhouse gas emissions based on the amount of flare gas measured in accordance with regulatory requirements. For this purpose, it is also necessary to precisely record very low flow rates. This is made possible by the use of state-of-the-art ultrasonic sensor

technology, as well as a high signal time resolution combined with cutting-edge signal processing.

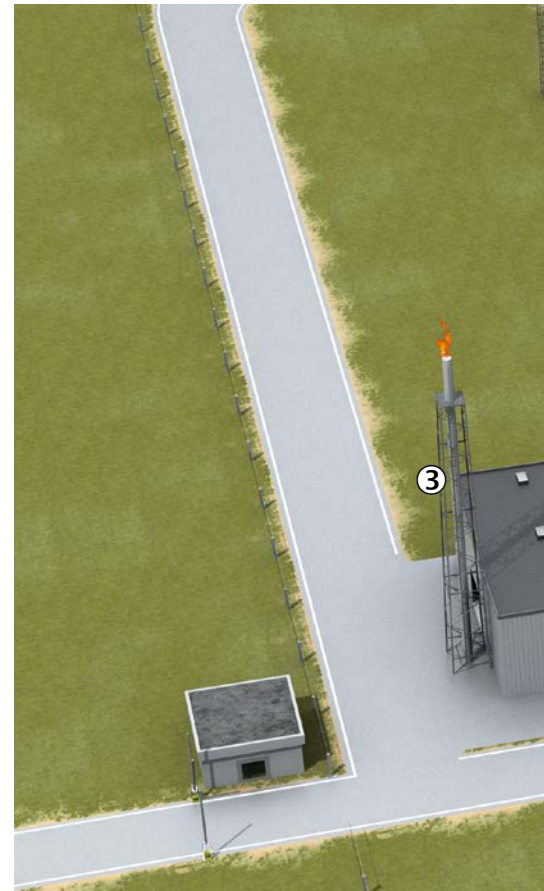


FLOWSIC100 Flare → p. 75

Landfill gas

Landfill sites are one of the largest man-made sources of methane. Alongside CO₂, the methane gas emitted from landfill sites makes the biggest contribution to the greenhouse effect.

It is more environmentally friendly to capture landfill gas and use it as an energy source, rather than allowing it to be released into the atmosphere.



① Gas analysis at the gas outlet of landfill sites

Landfill gas is used to generate thermal or electrical energy. In Germany, combined heat and power stations with very high energy efficiency are used for processing landfill gas. At the gas outlet, the CO₂, CH₄, and O₂ components are continuously measured. The monitored recording of these gases helps to prevent explosions.

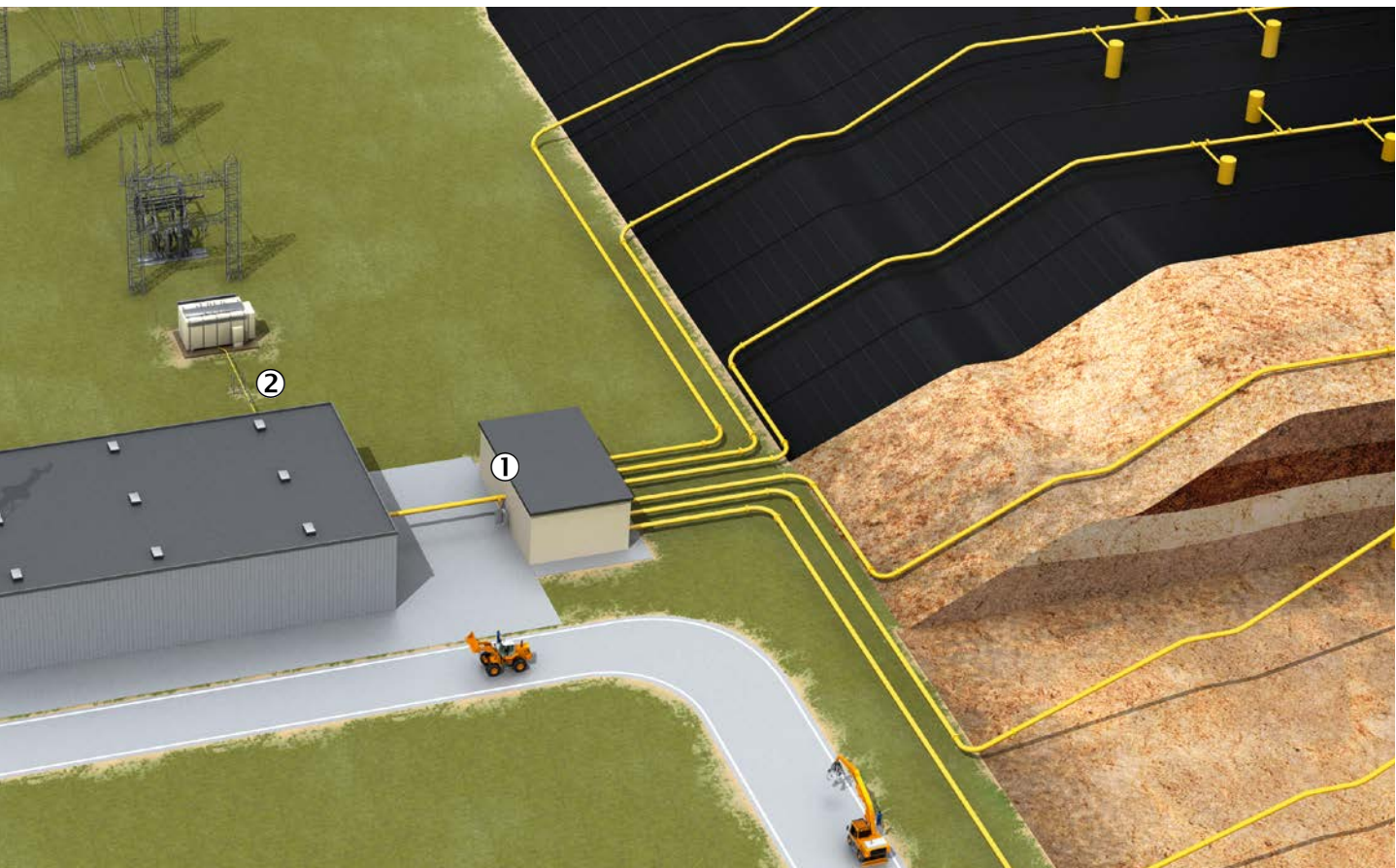
For this purpose, SICK offers the SIDOR gas analyzer, which is integrated into a measuring cabinet. Gas sampling for measurement is done extractively. Flame arresters at the sample gas inlet and outlet of the analyzer system protect the plant against explosions.



② Landfill gas flow measurement

By accurately measuring landfill gas, the operator can optimize regulation of their system and provide proof of their carbon dioxide emissions. In the case of applications with low pressure and flow, the FLOWSIC600 Bio acts as a reliable process gas counter for landfill gas. The FLOWSIC600 can be used for measuring gas flow at a high pressure and for purified gas.





Thanks to its high level of measurement accuracy of $\pm 0.2\%$, the FLOWSIC600 is an officially certified measuring device for feed-in to the natural gas network.

③ Flare gas measurement for landfill gas

When it comes to continuous process monitoring and optimization as well as detecting tiny leakages in the flare gas network, the FLOWSIC100 Flare is used. The primary area of application involves calculating greenhouse gas emissions based on the amount of flare gas measured in accordance with regulatory requirements. For this purpose, it is also necessary to precisely record very low flow rates.

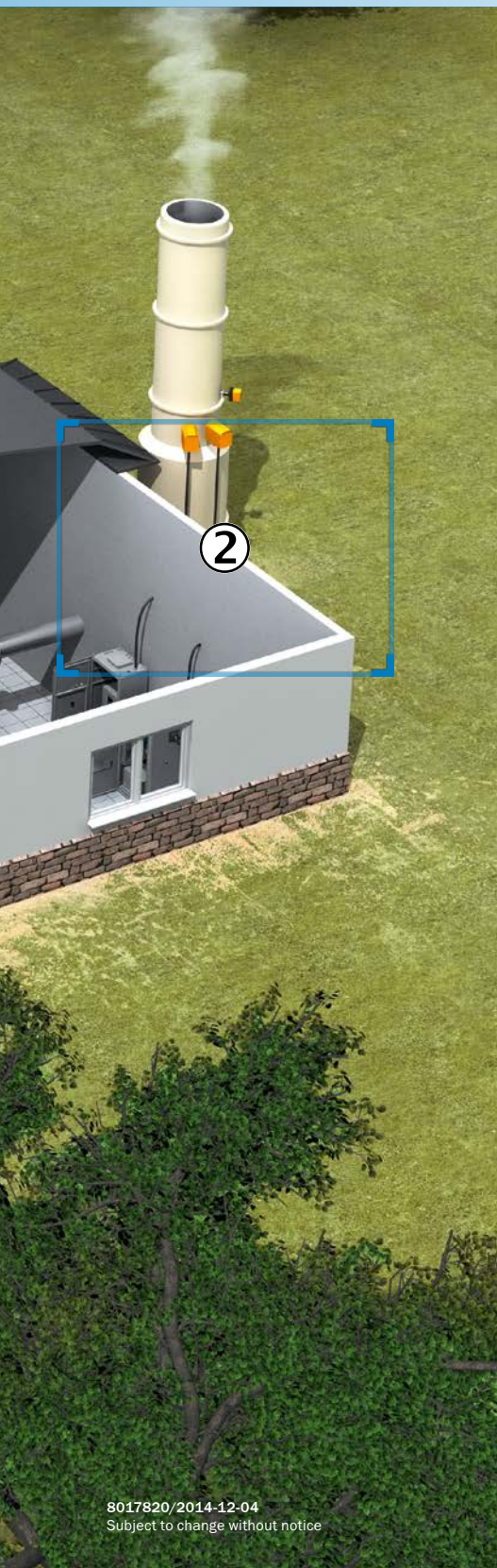
This is made possible by the use of state-of-the-art ultrasonic sensor technology, as well as a high signal time resolution combined with cutting-edge signal processing.



FLOWSIC100 Flare → p. 75

APPLICATIONS IN FOCUS CREMATORIA





Crematoria

Focus 1

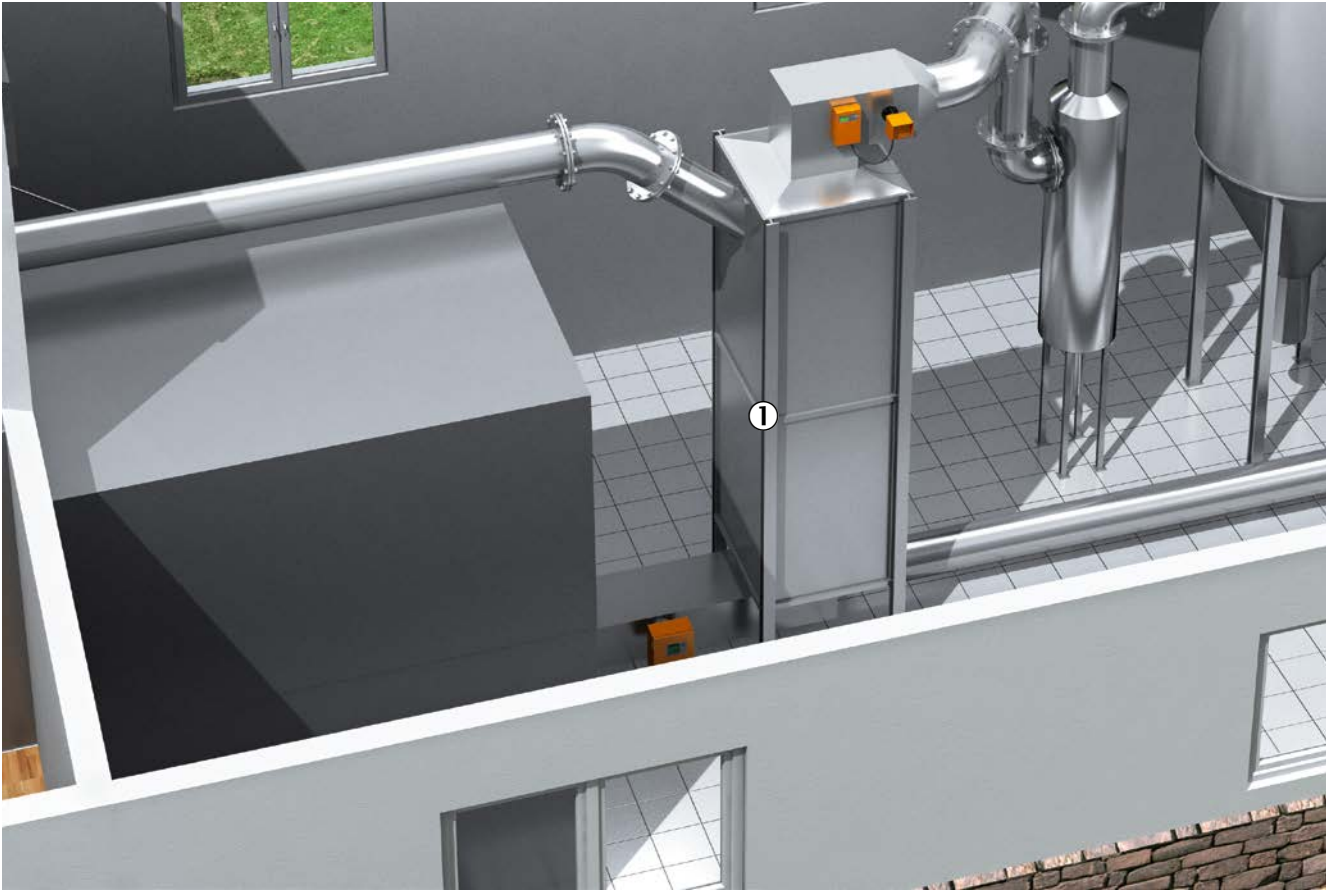
- ① Incineration optimization

50

Focus 2

- ② Emission measurement

51

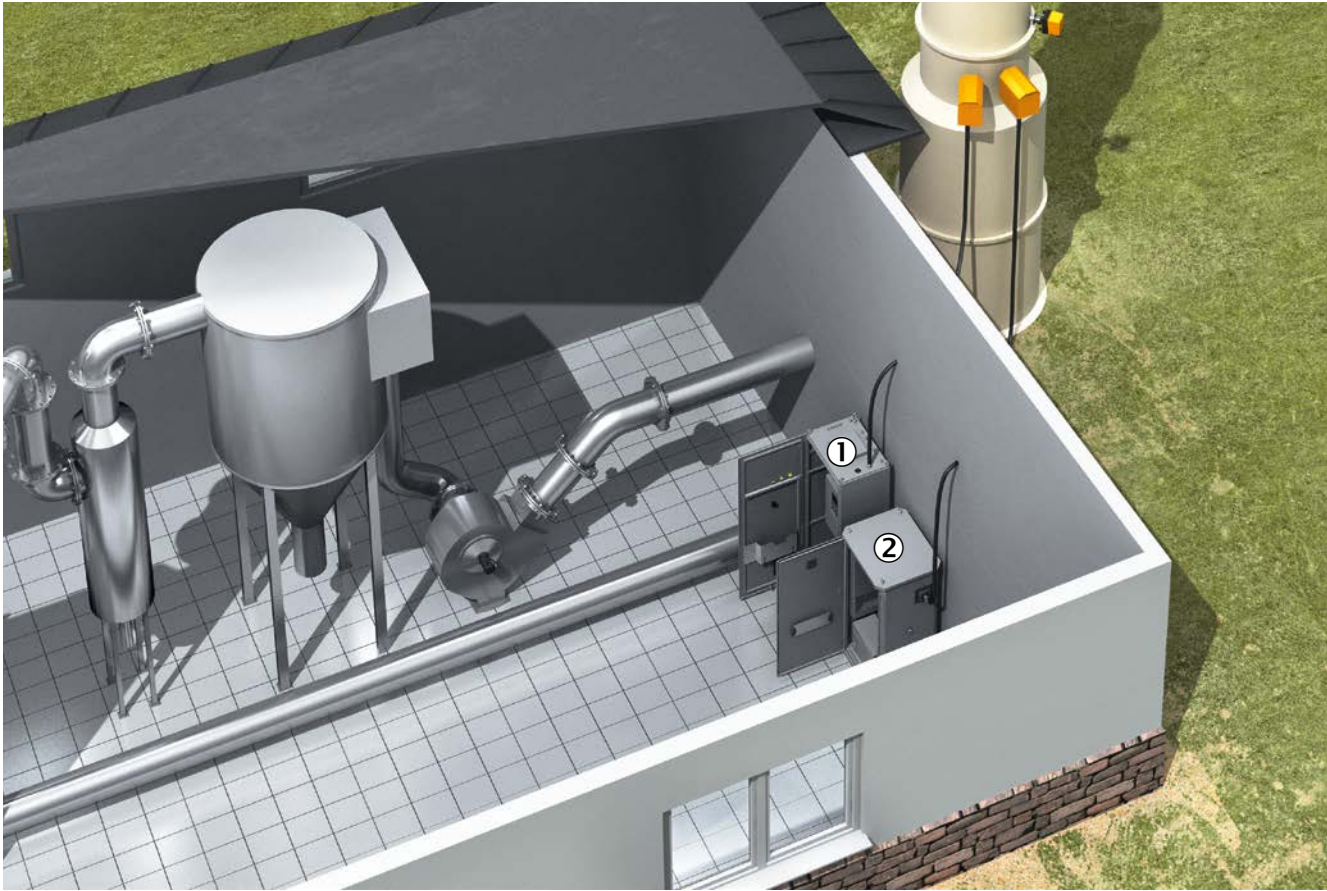


① Monitoring incineration efficiency (CO, O₂) in crematoria

The ZIRKOR302 in-situ gas analyzer is used to measure O₂. It quickly, reliably, and continuously measures the oxygen concentration during incineration. This allows optimal regulation of oxygenation from primary and secondary air. The GM901 in-situ gas analyzer continuously measures the CO concentration.

As rapid response times are essential when measuring CO, this in-situ measuring technology is best suited for this purpose. It enables permanent monitoring for the purpose of combustion optimization.





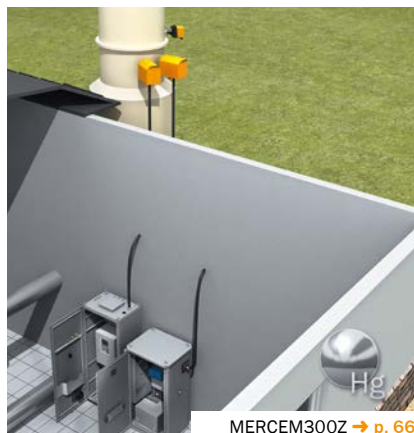
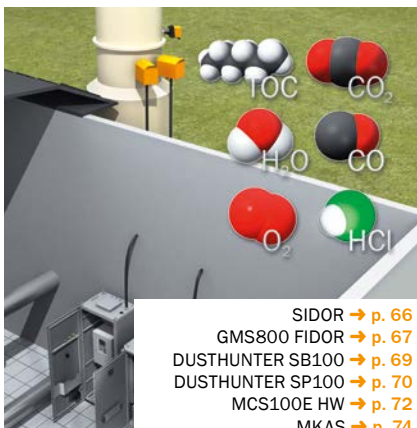
① Continuous recording of pollutant components in crematoria

The MCS100E HW is used for multiple component measurements. It continuously records all gas components that must be monitored under law. For emissions measurement in Germany, the cold-extractive system solution MKAS with SIDOR is sufficient. In all cases, continuous dust measurement is obligatory. With its portfolio of dust measuring devices, SICK offers the ideal measuring solution for crematoria in all regions, in accordance with the applicable local legal provisions.

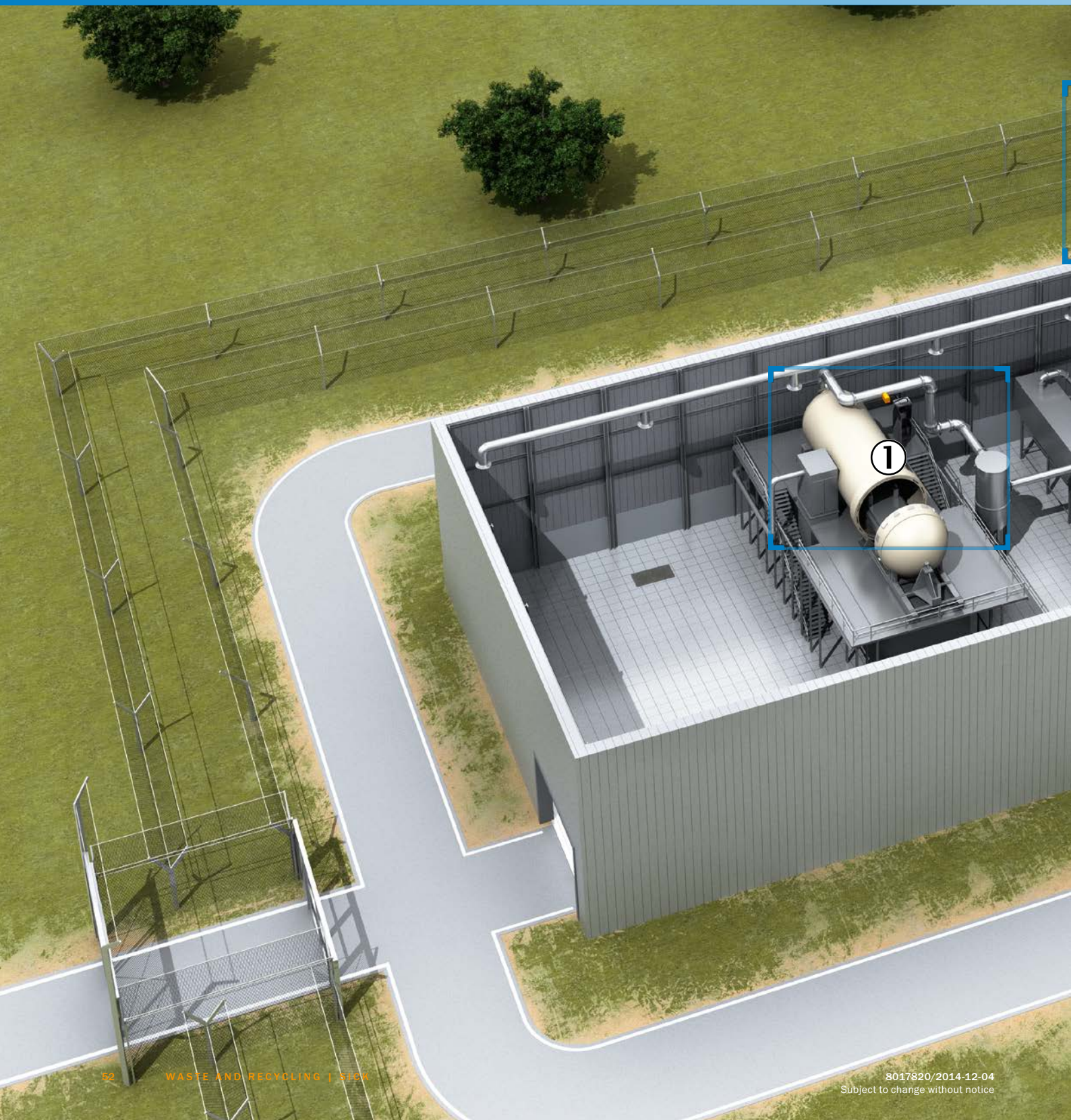
② Monitoring mercury in emissions in crematoria

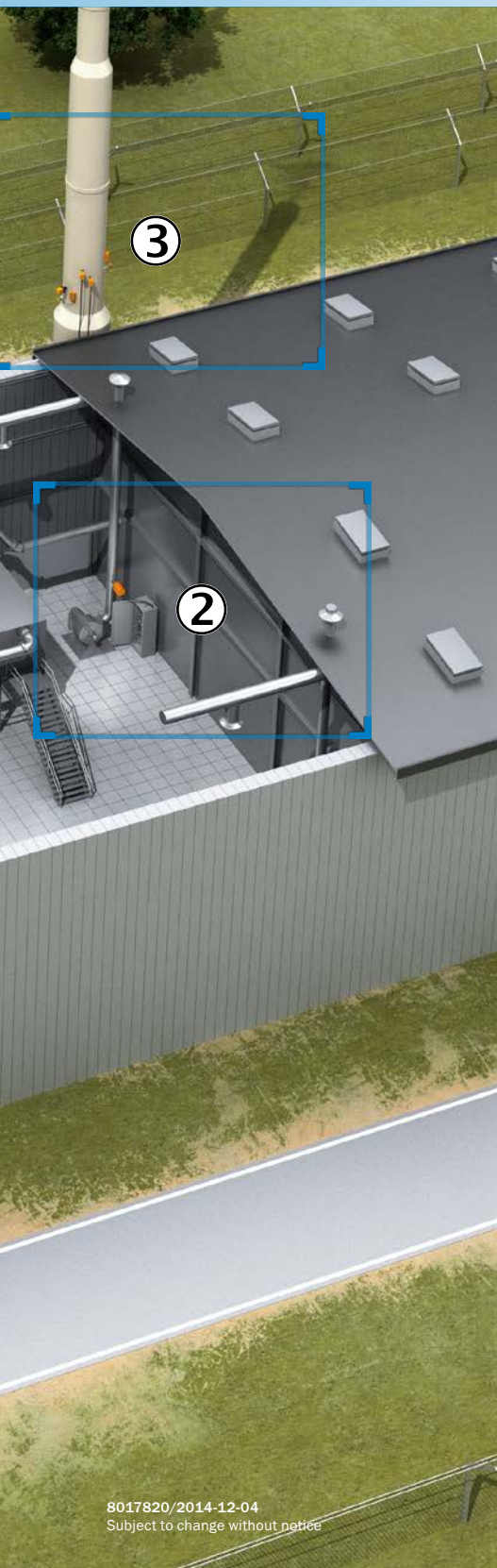
The MERCCEM300Z extractive gas analyzer has the smallest certified measuring range of all measuring systems suitability tested in accordance with EN 15267-3, with a range from 0 to 10 $\mu\text{g}/\text{m}^3$ total mercury content. It is also suitable for continuously monitoring the annual threshold of 10 $\mu\text{g}/\text{m}^3$, which is set to come into force in future. The greatest advantage of the MERCCEM300Z is that it transforms oxidized mercury into metallic mercury

without the addition of chemicals or converters, which significantly reduces the amount of maintenance required in comparison to all other measuring systems. This system is the only certified measuring assembly that can be operated with a heated sample gas line of a maximum of 35 m.



APPLICATIONS IN FOCUS AMMUNITION DISPOSAL





Ammunition disposal

Focus 1

54

- ① Process gas monitoring

Focus 2

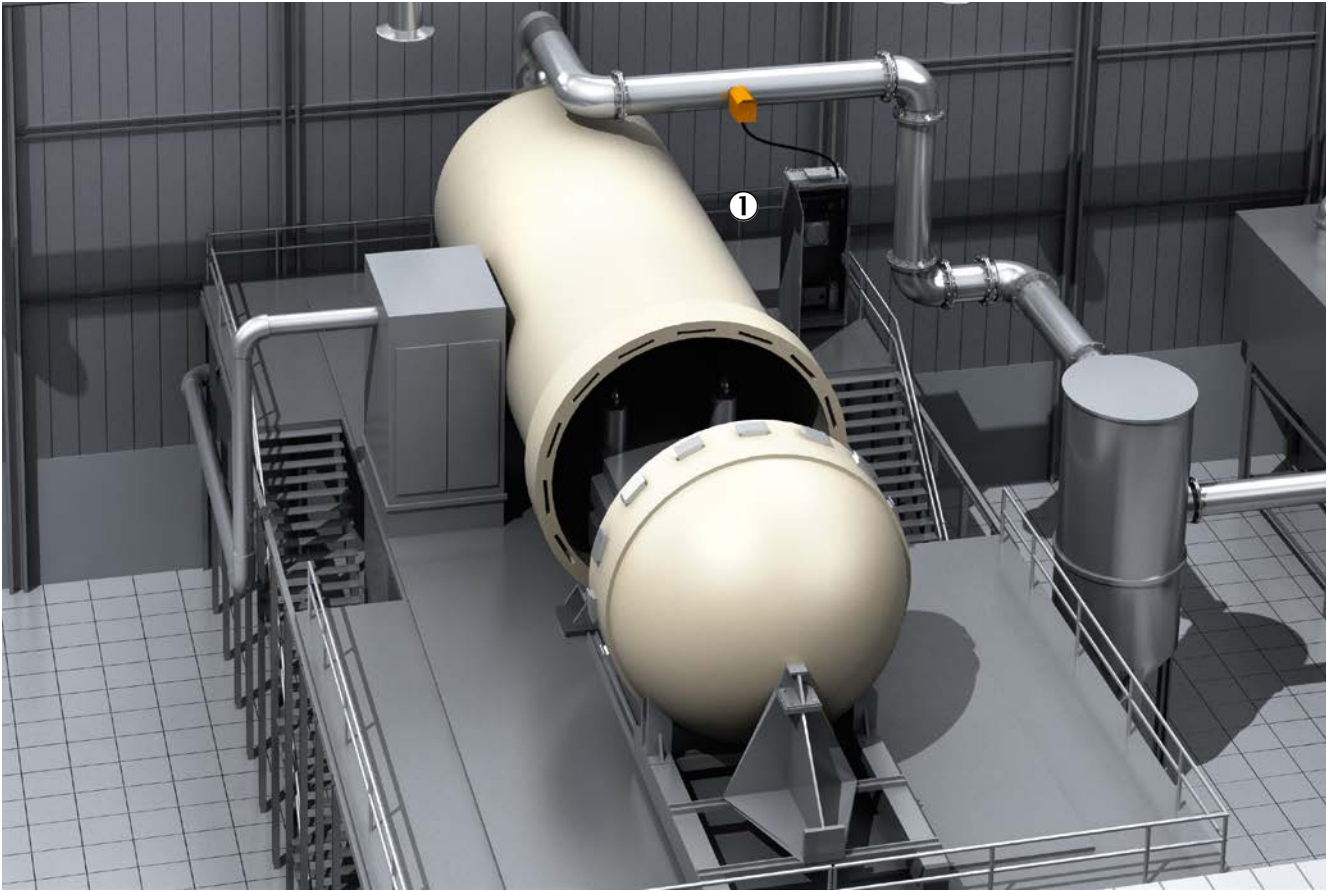
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- ② Continuous exhaust gas monitoring of air in buildings

Focus 3

56

- ③ Emissions monitoring in ammunition disposal plants



Process gas monitoring

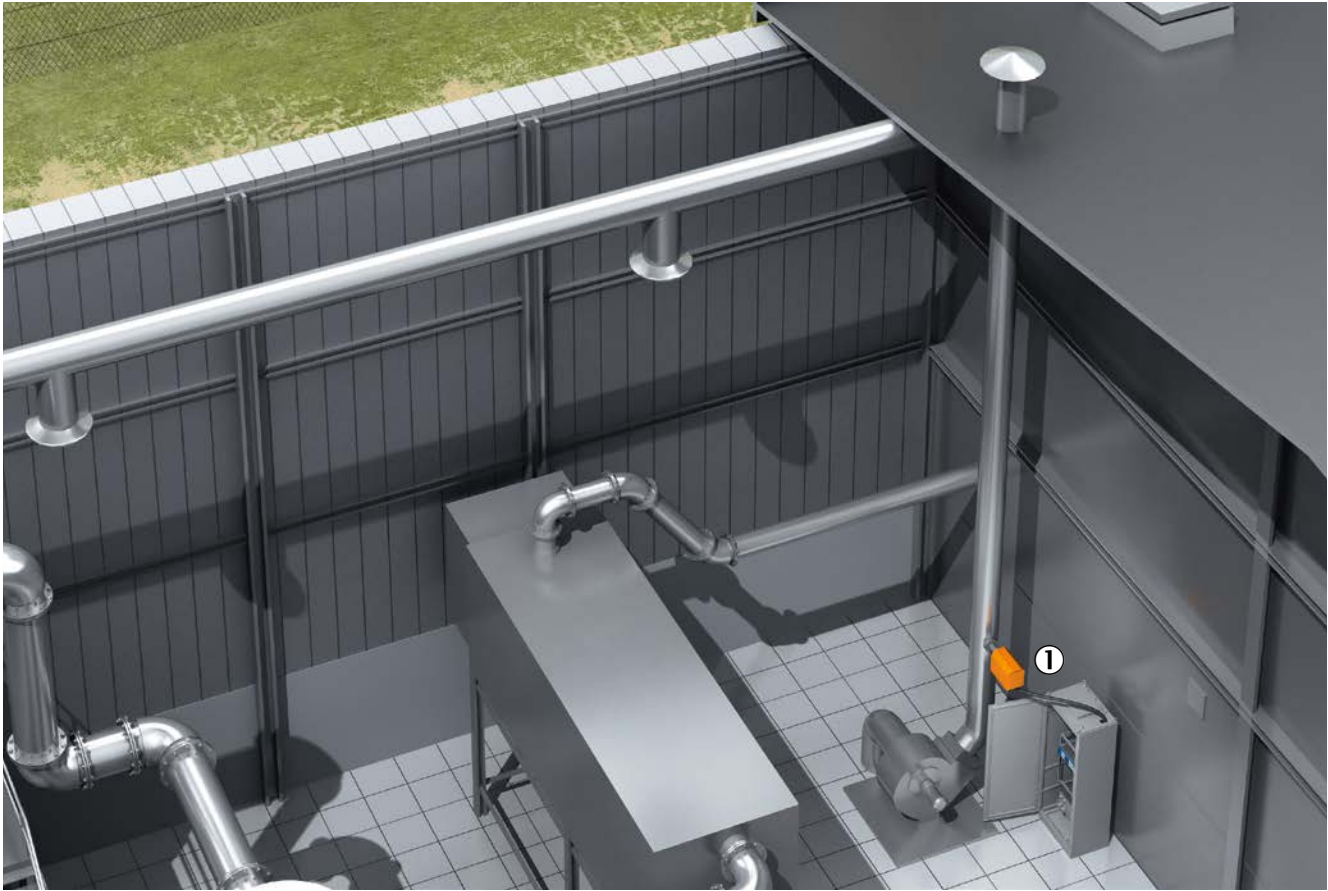
A special, explosion-resistant container is required for the disposal of chemical weapons. The gases created during this process are continuously monitored for CO, H₂, CH₄, and O₂ components. These gases contain toxic substances. For the purpose of subsequent disposal or storage, they are collected in special gas containers.

① ATEX-compliant process monitoring in ammunition disposal

With the S720 (MULTOR, THERMOR, OXOR-P), SICK offers an ATEX model for continuously measuring the sample gas components CO, H₂, CH₄, and O₂ as a percentage by volume. All components installed in the system cabinet comply with the ATEX regulations. This includes, for example, the flame arresters in the gas pipe of the analysis module, which protect the customer's plant.



S700 → p. 68
MKAS → p. 74



Continuous exhaust gas monitoring of air in buildings

All the air inside the factory hall is drawn in, and is then filtered before being expelled outside. Here, the exhaust gas components NO, CO, and O₂ must be continuously measured.

① Continuous monitoring of NO, CO, and O₂ in used air from buildings

In order to monitor used air coming from buildings, which is necessary in order to detect leakages in the process, SICK offers a cost-effective emissions monitoring system. The multiple component measuring system MKAS with the SIDOR analyzer continuously monitors the current concentrations of NO, CO, and O₂. Gas sampling for monitoring purposes is performed by an extractive sampling system.



S700 → p. 68
MKAS → p. 74

Emissions monitoring in ammunition disposal plants

In order to continuously monitor emissions from ammunition disposal plants, the law stipulates that, similarly to waste incineration plants, the following sample gas components must be measured:

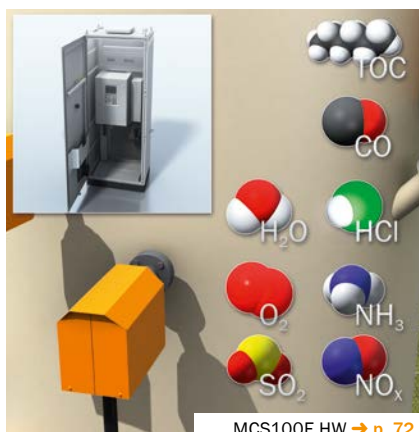
HCl, SO₂, NO_x, CO, TOC, O₂, H₂O, dust, flow, pressure, and temperature. All gas analysis systems for emissions applications must usually be certified (e.g., QAL1 TÜV certification, MCERTS).



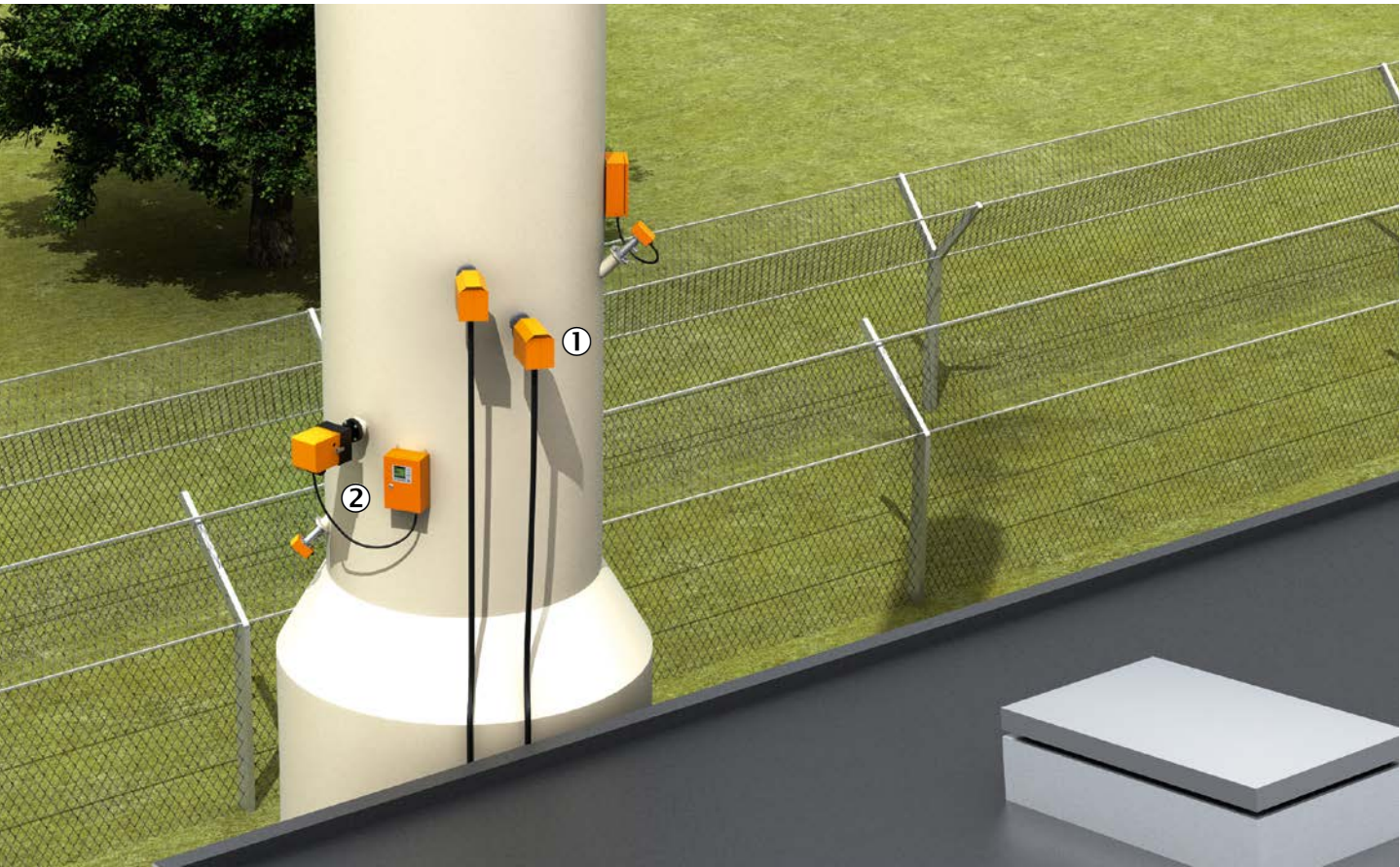
① Emissions monitoring of all pollutant components in ammunition disposal

With the MCS100E HW, the following components are continuously recorded: HCl, CO, NO_x (sum of NO and NO₂), SO₂, O₂, H₂O, and TOC. Optionally, NH₃ can also be measured with the multi-component analyzer system MCS100E HW. With its integrated calibration filter, drift control of the analyzer system can be performed in accordance with the QAL3 standard without using a test gas.

This makes the device significantly easier to use, and leads to a reduction in device maintenance costs as there is no need for calibration gases.



MCS100E HW → p. 72



② Monitoring of dust emissions in ammunition disposal

Dust can be measured extractively in the case of moist exhaust gases, or continuously in-situ under dry stack conditions. SICK has a fitting solution for both applications. For the standard application with dry flue gas (above the acid dew point), a DUSTHUNTER (scattered light measurement principle) is best suited. In the case of wet flue gas (under the acid dew point), the FWE200 is used.

Here, the gas to be measured is removed from the stack superisokinetically, heated to above the acid dew point, and continuously measured with a scattered light measuring cell.



FWE200 → p. 68
DUSTHUNTER SB100 → p. 69
DUSTHUNTER SP100 → p. 70

③ Gas flow measurement in the stack in ammunition disposal

The FLOWSIC100 volume flow measuring device continuously measures gas flow in the stack with no contact needed. The device requires minimal maintenance due to the ultrasonic technology used. Ultrasonic measurements are particularly reliable because the volume flow is measured over the entire stack cross-section. High quality of measurement is key, as pollutant concentrations are given in relation to the volume of flue gas measured and are indicated in kg/h. This is a legal requirement under the applicable EU standard (WID 2000/76/EC) which all Member States of the EU must implement.



FLOWSIC100 → p. 74



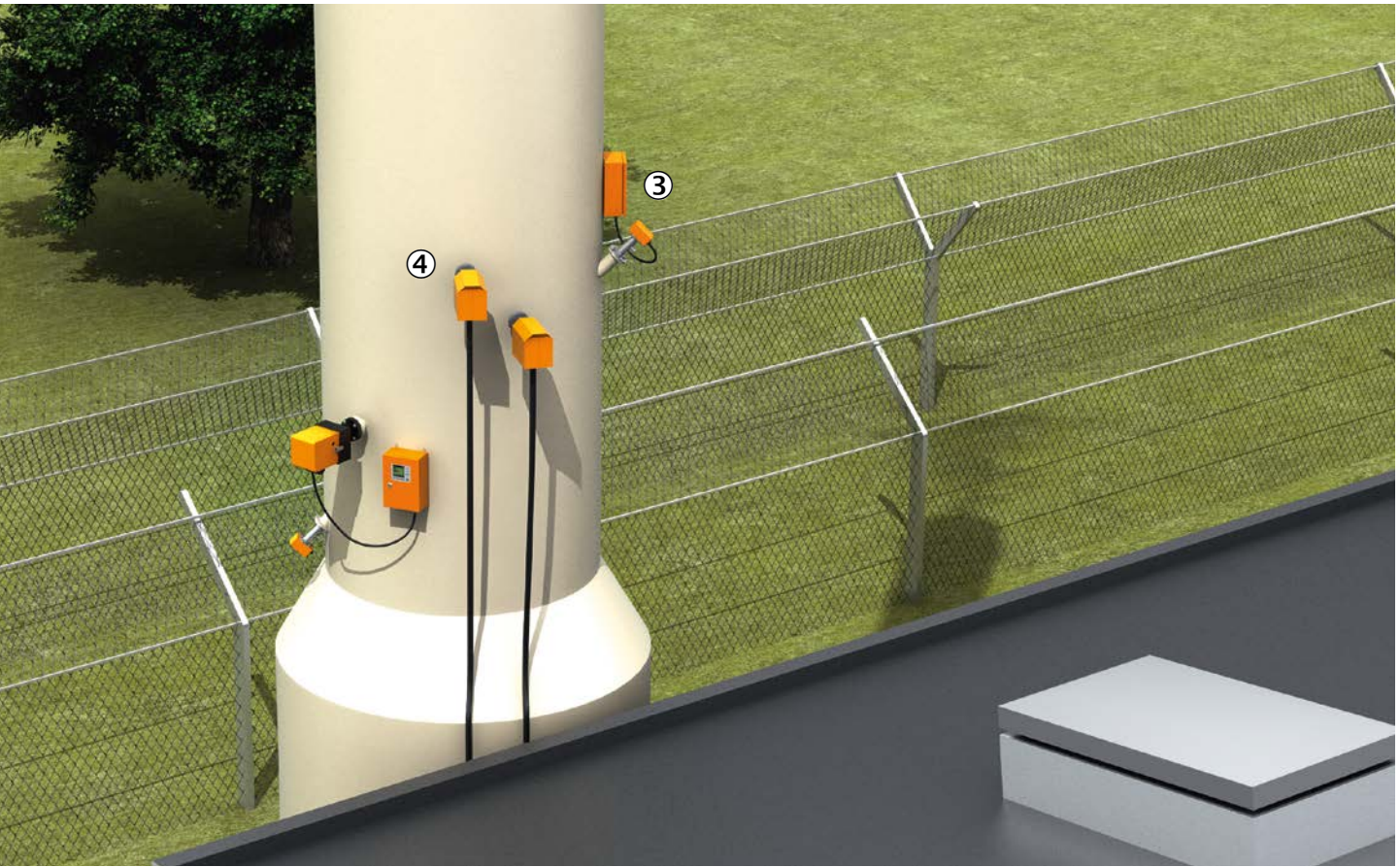
④ Monitoring of mercury in ammunition disposal

The MERCEM300Z extractive gas analyzer has the smallest certified measuring range of all measuring systems suitability tested in accordance with EN 15267-3, with a range from 0 to 10 $\mu\text{g}/\text{m}^3$ total mercury content. It is also suitable for continuously monitoring the annual threshold of 10 $\mu\text{g}/\text{m}^3$, which is set to come into force in future.

The greatest advantage of the MERCEM300Z is that it transforms oxidized mercury into metallic mercury without the addition of chemicals or converters, which significantly reduces the amount of maintenance required in comparison to all other measuring systems. This system is the only certified measuring assembly that can be operated with a heated sample gas line of a maximum of 35 m.



MERCEM300Z → p. 66



Emissions calculator for ammunition disposal

The MEAC emissions calculator is ideal for recording, saving, normalizing, analyzing, displaying, and forwarding a continuous flow of data. It is available in several different models, which perform reporting in accordance with the applicable local legislation. The MEAC is TÜV-tested and certified, and provides data analysis that takes into account QAL3 data on drift control, amongst other elements.

SICK also provides solutions involving the MEAC for redundant operation. For digital data transfer to the control system, all standard data transmission protocols are available: Modbus, PROFIBUS, and OPC. Wired, analog signal transmission is also possible.



MEAC → p. 73

EVERYTHING FROM STAND-ALONE DEVICES TO COMPLETE ANALYZER SYSTEMS

SICK provides application-related system solutions based on an extensive range of products. In addition to standard solutions, SICK also provides customized system solutions for the waste and recycling industry.

Ready-to-use analyzer containers

Whether used for emissions or process measurements, the analyzers should be installed in the immediate vicinity of the measurement points. Analysis containers serve an important function here by protecting the highly precise measuring systems and signal processing devices from the harsh ambient conditions at the installation site in the waste incineration plant.



Custom planning and engineering

Planning and engineering at SICK is combined with decades of experience in emissions and process monitoring. SICK's engineers use the latest CAD systems to plan and design solutions to handle the waste incineration plant requirements. In doing so, the latest technology in analyzers and sample conditioning is deployed, and the current communications interfaces are used to ensure rapid data transfer. Systems are designed in accordance with the applicable international standards, as well as many national standards. Implemented solutions are extensively and clearly documented. The system documentation thus forms the basis for creating comprehensive project documentation and for supplying replacement parts rapidly. Customers have an experienced project team and a worldwide service organization at their disposal through commissioning and afterwards to ensure reliable and sustained system operation.



Project management according to internationally recognized methods

SICK ensures globally consistent and effective project management. No matter in what country our customers award a project contract to SICK, our international project teams provide consistent project results based on the same high standards of quality. Experienced project teams support the projects starting with the contract award and continuing through to acceptance at the construction site. These teams work to adhere to the scheduled project delivery deadlines, organize the system acceptance in the plant or on-site, and update the project documentation in consultation with the customer. The project team remains available even after the conclusion of the project. The responsible project team begins supporting complex projects as early as the bidding phase. This ensures that all project requirements are correctly understood and included in the bid.



SICK Meeting Point Router (MPR)

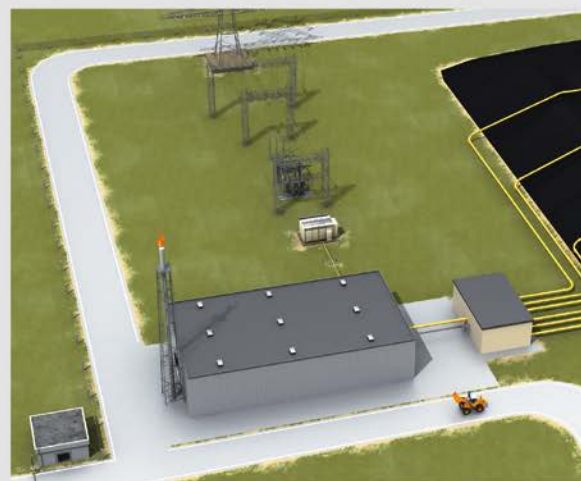
SICK's Meeting Point Router works like a modem. It acts as a connection switching point between your sensors and systems and ensures safe, feedback-free separation of the networks. You can activate and quit the remote maintenance with the touchscreen.

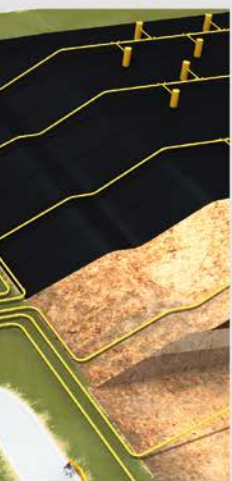
Your benefits

- Remote session activation with a click
- No mechanical devices like fans or hard disks
- Also ideal for small systems
- Physical network separation for highest level of security
- Can also be retrofitted into existing systems



PRODUCT OVERVIEW WASTE AND RECYCLING





Product overview

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ZIRKOR302 – At a glance

- All parts in contact with gas are heated
- Automatic testing and adjustment with ambient air
- Fixed physical zero point
- Short response time
- Operation of up to 3 sensors via one evaluation unit

Your benefits

- For high process temperatures up to 1400 °C
- No reference gas required
- No re-ignition into sample gas possible
- Ideal for process control due to rapid measurement
- Economic due to low maintenance effort

→ www.mysick.com/en/ZIRKOR302

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.



GM32 – At a glance

- Direct, fast in-situ measurement
- No gas sampling, no gas transport, no gas conditioning
- Up to eight measuring components at the same time, plus process temperature and pressure
- DOAS and CDE evaluation process
- Numerous independent measuring ranges with consistent accuracy
- Automatic self-test function (QAL3) without test gases
- Overpressure encapsulated design for ATEX Zones 1 and 2

Your benefits

- Measured values in real time without altering the gas composition
- Short-term process deviations are detected
- Representative measurement by selection of cross-duct or measuring probe versions
- Fast on-site service due to modular design
- Long maintenance-free intervals
- Cost-effective in-situ gas analyzer – also in ATEX design
- Low cost of installation and operation, no test gases required
- Complete emissions measurement in Kraft pulp process by way of simultaneous measurement of TRS components plus SO₂, NO, NH₃

→ www.mysick.com/en/GM32

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.





GM700 – At a glance

- High selectivity due to high spectral resolution
- Short response times
- No calibration required
- No moving parts: minimal wear and tear
- No gas sampling and conditioning required

Your benefits

- Unbiased measuring values due to in-situ measurement directly in the process
- Best application solution using probe or cross-duct type
- High reliability during operation
- Also applicable for harsh environment conditions
- Detection of fast and short-term process fluctuations

→ www.mysick.com/en/GM700

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.



GM901 – At a glance

- Representative measurement across the duct
- Operation via evaluation unit
- Short response times
- Verifiable with gas-filled cuvette; gas testable probe with test gas

Your benefits

- Measurement results in real time due to in-situ measurement
- Fast and simple installation and commissioning
- Easy, user-friendly operation
- Economical due to low maintenance

→ www.mysick.com/en/GM901

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.





MERCEM300Z – At a glance

- Accurate measurement of “total mercury” directly in a thermal converter (patented)
- Measuring operation without using consumables
- Very low maintenance gas sampling using an ejector pump – no moving parts
- Integrated adjustment cell for automatic drift correction
- Automatic adjustment of the entire measuring system with a built-in test gas generator (optional)
- Modular design with the entire system

Your benefits

- Reliable results of the actual measuring values of elemental Hg and Hg compounds in gases
- Very low operating expenses
- Measuring certainty using the fully automated adjustment with test gas
- Minimum maintenance expenditure
- Long-term stability minimizes technician time requirements due to self-adjusting measuring system
- Convenient and fast access for easy service and user-friendly remote diagnosis

→ www.mysick.com/en/MERCEM300Z

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.



SIDOR – At a glance

- Detector with high long-term stability
- Paramagnetic or electrochemical O₂ measurement
- Automatic adjustment with component-free ambient air
- Insensitive to contaminations

Your benefits

- Automatic adjustment, self-monitoring and fault diagnosis
- Test gas adjustment only every 6 months
- Long maintenance intervals
- TÜV approval and ATEX type approval for measurement of CH₄, CO₂ and O₂
- Repairable on site
- Exchange of components without complicated temperature adjustment in the factory

→ www.mysick.com/en/SIDOR

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.



GMS800 – At a glance

- 7 different analyzer modules: DEFOR (NDUV, UVRAS), FIDOR (FID), MULTOR (NDIR), OXOR-E (electrochemical O₂), OXOR-P (paramagnetic O₂), THERMOR (TC) and UNOR (NDIR)
- 4 different types of enclosures
- Gas module with sample gas pump and/or control sensors
- New enclosure type for easy and quick integration in analyzer cabinets
- Remote diagnosis via Ethernet with software SOPAS ET

Your benefits

- Approved according to EN 15267-3 and EN 14181
- Installations in Non-Ex-areas and Ex-areas (Zone 1 and 2 according to ATEX) possible
- Minimum service and maintenance work as well as easy reconditioning of existing installations due to modular design
- Adjustment without test gases via optional adjustment unit
- Minimal influence of ambient temperature through thermostatic controlled modules
- System solutions with turn-key analyzer cabinets MAC800
- Reliable measuring results by proven measurement technology
- Easy maintenance and repair due to replacement of complete assemblies or modules



→ www.mysick.com/en/GMS800

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.



GMS800 FIDOR – At a glance

- Standard 19" enclosure for easy integration into all industry-typical systems
- Maintenance free ejector pump delivers sample gas to the analyzer
- Integrated catalytic converter (option) provides very clean zero gas
- Automatic regulation and compensation of process pressure fluctuations
- Protective filter at sample gas inlet
- High degree of linearity ($\leq 2\%$) for very low and high measuring ranges

Your benefits

- High availability (99.5 %)
- Convenient remote diagnosis and operation via ethernet using SOPAS-ET software
- Minimum maintenance costs due to the absence of moving parts
- Replacement of complete assemblies and modules makes repairs easy
- Compatible with predecessor systems
- Hydrogen as fuel gas, expensive helium is not required
- Low operating costs, e.g., due to low hydrogen consumption (typical 30 ml/min)
- The GMS811 FIDOR, on which the control unit (BCU) can be separated from the analyzer unit, supports convenient control and monitoring from a central control room.



→ www.mysick.com/en/GMS800_FIDOR

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.





S700 – At a glance

- 5 different measuring principles available
- Over 60 measuring components from which to choose
- 3 different enclosure versions for several application ranges
- Up to 3 analyzer modules in one enclosure

Your benefits

- Easy application-specific adaptation due to modular design
- Also suitable for hazardous areas Zone 1 and Zone 2 (ATEX)
- Automatic adjustment with test gas or calibration cuvette
- Integrated self diagnostics and watchdog functions

→ www.mysick.com/en/S700

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.



FWE200 – At a glance

- For very low to medium dust concentrations
- Gas sampling and return combined in one probe
- Contamination check
- Automatic check of zero and reference point

Your benefits

- Reliable dust measurement in wet gas
- No movable parts with contact to aggressive gas, therefore low maintenance efforts
- Installation directly at the duct due to compact design

→ www.mysick.com/en/FWE200

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.





DUSTHUNTER SB50 – At a glance

- For low to medium dust concentrations
- One-side installation
- Automatic check of zero and reference point
- Automatic compensation of background radiation, therefore no light absorber necessary
- For medium to large duct diameters

Your benefits

- Easy installation, commissioning and operation
- Measurement independent of gas velocity, humidity and particle charge
- Low maintenance due to self-monitoring

→ www.mysick.com/en/DUSTHUNTER_SB50

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.



DUSTHUNTER SB100 – At a glance

- For very low to medium dust concentrations
- One-side installation
- Contamination check
- Automatic check of zero and reference point
- Automatic compensation of background radiation, therefore no light absorber necessary
- For medium to large duct diameters

Your benefits

- Easy installation, commissioning, and operation
- Measurement independent of gas velocity, humidity and particle charge
- Approved according to EN 15267
- Low maintenance due to self-monitoring

→ www.mysick.com/en/DUSTHUNTER_SB100

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.





DUSTHUNTER SP100 – At a glance

- One-side installation
- For very low to medium dust concentrations
- Automatic check of zero and reference point
- Contamination check
- Hastelloy probe available for corrosive gas environments
- For small to medium duct diameters

Your benefits

- Ideal for thick- or double-walled ducts
- Approved according to EN 15267
- Low maintenance due to self-monitoring and contamination check

→ www.mysick.com/en/DUSTHUNTER_SP100

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.



DUSTHUNTER T100 – At a glance

- For medium to high dust concentrations
- Integrated contamination check
- Automatic check of zero and reference point
- For small to large measuring distances

Your benefits

- Easy installation, commissioning and operation
- Measurement independent of gas velocity, humidity and particle charge
- Low maintenance due to self-monitoring
- Approved according to EN 15267

→ www.mysick.com/en/DUSTHUNTER_T100

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.





DUSTHUNTER T200 – At a glance

- Integrated contamination check for sender/receiver and reflector unit
- Automatic self-alignment of the optical assembly
- Automatic check of zero and reference point
- For medium to high dust concentrations
- For small to large measuring distances

Your benefits

- Easy installation, commissioning and operation
- Measurement independent of gas velocity, humidity and particle charge
- Low maintenance due to self-monitoring and contamination check
- Approved according to EN 15267

→ www.mysick.com/en/DUSTHUNTER_T200

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.



Combiprobe CP100 – At a glance

- Tested for suitability or officially approved
- Complete analyzer solutions
- Detection of pollutants and reference quantities that are relevant to emissions

Your benefits

- Officially approved analyzer systems
- Long maintenance intervals
- Convenient complete solutions for monitoring emissions

→ www.mysick.com/en/Combiprobe_CP100

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.





MCS100E HW – At a glance

- Extractive measurement of up to 8 IR-active gas compounds
- Additional oxygen and total hydrocarbon analyzers as an option
- Gas paths completely heated
- Test gas supply at the gas sampling probe or at the analyzer
- Back-purging of gas sampling probe for cleaning of filters
- Fast sample gas exchange for minimizing adsorption and desorption effects
- Automated sample point switching

Your benefits

- Measurement of several gas components with one analyzer
- Heated gas paths enables measurement of difficult gases like HCl and NH₃
- Long maintenance intervals (typically 6 months) due to self monitoring of the analyzer
- Selective measurement of NO and NO₂ – no converter required
- QAL3 drift test according to EN 14181 with internal calibration filter wheel – no test gas required

→ www.mysick.com/en/MCS100E_HW

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.



MCS100FT – At a glance

- Lowest approved HF measuring range of 0 ... 3 mg/m³
- Automatic spectrum adjustment via AutoVAL for reliable measuring values
- Operation via touchscreen
- Sample gas transport by an ejector without moving parts
- Approved according to EN 15267-3
- Remote control and diagnosis via software SOPAS ET
- Automatic adjustment of analyzer
- Automatic backflushing and filter cleaning of sampling unit

Your benefits

- Proper HF limit value monitoring
- Only one analyzer for more than 12 measuring components
- Easy integration into the customer network environment
- Long maintenance interval of 6 months for many measuring components
- Type approved measurement of greenhouse gases such as N₂O, CH₄ and CO₂
- Low maintenance requirements

→ www.mysick.com/en/MCS100FT

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.





MEAC – At a glance

- Evaluation according to EU directives 2000/76/EC and 2001/80/EC
- Evaluation according to 13., 17., 27. and 30. FICA and TA -Luft (Technical. Instructions on Air Quality Control)
- Inclusion of operational parameters and plant conditions
- Visualization of emission and operational data
- Remote data transfer, remote diagnosis and remote control
- Alarm signals when exceeding the limit values

Your benefits

- Software monitors all communications with connected field devices and control systems
- All values are stored on hard disk, thus it is possible to look at data history even after many years
- A routine back-up is made regularly on a second hard disk
- Screen displays and output of actual and historical data are freely configurable

→ www.mysick.com/en/MEAC

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.



MCS300P HW – At a glance

- Simultaneous measurement of up to 6 components plus O₂
- Sample flow control and sample gas pressure measurement
- Temperature of heated system components up to 220 °C
- Automatic sample point switching for up to 8 sample points (option)
- Automatic adjustment of zero and span point
- Integrated adjustment unit without span gas (option)
- Extended operation via PC and software
- Flexible I/O modules

Your benefits

- Economic, automatic adjustment without expensive test gases
- Easy remote control by integration in existing networks
- Automatic control of the complete measuring system and probe
- Low maintenance and reliable due to hot measurement
- In combination with probe SCP3000 also for measurements at high dust loads and high temperatures
- Short response time due to high sample gas flow

→ www.mysick.com/en/MCS300P_HW

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.





MKAS – At a glance

- Up to 3 S710 or SIDOR analyzers or NO_x-converter
- Includes the major system components
- Can be upgraded with optional components
- Wired and tested – ready for use

Your benefits

- Due to modular concept adaptable to the measuring task
- Proven system components offer a reliable solution
- Fulfills the requirements for an automatic measuring system according to EU standards
- Reduced response times due to sample gas bypass

→ www.mysick.com/en/MKAS

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.



FLOWSIC100 – At a glance

- Rugged titanium transducers for high durability
- Corrosion-resistant material for application in aggressive gases (option)
- Integral measurement over the duct diameter with types H, M and S
- Probe type PR for economic installation from one side of the duct
- Automatic function control with zero and span point check

Your benefits

- Reliable flow measurement for ducts with small up to very large diameters
- High durability of the device
- Minimum operating and maintenance costs
- Accurate measuring results under difficult measuring conditions
- Measurement without pressure loss, therefore no influences on the process
- User-friendly operation via SOPAS ET software
- Reliable function monitoring due to enhanced diagnosis
- No purge air required for applications with gas temperatures up to 260 °C

→ www.mysick.com/en/FLOWSIC100

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.



**FLWSIC100 Flare – At a glance**

- Highest measurement resolution and short response time
- Innovative sensor design for very high gas velocities
- Optimal signal transmission also at atmospheric pressure
- Remote installation of control unit up to 1,000 m away
- Single and multipath meter configuration
- Field repeatable check procedure of factory zero flow test
- Check cycle for automatic self-diagnosis / signal optimization

Your benefits

- Reliable process control by accurate measurement near to zero flow readings
- High measurement availability also under emergency plant operation conditions with high gas velocities up to 120 m/s
- Cost saving by remote installation of control unit in safe area
- System solution to serve three different flare measurements with a single control unit
- Cost saving by minimized installation using single probe version FLOW SIC100 EX-PR
- Securing optimal meter performance by continuous monitoring of meter function and extended field diagnostic capabilities

→ www.mysick.com/en/FLWSIC100_Flare

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.

**FLWSIC600 – At a glance**

- High efficient ultrasonic transducers
- Direct path layout
- Intelligent self-diagnostics
- Compact, robust design
- Integrated log book and data logger
- Large measuring range 1:120
- Bidirectional measurement
- Low power consumption: <1 W

Your benefits

- Long-term stability, reliable measurement
- Low maintenance due to intelligent self-diagnostics
- Virtually immune to pressure regulator noise
- Ultrasonic transducers can be exchanged under operating pressure
- Wide application range

→ www.mysick.com/en/FLWSIC600

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.





DFS60 – At a glance

- Compact installation depth
- High resolution up to 16 bits
- Optionally programmable: Output voltage, zero pulse position, zero pulse width and number of pulses
- Connection: Radial or axial cable outlet, M23 or M12 connector, axial or radial
- Electrical interfaces: 5V & 24V TTL/RS-422, 24 V HTL/push pull
- Mechanical interfaces: face mount or servo flange, blind or through hollow shaft
- Remote zero set possible

Your benefits

- Reduced storage costs and downtime due to customer-specific programming
- Variety of different mechanical and electrical interfaces enable the encoder to be optimally adjusted to fit the installation situation
- Excellent concentricity even at high speeds
- High resolution of up to 16 bits ensures precise measurements
- Permanent and safe operation due to a high enclosure rating, temperature resistance and a long bearing lifetime
- Programmability via the PGT-08 programming software and the PGT-10-S display programming tool allow the encoder to be adapted flexibly and quickly according to customer needs
- Programmable zero pulse position simplifies installation

→ www.mysick.com/en/DFS60

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.



LMS1xx – At a glance

- Small, light and economical measurement system
- Real-time output of measurement data via Ethernet interface
- Number of switching outputs can be expanded via external CAN module
- Parameterisation interface accessible from the front while device mounted
- Rugged housing
- Field evaluation using intelligent algorithms

Your benefits

- Lightweight housing makes it easy to mount
- No wiring between sender and receiver
- Advanced filtering technology rigorously reduces false trips caused by outdoor environmental factors like fog, rain and snow
- Optional external CAN I/O module increases number of switching outputs for greater application flexibility
- Fast, easy commissioning due to SOPAS software

→ www.mysick.com/en/LMS1xx

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.





LMS5xx – At a glance

- Powerful and efficient laser measurement sensor for ranges of up to 80 m
- Outstanding performance in adverse environmental conditions due to multi-echo technology
- Up to IP 67 enclosure rating, built-in heater for outdoor versions, highly compact design
- Low power consumption
- Fast signal processing
- Multiple I/Os
- Synchronization of multiple sensors possible

Your benefits

- Superior performance in a vast range of applications
- Smallest sensor with highest accuracy in its class
- Comprehensive range of lines and models to suit all performance and price requirements
- Fast, reliable object detection in nearly any weather conditions
- Low power consumption reduces total cost of ownership
- Best price/performance ratio in this sensor class on the market
- Fast, easy commissioning due to SOPAS software
- Self-monitoring functions increase system availability

→ www.mysick.com/en/LMS5xx

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.



Dx100 – At a glance

- 3-axis alignment bracket with quick lock system
- SpeedCon™ and standard M12 electrical connections
- Small and rugged metal housing
- Display with intuitive menu and easy-to-see status LEDs
- Pre-failure and diagnostic data available
- Numerous fieldbus and Ethernet interfaces
- Elongated holes for precise adjustment of sensor offset (or “home position”)
- Versatile accessories

Your benefits

- 3-axis alignment bracket ensures fast alignment and easy exchange, reducing maintenance and setup costs
- Enhanced closed-loop behavior offers highest performance and productivity
- Fast setup with an intuitive and easy-to-use display guarantees the perfect sensor settings
- Pre-failure and extensive diagnostic data allow for preventive maintenance, ensuring the highest machine uptime
- Numerous fieldbus and Ethernet-based interfaces offer the highest flexibility and fast communication for maximum efficiency
- Small, rugged metal housing and SpeedCon™ compatible connectors ensure hassle-free installation – even in confined spaces
- Numerous accessories allow flexible use and guarantee high operation functionality

→ www.mysick.com/en/Dx100

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.





Bulkscan® LMS511 – At a glance

- Non-contact measurement of volume and mass flow of bulk material
- Laser pulses with high angular resolution ensure outstanding image resolution
- 5-echo pulse evaluation produces highly reliable measurements
- Offers non-contact belt monitoring
- Integrated center-of-gravity calculator
- Robust structure for harsh ambient conditions
- Can also measure at low temperatures thanks to integrated heater
- Compact housing with IP67 enclosure rating

Your benefits

- Maximizes conveyor throughput
- Reduces maintenance costs by preventing belt slippage
- Increases the conveyor belt's service life
- Reduces loading time
- Increases efficiency by optimizing belt capacity
- Simple installation
- Low maintenance costs
- Offers savings through minimized energy consumption

→ www.mysick.com/en/Bulkscan_LMS511

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.



LFV300 – At a glance

- Several housing materials and electrical outputs available
- Commissioning without filling
- Process temperature up to 250 °C
- Immune to deposit formation
- Very high repeatability
- Aseptic versions according to EHEDG and FDA available, CIP and SIP resistant
- ATEX certification available
- Tube extension up to 6 m

Your benefits

- Easy installation and commissioning, no calibration necessary
- Easy operation and integration, saves time
- Maintenance-free sensor, reduces downtime
- Testing in place possible – no mounting required, which reduces installation time
- Flexible and tough system for a multitude of applications
- Universal technology works in all kinds of liquids

→ www.mysick.com/en/LFV300

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.





LBV300 – At a glance

- Tough device design
- Several housing materials and electrical outputs available
- Immune to deposit formation
- Commissioning without filling
- Process temperature up to 250 °C
- Very high repeatability
- ATEX versions (1D/2D/1G/2G) available
- Tube-extended version (LBV330) up to 6 m and rope extensions version (LBV320) up to 80 m available for vertical mounting

Your benefits

- Easy installation and commissioning, no calibration necessary
- Easy operation and integration, saves time
- Maintenance-free sensor, reduces downtime
- Testing in place possible – no mounting required, which reduces installation time
- Flexible and tough system for a multitude of applications
- Solutions for vertically mounted switches in difficult installation conditions and surroundings

→ www.mysick.com/en/LBV300

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.



RFU62x – At a glance

- Compact UHF RFID read/write device with integrated antenna for scanning ranges of less than 1 m
- Standard-compatible transponder interface (ISO/IEC 18000-6C / EPC C1G2)
- Supports industry-standard data interfaces and fieldbuses, as well as PoE
- MicroSD memory card for parameter cloning
- Extensive diagnostic and service functions

Your benefits

- Correct assignment and no overshoot thanks to the well-defined read/write range and intelligent filter functions
- Integrated process logic for remote solutions saves additional control and programming effort
- Can be easily integrated into industrial networks thanks to IDpro compatibility
- Firmware upgrades and industry-standard compliance ensure long-term reliability
- Minimum changeover times in case of failure thanks to cloning
- RFU62x can be mounted to metal directly – no loss of range
- Easy operation and installation with SOPAS user interface

→ www.mysick.com/en/RFU62x

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.



WE DELIVER “SENSOR INTELLIGENCE.”

SICK sensor solutions for industrial automation are the result of exceptional dedication and experience. From development all the way to service: The people at SICK are committed to investing all their expertise in providing with the very best sensors and system solutions possible.

A company with a culture of success

Over 6,500 people are on staff, with products and services available to help SICK sensor technology users increase their productivity and reduce their costs. Founded in 1946 and headquartered in Waldkirch, Germany, SICK is a global sensor specialist with more than 50 subsidiaries and representations worldwide.

Our exemplary corporate culture fosters an optimum work-life balance, thus attracting the best employees from all over the world. SICK is one of the best employers – we have been among the winners of the prestigious German “Great Place to Work” award for many years in succession.



Innovation for the leading edge

SICK sensor systems simplify and optimize processes and allow for sustainable production. SICK operates at many research and development centers all over the world. Co-designed with customers and universities, our innovative sensor products and solutions are made to give a decisive edge. With an impressive track record of innovation, we take the key parameters of modern production to new levels: reliable process control, safety of people and environmental protection.



A corporate culture for sustainable excellence

SICK is backed by a holistic, homogeneous corporate culture. We are an independent company. And our sensor technology is open to all system environments. The power of innovation has made SICK one of the technology and market leaders – sensor technology that is successful in the long term.



“SENSOR INTELLIGENCE.” FOR ALL REQUIREMENTS

SICK is a renowned expert in many industries, and is entirely familiar with the critical challenges they face. While speed, accuracy and availability take center stage in all industries, technical implementations vary greatly. SICK puts its vast experience to use to provide with precisely the solution you need.

For applications worldwide

Hundreds of thousands of installations and applications go to prove that SICK knows the different industries and their processes inside out. This tradition of uncompromising expertise is ongoing: As we move into the future, we will continue

to design, implement and optimize customized solutions in our application centers in Europe, Asia and North America. You can count on SICK as a reliable supplier and development partner.



For your specific industry

With a track record of proven expertise in a great variety of industries, SICK has taken quality and productivity to new heights. The automotive, pharmaceutical, electronics and solar industries are just a few examples of sectors that benefit from our know-how. In addition to increasing speed and improving traceability in warehouses and distribution centers, SICK solutions provide accident protection for automated guided vehicles. SICK system solutions for analysis and flow measurement of gases and liquids enable environmental protection and sustainability in, for example, energy production, cement production or waste incineration plants.

For performance across the board

SICK provides the right technology to respond to the tasks involved in industrial automation: measuring, detecting, monitoring and controlling, protecting, networking and integrating, identifying, positioning. Our development and industry experts continually create groundbreaking innovations to solve these tasks.

→ www.sick.com/industries



SERVICES FOR MACHINES AND SYSTEMS: SICK LifeTime Services

SICK LifeTime Services is a comprehensive set of high-quality services provided to support the entire life cycle of products and applications from plant walk-through to upgrades. These services increase the safety of people, boost the productivity of machines and serve as the basis for our customers' sustainable business success. LifeTime Services range from product-independent consulting to traditional product services and are characterized by extensive industry expertise and more than 60 years of experience.





→ www.sick.com/service



Consulting & Design

- Plant walk-through
- Risk assessment
- Safety concept
- Safety software and hardware design
- Validation of functional safety
- CE-conformance check



Product & System Support

- Installation
- Commissioning
- Start-up support
- Calibration
- Helpline support
- 24 h helpline
- SICK Remote Service
- Troubleshooting on site
- Repair
- Exchange units
- Extended warranty



Verification & Optimization

- Inspection
- Stop time measurement
- Machine safety inspection
- Electrical equipment check
- Accident investigation
- Initial verification
- Maintenance
- Performance check



Upgrade & Retrofits

- Upgrade



Training & Education

- Training
- Seminars
- WebTraining



VERSATILE PRODUCT RANGE FOR INDUSTRIAL AUTOMATION

From the simple acquisition task to the key sensor technology in a complex production process: With every product from its broad portfolio, SICK offers a sensor solution that best combines cost effectiveness and safety.

→ www.sick.com/products

Photoelectric sensors

- MultiTask photoelectric sensors
- Miniature photoelectric sensors
- Small photoelectric sensors
- Compact photoelectric sensors
- Cylindrical photoelectric sensors
- Fiber-optic sensors and fibers



Proximity sensors

- Inductive proximity sensors
- Capacitive proximity sensors
- Magnetic proximity sensors



Magnetic cylinder sensors

- Analog positioning sensors
- Sensors for T-slot cylinders
- Sensors for C-slot cylinders
- Sensor adapters for other cylinder types



Registration sensors

- Contrast sensors
- Markless sensors
- Color sensors
- Luminescence sensors
- Fork sensors
- Array sensors
- Register sensors



Automation light grids

- Measuring automation light grids
- Switching automation light grids



Opto-electronic protective devices

- Safety laser scanners
- Safety light curtains
- Safety camera systems
- Multiple light beam safety devices
- Single-beam photoelectric safety switches
- Mirror columns and device columns



Safety switches

- Electro-mechanical safety switches
- Non-contact safety switches
- Safety command devices



sens:Control – safe control solutions

- Safety controllers
- Safe sensor cascade
- Safety relays



Gas analyzers

- Gas transmitters
- In-situ gas analyzers
- Extractive gas analyzers



Dust measuring devices

- Scattered light dust measuring devices
- Transmittance dust measuring devices
- Gravimetric dust measuring devices



Analyzer solutions

- CEMS solutions
- Process solutions



Traffic sensors

- Tunnel sensors
- Overheight detectors
- Visual range measuring devices



Ultrasonic gas flow measuring devices

- Volume flow measuring devices
- Mass flow measuring devices
- Flow velocity measuring devices
- Gas flow meters
- Flow computers



Motor feedback systems

- Motor feedback system rotary HIPERFACE®
- Motor feedback system rotary HIPERFACE DSL®
- Motor feedback system rotary incremental
- Motor feedback system rotary incremental with commutation
- Motor feedback system linear HIPERFACE®



Encoders

- Absolute encoders
- Incremental encoders
- Linear encoders
- Wire draw encoders
- Safety encoders



Identification solutions

- Bar code scanners
- Image-based code readers
- Hand-held scanners
- RFID



Vision

- Vision sensors
- Smart cameras
- High-end cameras



Distance sensors

- Short range distance sensors (displacement)
- Mid range distance sensors
- Long range distance sensors
- Linear measurement sensors
- Ultrasonic sensors
- Double sheet detection
- Optical data transmission
- Position finders



Detection and ranging solutions

- 2D laser scanners
- 3D laser scanners



Fluid sensors

- Level sensors
- Pressure sensors
- Flow sensors
- Temperature sensors



System solutions

- Customized analyzer systems
- Collision awareness systems
- Flexible automation systems
- Object detection systems
- Profiling systems
- Quality control systems
- Security systems
- Track and trace systems



EASY INTEGRATION INTO YOUR AUTOMATION WORLD

Sensor integration with SICK is easy and fast for you: Our intelligent sensor solutions and safety controllers provide different integration technologies which allow easy access – from HMI, PLC, and engineering tools – to data from our sensors. In this way, we support you towards solving your application rapidly and easily and increase machine reliability with a continuous diagnostic concept.

PLC and engineering tool integration

Function Blocks	
IO-Link devices Level sensors Pressure sensors Presence detection sensors Distance sensors	Bar code scanners, Image-based code readers 1D and 2D
Vision sensors Inspectors	RFID RFH6xx RFU62x, RFU63x
Absolute encoders AFS60 AFM60	Laser volume flowmeter Bulkscan® LMS511

Function blocks

The SICK function blocks quickly allow you to establish acyclic communication to our sensors within your PLC program. Additionally, complex and variable process data can be parsed into their individual information contents without programmer effort.

DTM (Device Type Manager)

FDT/DTM is a cross-manufacturer concept, with which configuration and diagnosis of devices from different manufacturers can be done with just one engineering tool.

TCI (Tool Calling Interface)

The Tool Calling Interface (TCI) makes it possible to call up a tool used to carry out parameterization and diagnosis of a field device via the existing communication infrastructure.

HMI integration

OPC server

OPC technology is used to exchange data between field devices and Windows-based applications. The SOPAS OPC server from SICK follows the OPC DA specification and thus can be used on Windows operating systems.



Web server

The SOPAS web server from SICK can be used everywhere, where a web browser is available. The web server is distinguished by its ability to both carry out pure data exchange and also to provide visualizations for the devices, which is a big advantage, particularly for vision sensors.

Fieldbus Communication Interface



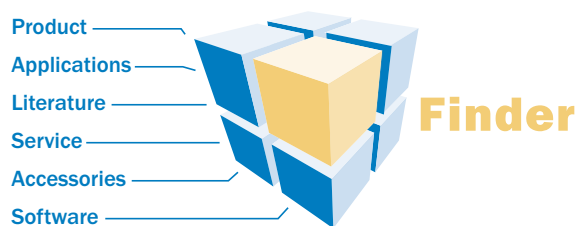
Modbus®TCP

Our fieldbus and network solutions allow SICK sensors and safety controllers to be connected to all conventional automation systems. This guarantees an easy and fast access to the available data.

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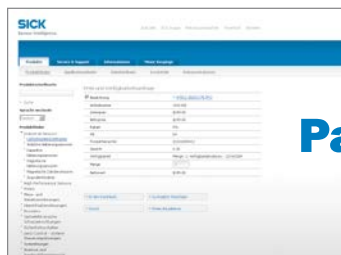
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SICK AT A GLANCE

SICK is a leading manufacturer of intelligent sensors and sensor solutions for industrial applications. With more than 6,500 employees and over 50 subsidiaries and equity investments as well as numerous representative offices worldwide, we are always close to our customers. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents and preventing damage to the environment.

We have extensive experience in various industries and understand their processes and requirements. With intelligent sensors, we can deliver exactly what our customers need. In application centers in Europe, Asia and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes us a reliable supplier and development partner.

Comprehensive services round out our offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

For us, that is “Sensor Intelligence.”

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Detailed addresses and additional representatives → www.sick.com