

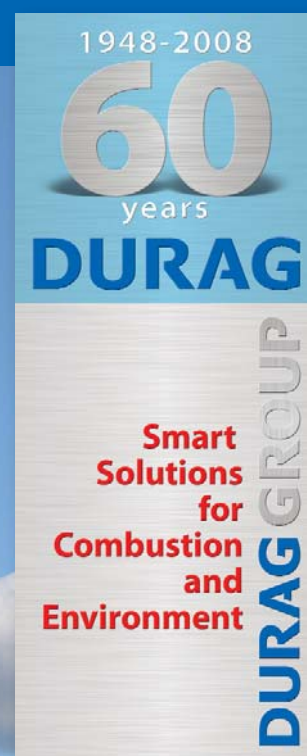
Product Overview

Emission Monitoring

Ambient Monitoring

Environmental and Process Data

Management Systems



Introduction

The DURAG GROUP develops and manufactures products in the field of environmental measuring technology for measuring and monitoring

- dust concentration and opacity
- total mercury concentration
- flue gas volume flow

as well as evaluation systems for the calculation of emissions.

The products are used worldwide in power generation plants and the process industry, such as e.g. fossil fuel power stations, waste incineration plants, refineries, chemical processing plants, cement works, the lime industry, the steel industry, filter and dust extraction plants as well as for monitoring ambient air.

The DURAG Group is known for its high standards of quality. DURAG has been ISO 9001 certified for a number of years and has fully implemented the corresponding requirements. The products are manufactured to national, European and international standards.

The following are taken into account:

- **VDI 2066 / VDI 3950** – German dust measurement standard
- **EN 14181** – European quality assurance standard for automatic measuring equipment
- **EN 13284** – European standard for determining small dust concentrations
- **EN 14884** – European standard for determining total mercury concentration
- **EN 12341** – European standard for determining PM10 airborne dust
- **ISO 10473** – International standard for beta absorption method
- **ASTM D-6216.98** – American dust measurement standard.

DIN EN 14181

DIN EN 14181 defines three so-called quality assurance levels (QAL) and an annual functional test (AST) for automatic measuring systems:

- **QAL 1:** Requirement for use of automatic measuring equipment that has had its suitability tested (the test complies with DIN EN ISO 14956)
- **QAL 2:** Installation of automatic measuring system (AMS), calibration of AMS using the standard reference method (SRM), determination of measuring uncertainty / variability of AMS and check for observance of preset measuring uncertainties
- **QAL 3:** Continuous quality assurance by the operator (drift and precision of the AMS, verification on control card)
- **AST:** Annual surveillance test including SRM measurements to check the uncertainty of the AMS values.

DIN EN 14181 prescribes which characteristics automatic measuring equipment must possess, and how they must be calibrated and maintained. In addition to the calibration function, measurement inaccuracy - which plays a decisive role in the validation of the measured values obtained during continuous monitoring - is also determined from the data of the calibration. In addition, the requirements for the uncertainty of the measured values obtained with the measuring equipment, which are defined in the EU directives relating to large combustion plants, waste incineration plants and waste co-incineration plants, are checked using a method described in the standard.

QAL 1 – Testing the suitability of the equipment technology

QAL 1 specifies the suitability of a measuring device by calculating the total measuring uncertainty according to EN ISO 14956 before installation, by taking account of all potential influences.

Devices that have passed the TÜV suitability test and have been established as suitable measuring devices generally fulfil the standards of QAL 1.

QAL 2 – Installation and calibration check

Selection of the measuring location and correct installation of the measuring device. Calibration of the device using a standard reference method, min. 15 measuring points distributed over 3 days, determination of the calibration curve or curves in different operating conditions (fuels, load, etc.) and definition of the area of validity of the calibration curve.

Calculation of the total measuring uncertainty of the measuring device.

QAL 3 – Continuous monitoring

Regular checks of the zero and reference point drifts during the plant operation by the operating personnel should ensure reliable and correct operation of the measuring device.

AST – Annual inspection

The calibration curve found in QAL 2 must be checked / confirmed annually by means of 5 parallel measurements.

Monitor selection

In addition to the general data, such as desired measurand or measuring range, special account must be taken of the plant conditions at the measuring location when selecting a suitable measuring device, especially in the case of dust concentration measurement.

Opacity

A light beam sent through a mixture of gas and particles is attenuated by absorption and diffusion. The more particles are found in the light beam, the stronger the opacity. The ratio of received light to initial light is a measurement of the transmission or the reciprocal opacity.

Extinction

By converting the transmission to extinction and after a gravimetric comparison measurement the display is in mg/m^3 . For dust concentrations this result is displayed in mg/Nm^3 by calculation with the reference units T, P, RF.

Scattered light

A light source emits light which is diffused by particles in the gas and recorded by a detector. The scattered light principle is suitable for small dust loads to under $1 \text{ mg}/\text{m}^3$. The relationship between measured value display and dust load is determined by means of gravimetric comparison measurement.

Smoke spot number (soot)

Scattered light measurement with very low measuring range. Smoke spot number 1 corresponds to approx. $100 \mu\text{g}/\text{m}^3$. A comparison measurement determines the relationship between display and smoke spot number.

Triboelectricity

Triboelectricity results from friction between bodies or particles. If these charged particles strike a measuring probe, an electron transfer takes place. The value of the charge is a measurement for the dust mass flow rate. The relationship between measured value display and dust concentration can be determined by a gravimetric comparison measurement.

Dew point

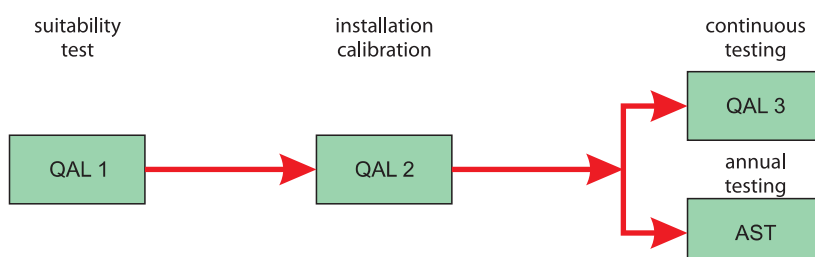
Every gas mixture contains a defined quantity of humidity. The maximum possible saturation humidity is dependent on the temperature: if air is continuously cooled, with constant absolute air humidity the relative air humidity increases up to 100%. If the air is further cooled, the humidity condenses as water drops and affects the measuring result in optical and triboelectric measuring procedures.

Temperature

The ambient temperature of the measuring head may be maximum 50°C . In optical systems, the purge air is also used as cooling air and separates the hot exhaust gas through the purge air buffer. In transmission systems, the standard assembly connection can be used up to an exhaust gas temperature of 200°C . Beyond this, the connection must be extended (approx. $1 \text{ mm} / 1^\circ\text{C}$).

Pressure

The standard purge air blower can be used up to a channel overpressure of 20 hPa. Beyond this, special blowers are available. A flap valve should be used in the event of overpressures.

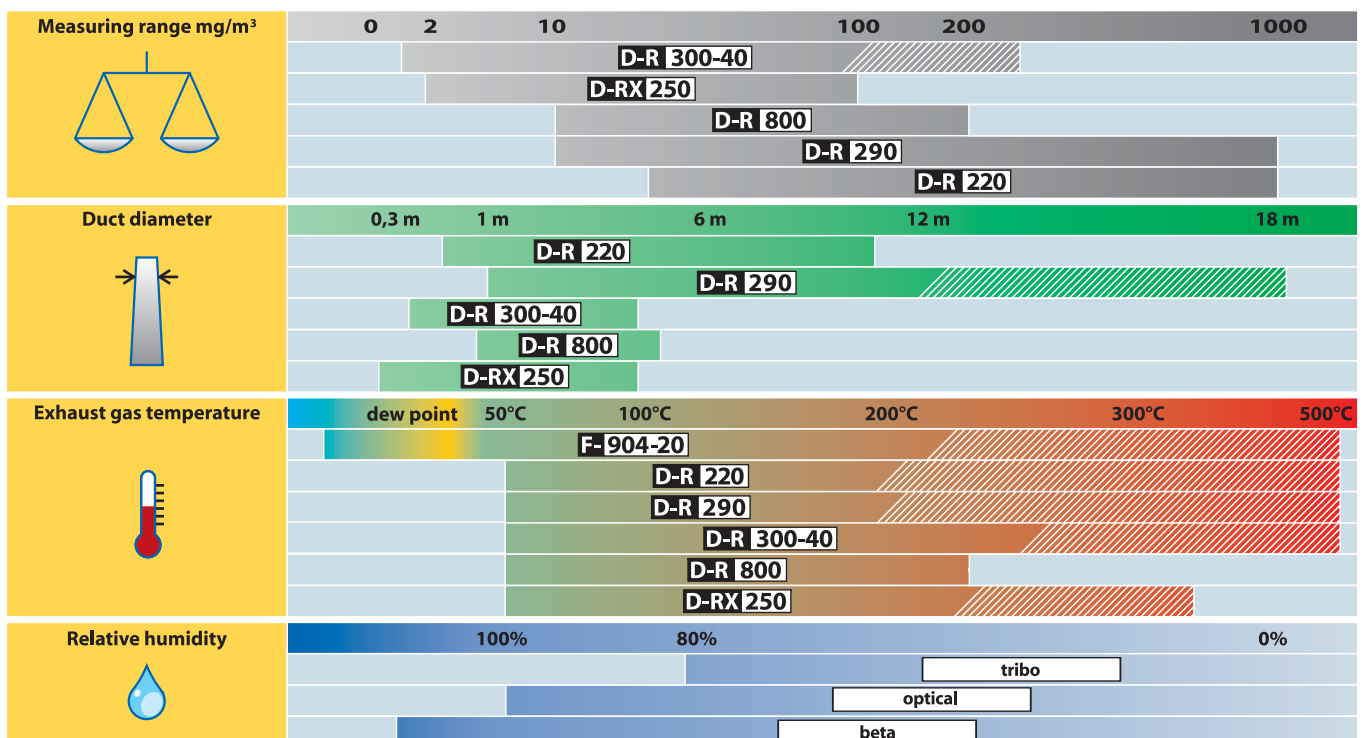


Devices for measuring emissions and immissions

Measurement	Dust / Opacity		Dust	Soot	Dust	Dust	Dust	Total Mercury	Ambient Dust
Measuring principle	Transmission		Scattered Light		Forward Scattering	Tribo	Beta	UV Photometer	Beta
DURAG Group Device	D-R 220	D-R 290	D-R 300-40	D-R 300	D-R 800	D-RX 250	F-904-20	HM-1400TR	F-701-20
TÜV		●	●	●	●	●	●	●	●
US EPA		●							
GOST		●	●		●	●	●		
MCERTS		●	●		●	●		●	
Korean		●	●				●		
in-situ	●	●	●	●	●	●			
extractive							●	●	●
Automatic zero and control point		●	●	●	●	●	●	●	●
Automatic soiling correction		●	●	●	●	N/A	N/A	N/A	N/A
Fail safe shutters		●	●	●		N/A	N/A	N/A	N/A
Range switching		●	● opt.				●	●	●
Remote control unit		●				●			
Calibratable in	mg/m ³ wet	mg/m ³ wet	mg/m ³ wet	smoke spot number	mg/m ³ wet	mg/m ³ wet	mg/m ³	mg/m ³	mg/m ³
Measuring ranges	0-0.2...1.6 Ext	0-0.1...1.6 Ext 0-20...100%	0-1...30 mg/m ³ *	3 RZ	0-10...200 mg/m ³	0-2...100 mg/m ³ wet	0-1...0-1000 mg/m ³	0-45...500 µg/Nm ³	0-0.1...10 mg/m ³
Detection limit @ stack Ø 1 m	20 mg/m ³	10 mg/m ³	0.01 mg/m ³	0.06 RZ	0.2 mg/m ³		0.01 mg/m ³	0.5 µg/Nm ³	N/A
Detection limit @ stack Ø 5 m	8 mg/m ³	2 mg/m ³	0.01 mg/m ³	0.06 RZ	0.2 mg/m ³		0.01 mg/m ³	0.5 µg/Nm ³	N/A
Sample collection/ Heavy metal analysis							●		●

* with measuring range switching up to approx. 300 mg/m³

Comparison of emission dust monitors according to application criteria



//// Option

Optical dust and opacity meter

New system for monitoring dust emissions on smaller plants and in process applications.

Features

- In-situ measurement directly in the flue gas flow
- Digital operation with microprocessor
- Adjustable limit value
- 2 contact switch outputs
- Measuring value integral 4/15/64 seconds
- Internal event memory
- PC-interface for easy maintenance
- Modbus RTU interface
- Measurement results shown as opacity or extinction
- No weather protection covers needed.

Applications

- Non-compliant device for smaller plants
- Heating stations, power stations
- Boiler plants in industry, barracks, hospitals, schools
- Dust extraction and filter plants
- Process monitoring
- Filter monitoring.

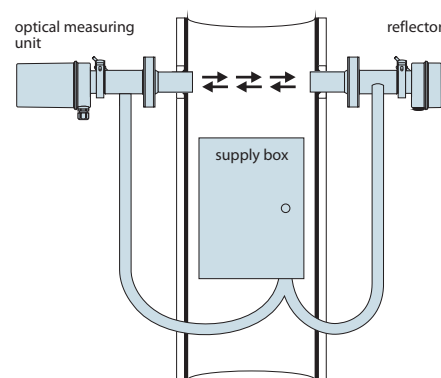


Measuring principle

The device operates using the double-pass method according to the auto-collimation principle. The light beam traverses the measuring distance twice. The attenuation of the light beam by the dust content in the measuring section is measured and evaluated.

System components

- D-R 220 measuring head
- Reflectors for measuring distances 0.4 to 10 m
- Mounting flanges
- Supply box with purge air unit
- Zero point reflector.



Models

- System 1: for measuring sections up to 3 m
- System 2: for measuring sections from 2.5 m up to 10 m.

Options

- Neutral density filters for linearity check
- Sighting scope

measurements	opacity, extinction	accuracy	<2% of measuring range
measuring ranges	0–25/50/100% OP 0–0.2/1.6 Ext	detection limit	<3% of measuring range
measuring principle	transmission	supply voltage	24 VDC, 0.4 A
flue gas temperature	above dew point up to 200°C, optional up to 500°C, depending on application	dimensions (H x W x D)	measuring head 160 x 150 x 314 mm
flue gas pressure	-50 up to +10 hPa, optional higher	weight	measuring unit 2.7 kg, reflector 1,6 kg
duct diameter	400–10,000 mm	supply box	
ambient temperature	-20 up to +50°C	purge air supply	integrated
protection	IP65	supply voltage	85–264 VAC, 46–63 Hz, 50 VA
measuring output	0 / 4–20 mA / 400 Ohm	dimensions (h x w x d)	210 x 300 x 380 mm
digital outputs	2 relay outputs 30 VA, max. 48 V/1A	weight	13 kg
digital inputs	NA	protection	IP54

Optical opacity /dust monitor

Standard system for plants with small to medium dust concentrations.

Features

- In-situ measuring procedure, continuous measurement
- Semi-conductor source with long service life
- Super-wide band diode (SWBD), which provides more stable measuring results in comparison to devices with conventional LEDs
- Powerful microprocessor technology
- Measured value display on LC display in opacity, extinction or in mg/m^3
- Automatic function tests with correction of measured values in relation to soiling
- Optics and electronics in a hermetically sealed unit - no smoke gas can enter device
- Easy adjustment without additional equipment
- Low-maintenance thanks to optimal purge air conduction.

Applications

Plants in which the dust concentration quantity needs to be measured, e.g.:

- Furnace plants with semi-anthracite coal, brown coal, fuel oil and combined heating
- Converter plants, asphalt mixing plants
- Plants for cement manufacture.

Approvals

- Suitability-tested by the TÜV Cologne, test report 936/801017
- Itemized in the list of suitable measuring devices for continuous emission measuring.
- MCERTS.



TÜV



Measuring principle

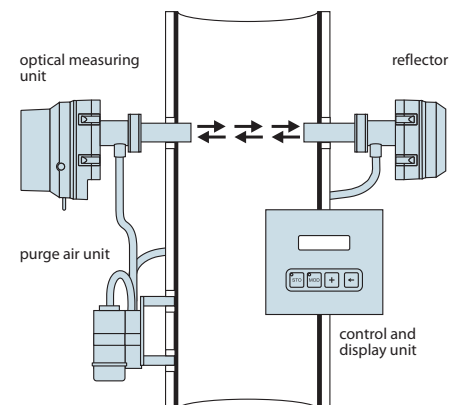
The device operates using the double-pass method according to the auto-collimation principle. The light beam traverses the measuring distance twice. The attenuation of the light beam by the dust content in the measuring section is measured and evaluated.

System components

- Mounting flanges
- Measuring head
- Reflector
- Control and display unit
- Purge air unit.

Options

- Bus interface, e.g. Modbus or similar
- Automatic quick-closing shutters to protect the measuring head and the reflector in the event of failure of the purge air
- Weather protection covers, for outdoor installation
- Explosion proof design for EEx p, Zone 1 or Zone 2
- With an additional display unit at the measuring location, the control and display unit can be installed in up to 1000 m distance away
- Temperature compensation through additional analog input
- Special model for measuring distances up to 18 m with 2 purge air units
- Filter set for sensitivity and linearity control.



measurements	opacity, extinction	detection limit	0.75% @ extinction 0–0.1
switchable measuring ranges	opacity: 0–20% ... 0–100% extinction: 0–0.1 ... 0–1.6 dust: 0–80 mg/m^3 ... 0–4000 mg/m^3 ¹⁾	reference point drift	<0.4% of measuring range/month
measuring principle	transmission	zero point drift	<0.4% of measuring range/month
flue gas temperature	above dew point up to 250°C, optional up to 1000°C, depending on application	supply voltage	95–264 VAC, 47–63 Hz, 30 VA
flue gas pressure	-50 up to +20 hPa, optional higher	dimensions (h x w x d)	measuring head 363 x 185 x 398 mm
duct diameter	1 up to 12 m, optional up to 18 m	weight	7 kg
ambient temperature	-20 up to +50°C, optional higher	remarks	¹⁾ with reference to one meter of path length after gravimetric calibration
protection	IP65, Ex optional	purge air supply	
measuring outputs	2 x 0 / 4–20 mA / 500 Ohm, manual or automatic measuring range switching, optional Modbus RTU, Profibus DP	purge air quantity	approx. 80 m^3/h
digital outputs	6 programmable relay outputs, permissible load 48 V / 0.5 A	supply voltage	115/230 VAC, 50/60 Hz, 0.37 / 0.43 kW
digital inputs	6 programmable potential free inputs	dimensions (h x w x d) weight	350 x 550 x 500 mm 12 kg
accuracy	<1% of measuring range	protection	IP65

Measuring device for smoke spot number / dust concentration

D-R 300: Extremely sensitive device for measuring smoke spot number.

D-R 300-40: Especially sensitive measuring device for the smallest concentration of dust, in particular in waste incineration plants.

Features

- In-situ measurement directly in the flue gas flow
- Automatic system tests and correction of measured values
- Self-calibration in 4-h cycle
- Optics and electronics in a hermetically sealed unit - no smoke gas can enter device
- Maintenance-friendly, thanks to optimal purge air conduction in front of the heated optical end plates
- Direct access to all parameters via the operator display
- Automatic measuring range selection in accordance with 17. BImSchV. in relation 1:3:9*.

Applications

- Smoke spot number measurement in furnaces designed for light fuel oil
- Fine dust measurements in processes
- Waste incineration
- Filter monitoring and emission-value measuring in waste incineration and power plants*.

Approvals

- Suitability-tested by the TÜV Cologne, test report 936/800002
- Suitability-tested by the TÜV Cologne, test report 936/801004*
- Itemized in the list of suitable measuring devices for continuous emission measuring
- MCERTS.

*D-R 300-40



System components

- Measuring head
- Mounting flange
- Control and display unit
- light trap(s)
- Purge air unit.

Options

- Automatic measuring range selection for dust measurement in accordance with 17. BImSchV (D-R 300-40)
- Weather protection covers
- Quick-closing shutter to protect measuring device in the event of failure of the purge air supply
- Halar flange coating.

Measuring principle

The D-R 300 / D-R 300-40 meters operate according to the scattered light method. The modulated light from a Halogen lamp illuminates the dust particles in the exhaust duct. The scattered light reflected from these particles is measured and assessed.

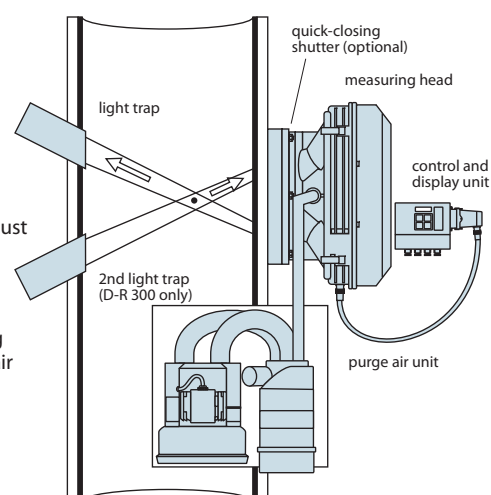
Specifications

D-R 300

- Measuring range: smoke spot number 0-3. Limit value II can be set as delayed disconnected contact
- Calibration: VDI 2066, page 8.

D-R 300-40

- Minimum measuring range 0-1 mg/m³ dust concentration. Other measuring ranges up to 300 mg/m³ can be set (optional automatic switching of measuring ranges 1:3:9)
- Calibration: VDI 2066, page 7.



measurements	smoke spot number (D-R 300) dust concentration (D-R 300-40)	detection limit	<1% measuring range
measuring ranges	D-R 300: smoke spot number 1-3 (5) D-R 300-40: dust concentration 0-1 mg/m ³ ... 0-30 mg/m ³ 1), optional 0-300 mg/m ³ with range switching	reference point drift	<0.2% of measuring range/month
measuring principle	back scattering	zero point drift	<0.2% of measuring range/month
flue gas temperature	above dew point up to 320°C, optional up to 600°C, depending on application	supply voltage	115 / 230 VAC, 50 / 60 Hz, 50 VA
flue gas pressure	-50 up to +20 hPa	dimensions (h x w x d)	measuring head 565 x 310 x 200 mm
duct diameter	0.3 to 4 m	weight	18 kg
ambient temperature	-20 up to +50°C	remarks	1) after gravimetric calibration
protection	IP65	purge air supply	
measuring outputs	2 x 0/4-20 mA/500 Ohm, optional measuring range switching	purge air quantity	approx. 80 m ³ /h
digital outputs	3 relay outputs, permissible load 250 V / 100 VA	supply voltage	115 / 230 VAC, 50 / 60 Hz, 0.37 / 0.43 kW
digital inputs	1 potential free input	dimensions (h x w x d) weight	350 x 550 x 500 mm 12 kg
accuracy	<1% of measuring range	protection	IP54

Dust monitor

Innovative measuring device with laser technology to monitor small to medium dust emission according to the new European regulations.

Features

- **Integrated display: Measuring value, threshold value, parameter in probe**
- In-situ measuring procedure with continuous measurement
- High sensitivity
- Easy installation on one side of the duct
- Can also be deployed in thick-walled stone/insulated channels
- **Long lifetime, as there are no moving parts inside the duct**
- Hermetically sealed electronic housing against exhaust gas
- Parameterisation and operation with keyboard plus easily readable display directly on device or via bus interface
- Automatic function test with soiling correction
- Two analog outputs with adjustable measuring ranges
- **Automatic switching of measuring ranges according to 17. BImSchV.**

Applications

- Power stations
- Cement plants, the metallurgy and wood industries, chemical industry etc.
- Waste incineration plants
- Monitoring of dust filter plants.

Approvals

- Suitability-tested by the TÜV Cologne, test report 936/21205307/A
- Itemized in the list of suitable measuring devices for continuous emission measuring
- MCERTS pending.



Measuring principle

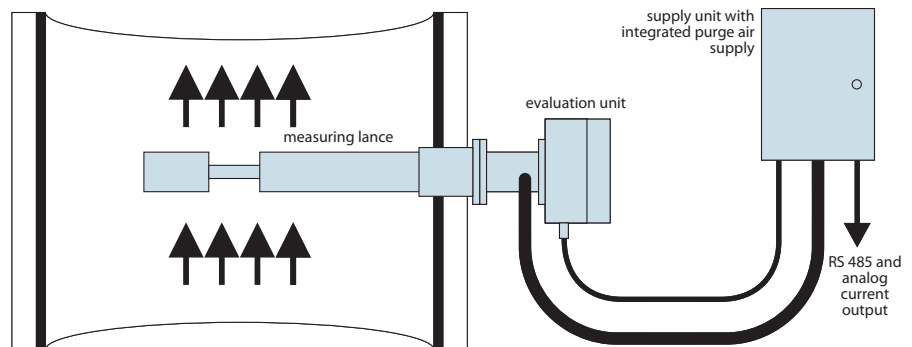
The D-R 800 device works according to the principle of forward scattering. The concentrated and modulated light of a laser diode penetrates the measuring volume. The forward-scattered light largely reflected from dust particles is measured and assessed.

System components

- Measuring lance
- Supply unit with integrated purge air supply
- Mounting flange 130 / 240 / 500 mm.

Options

- Weather protection cover
- **Temperature compensation through additional analog input.**



measurements	dust concentration	accuracy	<1% of measuring range limit
measuring ranges	0–10 mg/m ³ ... 0–200 mg/m ³ ¹⁾	detection limit	<0.5% measuring range
measuring principle	forward scattering	reference point drift	<0.7% of measuring range/month
flue gas temperature	above dew point up to 220 °C	zero point drift	<0.15 % of measuring range/month
flue gas pressure	-50 up to +10 hPa	supply voltage	85–264 VAC, 47–63 Hz, 50 VA
duct diameter	0.4–8 m	dimensions (h x w x d)	measuring lance: 160 x 160 x 600 / 1000 mm supply unit: 380 x 300 x 210 mm
probe length (from flange)	473 / 787 mm	weight	measuring lance: 7 kg supply unit: 13 kg
ambient temperature	-20 up to +50°C	purge air supply	integrated into supply unit
protection	IP65		
measuring outputs	2 x 0 / 4–20 mA / 500 Ohm, Modbus RTU (RS485)		
digital outputs	4 relay outputs, programmable, permissible load 24 V / 25 VA		
digital inputs	2 potential free inputs, programmable	remarks	¹⁾ after gravimetric calibration

Dust concentration monitor for wet gases

Highly sensitive system for continuous extractive dust concentration measurement in accordance with the scattered light principle.

Features

- Compact design
- No need for laborious gas withdrawal
- Very low maintenance requirement
- In-situ measuring method with continuous measurement
- High sensitivity
- No laborious device adjustment
- Automatic function test with soiling correction.

Applications

The D-R 820 F is used for measuring dust concentration in wet gases. It can also be used for sticky dusts that tend towards caking.

Potential applications e.g.:

- Measurements in saturated gas downstream of desulfurization plants
- Downstream of wet cleaning plants
- Waste incineration plants
- Particle board manufacture
- Urea industry
- Insulating material manufacture
- Technological processes.



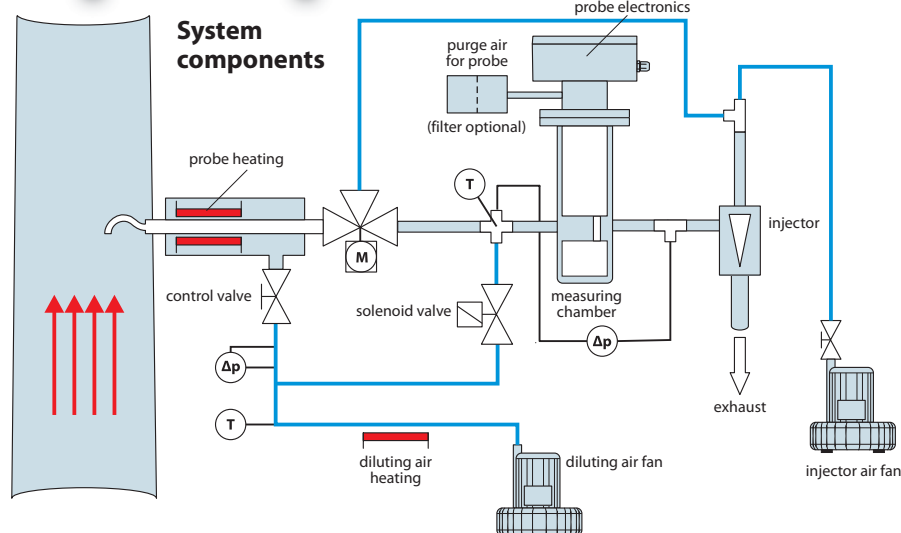
Measuring principle

A defined partial current is withdrawn from the exhaust gas current. This partial current is continuously heated and diluted with clean, tempered ambient air. The partial current is optically measured in the measuring chamber. The signal produced from the diverted current is a measurement of

the dust content of the exhaust gas.

The system comprises a special sampling probe, the laser dust monitor, a gas conditioning unit (dilution, tempering), an injector, two fans and an electronic evaluation unit.

The sampling probe and the measuring chamber form an assembly. The electronic evaluation unit and one blower for operating the injector and one for generating the diluting air are mounted together on a rack frame.



Measuring range		Rack frame with control unit	
dust in operation	0 ... 15 (max. 500) mg/m ³	dimensions	600 x 1700 x 500 mm (W x H x D)
exhaust gas moisture limit value	absolute moisture ≤40%, 250 g/m ³ , relative moisture = 100%	space requirements	1100 x 1700 x 1100 mm (W x H x D)
Probe unit		weight	approx. 90 kg
dimensions including immersion depth	500 x 750 x 1000 mm (W x H x D), 500 mm	protection class	IP65
weight	approx. 40 kg	ambient temperature	-20 ... 50°C
material	stainless steel	power supply	400 V, 50 Hz, 3~ (fuse protection 16 A)
protection class	IP65	Connections on control unit	
ambient temperature	-20 ... 50°C	current outputs	4x 4 ... 20 mA, galvanically isolated with common ground
measuring gas temperature	max. 280°C (higher on request)	load	max. 1 kOhm
measuring air flow rate	8–10 m ³ /h	digital contacts	6x max. 35 V 0.4 A
flange	DN 80 PN 6 special version tube Ø100 mm	digital input	optional via switching contact to externally change between measuring/purging
		terminal contacts	max. 2.5 mm ²

Combined probe sensor

Single rod measurement probe for simultaneous measurement of

- Dust concentration [mg/Nm³]
- Volume flow [Nm³/h]
- Temperature [°C]
- Absolute pressure [hPa].

Features

- Only one probe / installation opening in the exhaust gas channel
- Compact design, no moving parts, no consumable parts
- Continuous conversion to normalised dust concentration in mg/Nm³ and to normalised volume flow in Nm³/h
- LCD display in mg/Nm³, Nm³/h, °C and hPa, one analog output for each measurement value
- Parameterization at the control unit without the need of a PC or other tools
- Remote connection of control and evaluation unit via two-wire bus interface up to 1000 m.

Applications

- For measurements in accordance with TI Air (Technical Instructions for Maintaining Air Purity), 13., 17. and 27. BImSchV
- Not suitable for use behind electrostatic precipitators. Please consult us.

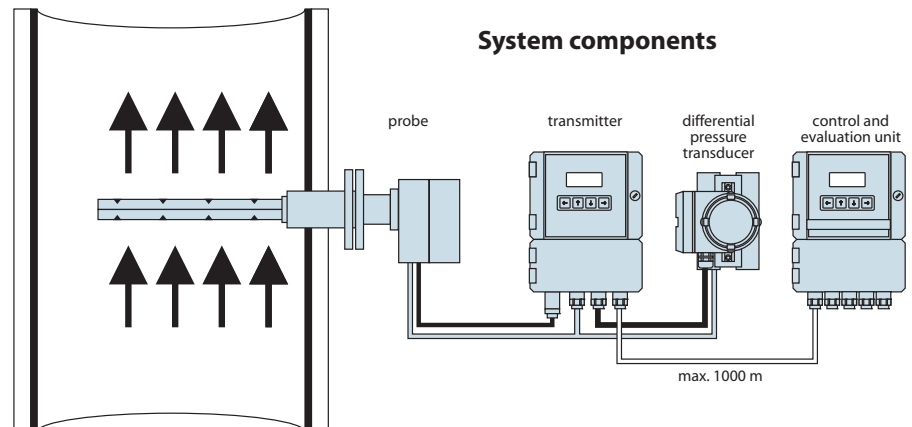
Approvals

- Suitability-tested by the TÜV Cologne, test report 936/800006/A
- Itemized in the list of suitable measuring devices for continuous emission measuring
- MCERTS.



Measuring principle

- The tribo probe measures the electric charge of the incident particles.
- The measurement of the **volume flow** is based on the mechanical action principle. The probe has two separate chambers, between which a differential pressure builds up under flow.
- The **absolute pressure** in the flue gas is measured by a pressure transmitter in one chamber of the probe.
- The **temperature** is measured directly in the centre of the flue gas flow in a separate chamber within the probe with a temperature sensor.
- Dust concentration** is calculated from the triboelectric measuring signal and the volume flow. To this purpose in calibration, you receive the necessary parameters for the relevant speed ranges, which form the basis for calculating dust concentration. The raw data that are also measured for gas temperature and absolute pressure are used to calculate the standard dust concentration and the standard volume flow (wet).



System components

Options

- Weather protection cover
- Switch-over cock for back purging / zero point control
- Automatic cyclic probe back purging for high dust concentrations
- Hastelloy probes for corrosive gases
- Purge air connection at flange.

measurements	dust concentration, volume flow, absolute pressure, temperature	detection limit	<2% of measuring range
measuring ranges	0–10 ... 0–500 mg/Nm ³ 0–9,999,999 Nm ³ /h ¹⁾ 0–200°C, optional 0–350°C 900–1,300 hPa	reference point drift	<1% of measuring range/month
measuring principle	dust: tribo electric volume flow: differential pressure	zero point drift	<1% of measuring range/month
flue gas temperature	above dew point up to 200°C, optional up to 350°C, flue gas humidity <80%	supply voltage	115 / 230 VAC, 50 / 60 Hz, 50 VA
flue gas pressure	-200 up to 200 hPa	dimensions (h x w x d) probe length	probes: 180 x 180 x (340 + probe length) mm 250, 400, 700, 1000 mm
duct diameter	0.3–4 m	weight	probe 9.5 kg electronics 22 kg
ambient temperature	-20 up to +50°C	probe back purging (option)	purge air supply 3 bar
protection	IP65	insulator purging (option)	continuous purge air supply approx. 2 m ³ /h
measuring outputs	4x 0 / 4–20 mA / 500 Ohm, Modbus RTU (RS485)		
digital outputs	7 relay outputs, permissible load 250 V / 100 VA		
digital inputs	6 potential free inputs		
accuracy	<2% of measuring range	remarks	¹⁾ flue gas velocity >5 m/s concentration after gravimetric calibration

Filter monitor

Triboelectric filter monitor for efficiency monitoring after filter plants and for continuous dust measuring in dry emissions.

Features

- Compact and rugged design
- Good price/performance ratio
- Ideal for monitoring bag filters
- Minimal maintenance required
- Early detection of filter malfunctions
- Savings in cost, as no preventative filter exchange is necessary.

Applications

- Power stations
- Bag filter plants of all types
- Dust extraction plants in the production industry
- Waste incineration plants
- Crematoriums
- ✗ Not suitable for use directly behind electrostatic precipitators.

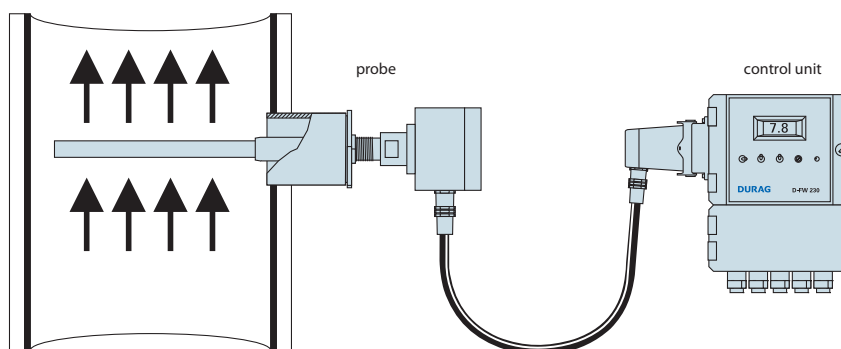
Approvals

- Suitability-tested by the TÜV Hamburg, test report 98CU026
- Itemized in the list of suitable measuring devices for continuous emission measuring.



Measuring principle

The filter monitor uses the triboelectric effect to determine dust loads in flowing gases. The electrical charge which the dust particles experience due to friction is picked up by a probe protruding into the dust channel and converted into a measuring signal by electronics. The measuring signal is proportional to the dust concentration and is calibratable at a constant gas speed.



System versions

D-FW 231 measuring probe

- With complete electronics in the probe
- Probe rod length 400 mm
- Fitted via 1"(G1) thread

D-FW 230 filter monitor

- D-FW 231 measuring probe Probe rod length 400 mm
- D-FW 230-B control unit with digital display 115/230V 50/60 Hz.

Options

- Measuring gas temperature up to 500°C
- Ex version **D-FW 240/Ex**
- Weather protection cover
- Various mounting options (flange, connection piece)
- Probe rod lengths 80, 250, 700 mm

measurements	dust mass flow	detection limit	<2% of measuring range/month
measuring ranges	0–100% (flue gas velocity >5 m/s)	reference point drift	<0.3% of measuring range/month
measuring principle	tribo electric	zero point drift	<0.3% of measuring range/month
flue gas temperature	above dew point up to 200°C, optional up to 500°C, flue gas humidity <80%	supply voltage	24 VDC, 5 VA 115 / 230 VAC, 50 / 60 Hz, 10 VA*
flue gas pressure	-500 up to +500 hPa	dimensions (h x w x d) probe length	probe: 180 x 80 x (270 + probe length) mm 80, 250, 400, 700 mm
duct diameter	0.3–4 m	weight	probe: max. 4.5 kg control unit: 3 kg
ambient temperature	-20 up to +50 °C		
protection	IP65		
measuring outputs	0 / 4–20 mA / 500 Ohm		
digital outputs*	1 relay output, permissible load 250 V / 100 VA		
digital inputs*	2 potential free inputs		
accuracy	<2% of measuring range	remarks	*D-FW 230 only

Extractive beta gauge particulate monitor

Dust monitor especially for wet flues - emission temperature under dew point - and for the monitoring of blast furnace gas.

Features

- Automatic zero correction
- Pre-calibrated, unaffected by particle size, colour or moisture
- Sample gas flow regulated at 1 - 3 m³/h
- Isokinetic sampling
- Optional dilution sample probe for high concentrations or after wet scrubbers
- Heavy metal analysis possible
- Special model with measuring chamber purging and CO-TLV monitoring during dust monitoring of blast furnace gas.

Applications

- Coal and oil-fired power stations
- Waste incineration plants (municipal waste, industrial waste and hazardous waste)
- Sewage sludge incineration plants
- Emission dust measurement after wet scrubbers or in very wet exhaust gases
- Heavy metal analysis
- Measurement of very low dust concentrations in emissions
- Emission dust measurement in inaccessible flues with small diameter
- Dust concentration measurements in process applications.

Approvals

- Suitability-tested by the TÜV Essen, test report 3.5.2/209/88-338529
- Itemized in the list of suitable measuring devices for continuous emission measuring
- Type approval: HH 1/98
- PTB test certificate no. 6.22-R202.

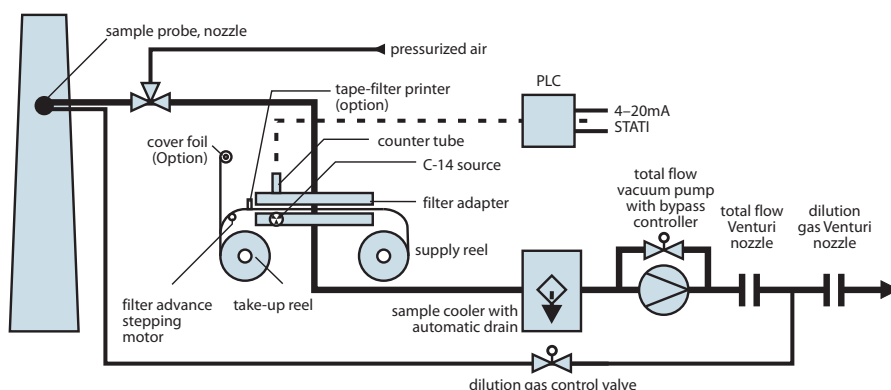


Measuring principle

Determination of the dust concentration by measuring the absorption of beta rays emitted by a radioactive emitter by particles collected from an exhaust gas flow.

System components

- Heated sample probe (material 1.4571 or titanium), with or without dilution
- Heated sample line in 1.4571
- Filter tape in gas-tight filter holder
- ¹⁴C emitter and detector (Geiger-Müller counter)
- Sample gas cooler
- PLC control, also for calculating the concentration from the dust content.



Options

- Special design **F-904-20/BFG** for measurement of the dust concentration in toxic and explosive blast-furnace gas with shut-off valves for the sample gas during filter transport and with purge gas (usually nitrogen) for line back purging. A CO detector is also provided, which closes all gauge connections to the process gas if the CO threshold limit value is exceeded and gives an alarm
- Filter tape printer and protective sheet for specimens in heavy metal analyses.

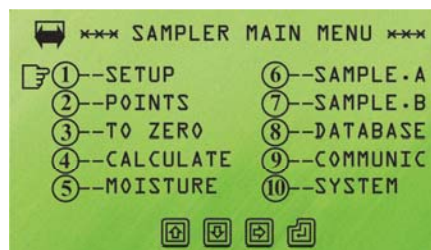
measurements	dust concentration	detection limit	<0.3 mg/Nm ³
measuring ranges	0–1 ... 0–1000 mg/Nm ³	reference point drift	<1% of measuring range/month
measuring principle	beta ray absorption	zero point drift	automatic zero point correction
flue gas temperature	0–250°C, optional up to 500°C	supply voltage	115 / 230 VAC 50 / 60 Hz, 5 kVA
flue gas pressure	-100 up to +100 hPa	dimensions (h x w x d)	1600 x 800 x 800 mm
duct diameter	>0.5 m	weight	300 kg
ambient temperature	0 up to +50°C, cooler optional	purge air supply	pressurized air 6–8 bar
protection	IP43 (with filter blower), upgradable to IP54		
measuring outputs	2 x 0 / 4–20 mA / 450 Ohm		
digital outputs	11 relay outputs, permissible load 24 V / 25 VA		
digital inputs	2 potential free inputs		
accuracy	<5% of measuring range	option	dust monitoring of blast furnace gas

Automatic sampling device for gravimetric dust measurements

Reference measuring system for calibration of dust measuring instruments [mg/Nm³] according to DIN EN 13284-1 and VDI 2066.

Features

- Automatically registers all relevant parameters necessary for dust measurement, for example:
 - humidity of the measuring gas
 - velocity in the measuring gas duct
 - temperature
 - pressure
- Compact system consisting of probes and control unit
- Variable applications through probe adaptation to plant conditions
- On site diagnosis of the measured values on high resolution graphics display
- Stores up to 125 measurements
- Automatic calculation of the concentration in mg/Nm³ after entering the filter weights
- Built-in log printer
- Serial PC interface
- Automatic calculation of the correct nozzle size
- Calculation of furnace efficiency through the standardization program, as required in China and other Asiatic countries
- Excellent price/performance ratio.



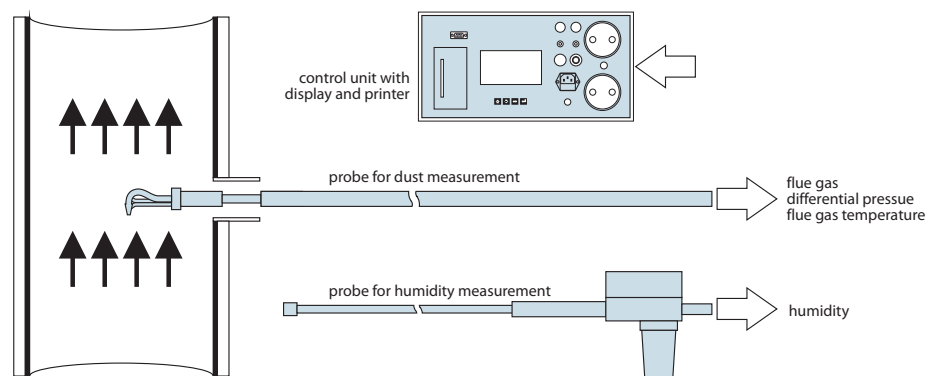
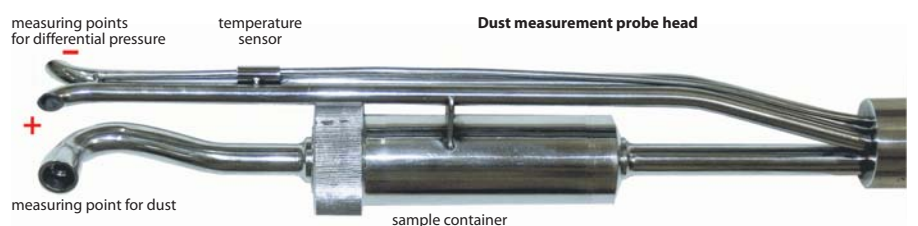
Display main menu



Measuring principle

The D-RC 80 automatically extracts a partial gas stream isokinetically from the measuring gas duct. This partial gas stream is sucked through a filter in which the contained dust is deposited. At the end of the measurement the filter is conditioned and weighed.

After manual input of the weighed filter mass the D-RC 80 computes the dust content of the sample in the operational and standard state. The values can be printed by the integrated printer or put out through the built-in interface..



Measurements		General technical data	
dynamic pressure	0 ... 1.500 Pa	ambient temperature	-20 ... +50°C
static pressure	-30 ... 10 kPa	dew point difference	min. +5 K
barometric pressure	950 ... 1050 hPa	mains	230 VAC / 50 Hz, 200 VA
flue gas pressure	-50 up to +20 hPa, optional higher	data storage capacity	125 samples
volume flow (sampling)	10 ... 50 l/min	container dimensions (w x h x d), weight	measuring container: 400 x 370 x 200 mm, approx. 15 kg
temperature (before flowmeter)	0 ... 99°C		accessories container: 400 x 370 x 200 mm, approx. 6 kg
flue gas temperature	0 ... 400 °C		probe case: 1570 x 120 x 230 mm, approx. 9.5 kg
humidity	0...40 Vol%	installation depth: humidity probe dust probe	max. 650 mm
response time	<8 s		max. 1350 mm

Beta gauge particulate monitor

A measuring device for the continuous monitoring of the smallest concentration of particles in the ambient air (fine dust).

Features

- C-14 method, no measurable decrease in activity
- Lowest radioactivity of all beta gauges, usable without licence, or disclosure
- Automatic zero correction
- Pre-calibrated, no site-specific calibration required
- Mass-flow controlled sample flow 1 m³/h
- Extraction of a constant sample flow, irrespective of the ambient temperature
- Repeated collection on the same spot, collected particles available for heavy metal analysis
- RS-232 interface and analog output, status signals

Applications

- Immissions measuring systems for monitoring fine dust
- Mobile immissions-measuring
- Dust measurement in health and safety applications
- Interior dust measurements
- Measurement and collection of dust particles for heavy metal analysis
- Long-term background studies in ambient dust concentration
- Dust measurement and collection at problem sites and repositories
- Dust measurement for secondary emission of repositories (e.g. coal).
- Dust measurement in supply air and exhaust ducts.

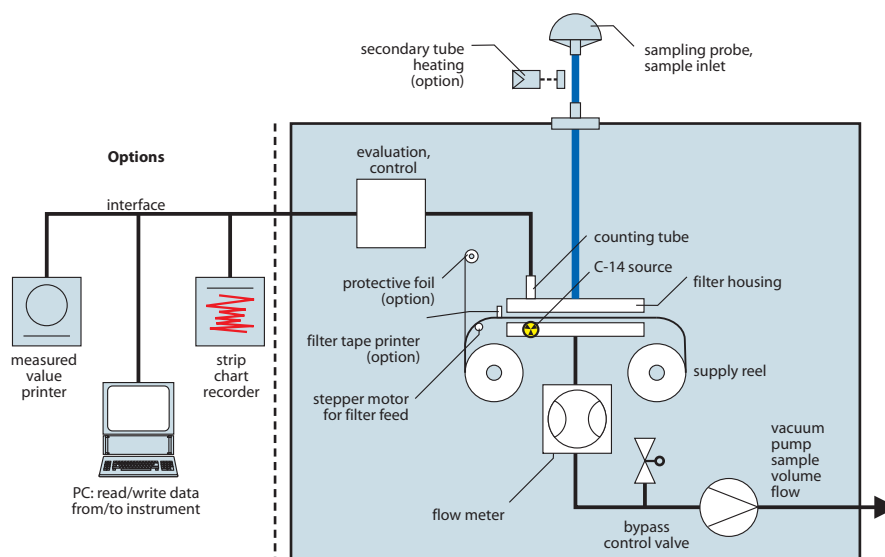
Approvals

- Suitability-tested by the TÜV Munich, test report 720349
- Itemized in the list of suitable measuring devices for continuous emission measuring.



Measuring principle

The measuring principle of the F-701-20 ambient dust monitor is based on the absorption of the beta rays (electrons) emitted by a radioactive emitter through particles collected from an ambient air flow. In the F-701-20 the pulse rate of the unloaded filter tape is measured before each collecting cycle, then dust is collected on this precise filter spot over a pre-defined period, and finally the pulse rate of the loaded filter tape is measured. The difference between the two pulse rates is evaluated in the device and displayed as dust concentration in µg/m³.



Options

Further sample inlets:

- PM-2.5 (accordant EN 12341)
- PM-10 (according to EN 12341)
- Total dust (according to VDI 2463)

measurements	dust concentration	accuracy	<2% of measuring range
measuring ranges	0–0.1 ... 0–10 mg/m ³	detection limit	<0.001 mg/m ³
measuring principle	beta-ray absorption	reference point drift	<1% of measuring range/month
ambient temperature	0 up to +50°C	zero point drift	automatic zero point correction
protection	IP20	supply voltage	230 VAC / 50 Hz, 110 V / 60 Hz, 400 VA
measuring outputs	2 x 0 / 4–20 mA / 500 Ohm	dimensions (h x w x d)	320 x 450 x 500 mm, 19"-rack mount / desk unit
digital outputs	8 relay outputs, permissible load 24 V, 12 VA	weight	26 kg
digital inputs	3 potential free inputs	probe tube length	standard 2 m 0.5–5 m possible

Total mercury analyser

Measuring device for fully-automatic and continuous mercury analysis in smoke gas (without wet chemistry).

Features

- Maintenance-free (6 months) dry reactor
- High operational safety
- Easy maintenance
- Low cross sensitivities
- Easily legible LC display.

Applications

- Waste incinerations (municipal waste, industrial waste, hospital waste)
- Sewage sludge incineration
- Hazardous waste incineration
- Steel plants with scrap metal preparation
- Contaminated soil burning plants
- Crematoriums
- Mercury mines and refineries
- Fluorescent light bulb recycling plants.

Approvals

- Suitability-tested by the TÜV Hamburg, test report 00 CU 014
- Itemized in the list of suitable measuring devices for continuous emission measuring
- MCERTS.



Measuring principle

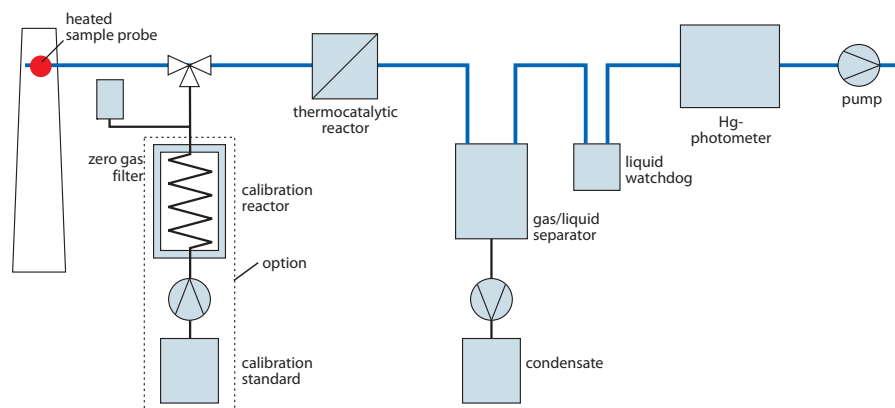
In the HM 1400 TR total mercury analyser the sample gas is converted into mercury vapour by a combination of thermal and dry chemical treatment. This is then continuously measured in a photometer. The probe gas flow is measured after a gas cooler at 2°C. The concentration is calculated and displayed as „dry flue gas“.

System components

- sampling probe
- sampling line
- measuring device.

Options

- Larger measuring range with dilution device
- Top-mounted cooling device
- Automatic probe back purging device, dilution device for gas sample
- Integrated system to generate calibration gas.



measurements	total mercury	detection limit	<1 µg/Nm³
measuring ranges	0–45 ... 0–500 µg/Nm³	reference point drift	<2% of measuring range/month
measuring principle	UV-absorption	zero point drift	automatic zero correction
flue gas temperature	0–250 °C	supply voltage	230 VAC, 50 Hz, 1200 VA, sample probe: 650 VA, sample line: 100 VA/m
flue gas pressure	-50 up to +50 hPa	dimensions (h x w x d)	cabinet 1600 x 800 x 500 mm
duct diameter	>0.5 m	weight	220 kg
ambient temperature	+5 bis +30°C	purge air supply	pressurized air 3–6 bar
protection	IP40 (IP55)		
measuring outputs	2 x 0 / 4–20 mA/500 Ohm		
digital outputs	4 relay outputs, permissible load 250 V, 100 VA		
digital inputs	1 potential free outputs		
accuracy	<1% of measuring range		

Volume flow measuring system

Measuring system to measure flow rate in dry emissions with a probe using the differential pressure principle.

Features

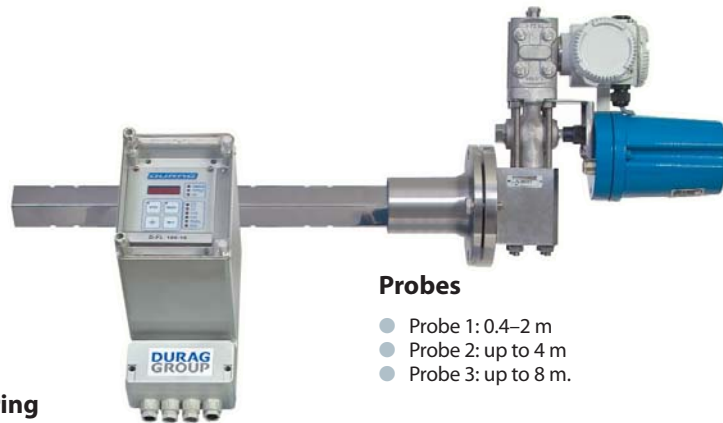
- Measurement of emission speed
- Calculation of volume flow at standard conditions with the evaluation unit D-FL 100-10 (optional)
- Adjustable parameters
- Automatic back purging device (optional)
- Versions with or without counter-support and for point measurement.

Applications

- Volume flow measurement at high temperatures
- Plants with large or small flue cross-sections
- Volume flow measurement at high pressure.

Approvals

- Suitability-tested by the TÜV Hamburg, test report 128CU11650
- Itemized in the list of suitable measuring devices for continuous emission measuring.
- MCERTS.



Probes

- Probe 1: 0.4–2 m
- Probe 2: up to 4 m
- Probe 3: up to 8 m.

System components

- Mounting flange
- Flow probe
- Counter-support
- Differential pressure transducer
- Cross-over cock
- Probe adapter.

Options

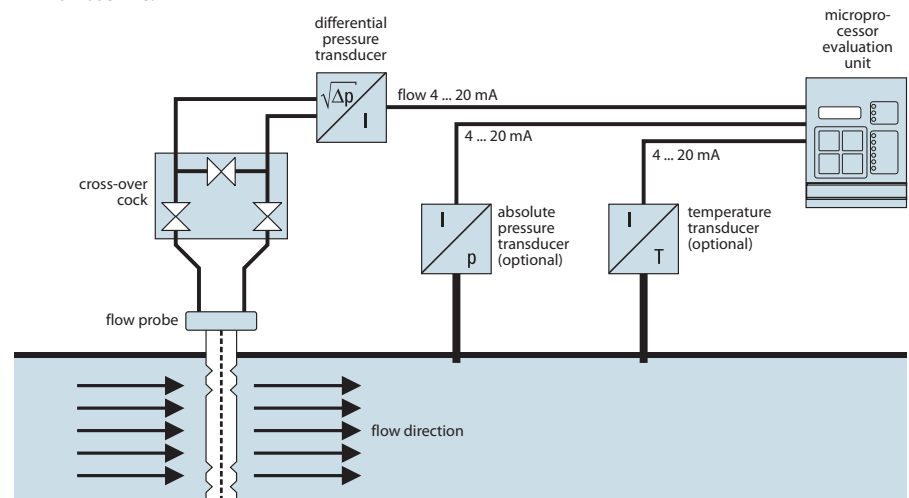
- Microprocessor evaluation unit **D-FL100-10**
- Absolute pressure transducer
- Temperature transducer
- Weather protection covers
- Automatically controlled back purging device
- Special designs in other materials for applications with particularly aggressive exhaust gases or high gas temperatures
- dP-transducer in Ex-version.

Measuring principle

The D-FL 100 measuring system operates according to the differential pressure principle. The probe has two separate chambers, between which the flow builds up a differential pressure. Taking account of the other flow parameters such as, e.g. absolute pressure and temperature, the volume flow can be converted from operating to standard conditions with the help of the D-FL 100-10 microprocessor evaluation unit.

Models

- **D-FL 100 probe assembly** with assembly of measuring transducer on the probe (not for probe 3)
- **D-FL 100 hose assembly** with the measuring transducer connection via hose line.



measurements	flue gas velocity, volume flow ¹⁾	accuracy	<2% of measuring range
measuring ranges	0–3000000 m ³ /h / 3–40 m/s	detection limit	<3 m/s
measuring principle	differential pressure	reference point drift	<0.5% of measuring range/month
flue gas temperature	above dew point up to 400 °C, optional up to 800 °C	zero point drift	<0.5% of measuring range
flue gas pressure	–700 up to 1000 hPa, optional higher	supply voltage	14–45 VDC 115 / 230 VAC, 50 / 60 Hz, 50 VA ²⁾
duct diameter	0.4–8 m	dimensions (h x w x d)	probe: 380 x 160 x (300 + probe length) mm
ambient temperature	–20 up to +50 °C	weight	32 kg + 6.8 kg/m probe length
protection	IP65, Ex optional	purge air supply	6–8 bar for back purging if necessary
measuring outputs	0 / 4–20 mA / 500 Ohm ²⁾	remarks	¹⁾ optional pressure and temperature correction ²⁾ only with evaluation unit
digital outputs	3 relay outputs, permissible load 250 V, 100 VA ²⁾		

Volume flow measuring system

Measuring system for ultra-sonic measuring of velocity and volume flow, especially for wet and aggressive smoke emissions (waste incineration).

Features

- In-situ measuring method
- Measurement possible below dew point and for high dust concentrations
- Continuous measurement of normal volume flow and gas velocity
- Automatic zero point and reference point control
- Direct connection for temperature and pressure correction
- Parameter input via keyboard or PC
- Continuous temperature measuring.

Applications

- Volume flow measuring at low speeds
- Plants with damp and/or aggressive exhaust gas, e.g. in waste incineration plants.
- Volume flow measurement at high dust content.

Approvals

- Suitability-tested by the TÜV Hamburg, test report 99CU019
- Itemized in the list of suitable measuring devices for continuous emission measuring
- MCERTS.



Measuring principle

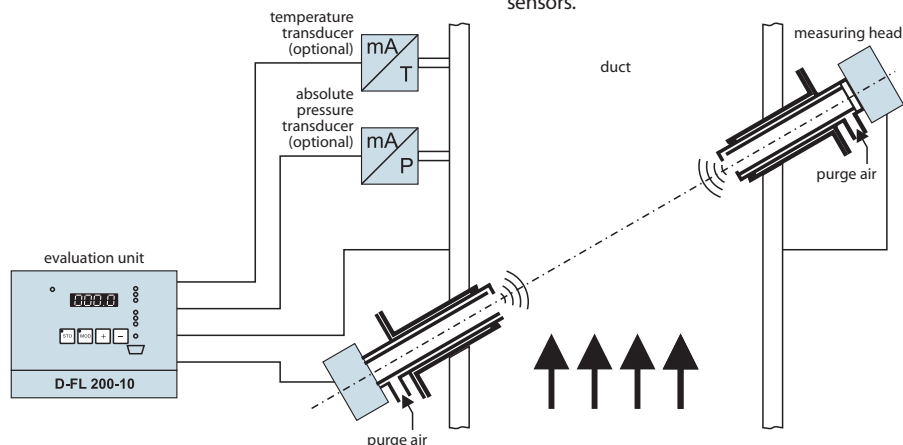
The D-FL 200 measuring system works according to the acoustic transit time differential method. Ultrasonic transducers mutually send and receive short pulses with and against the gas flow direction which affects their transit time. The volume flow is calculated from the difference of transit times.

System components

- 2 mounting flanges (Mat. 1.4571)
- 2 measuring heads

Options

- Modbus interface
- Temperature transducer
- Absolute pressure transducer
- Weather protection covers
- Purge air sensor with potential free error contact.



measurements	flue gas velocity, volume flow ¹⁾ , temperature	detection limit	<0.3% of measuring range
measuring ranges	0–3000000 m ³ /h / 0–40 m/s 0–400 °C	reference point drift	<0.3% of measuring range/month
measuring principle	acoustic propagation delay	zero point drift	<0.2% of measuring range/month
flue gas temperature	0–200 °C, optional higher	supply voltage	115 / 230 VAC, 50 / 60 Hz, 50 VA
flue gas pressure	-50 up to +20 hPa, optional higher	dimensions	standard measuring head: 190 Ø x 570 mm
duct diameter	0.7–10 m, temperature dependent	weight	17 kg
ambient temperature	-20 up to +50 °C	remarks	¹⁾ optional pressure and temperature correction
protection	IP65	purge air supply	
measuring outputs	2 x 0 / 4–20 mA / 500 Ohm, optional Modbus RTU, Profibus DP	purge air quantity	approx. 80 m ³ /h
digital outputs	3 relay outputs, permissible load 250 V, 100 VA	supply voltage	115 / 230 V, 50 / 60 Hz, 0.37 / 0.43 kW
digital inputs	none	dimensions weight	350 x 550 x 500 mm 12 kg
accuracy	<2%	protection	IP54

Environmental and process data management system

Modular system for continuous acquisition, long-term storage, calculation and visualisation of environmental and process data.

Features

- Instrument for monitoring legally prescribed limit values and recording their observance
- Emission monitoring and remote data transmission to the authorities
- Adjustable to any plant size through to complete assessment of complex industrial sites
- Continuous monitoring of 1 to 320 components per system workstation
- Interconnection of any number of components via data networks.

Approvals

- Suitability-tested by TÜV Munich, test report 24108990 in accordance with German TA-Luft, 13., 17., 27. 30. and 31. BImSchV as well as the European Directives 2000/76/EC for waste incinerators and 2001/80/EC for large combustion plants, considering EN 14181.

Measured data recording

- Analog/digital inputs
 - as sub-rack with intermediate data storage
 - or as local modules
- Data transmission via bus systems, Modbus, Profibus, TCP/IP or other interfaces.

Data sources

- Emission data
- Immission data
- Meteorological data
- Water data
- Process data.

Data export

- Data interface to MS-Excel with option of further measured data evaluation, e.g. for fulfillment of environmental protection officer's reporting duties
- Measured data can be transferred to authorities via standard remote communication or via internet
- Merging of measured data e.g. for greenhouse emission trading
- Remote service interface for fast and cost effective service.

Data security

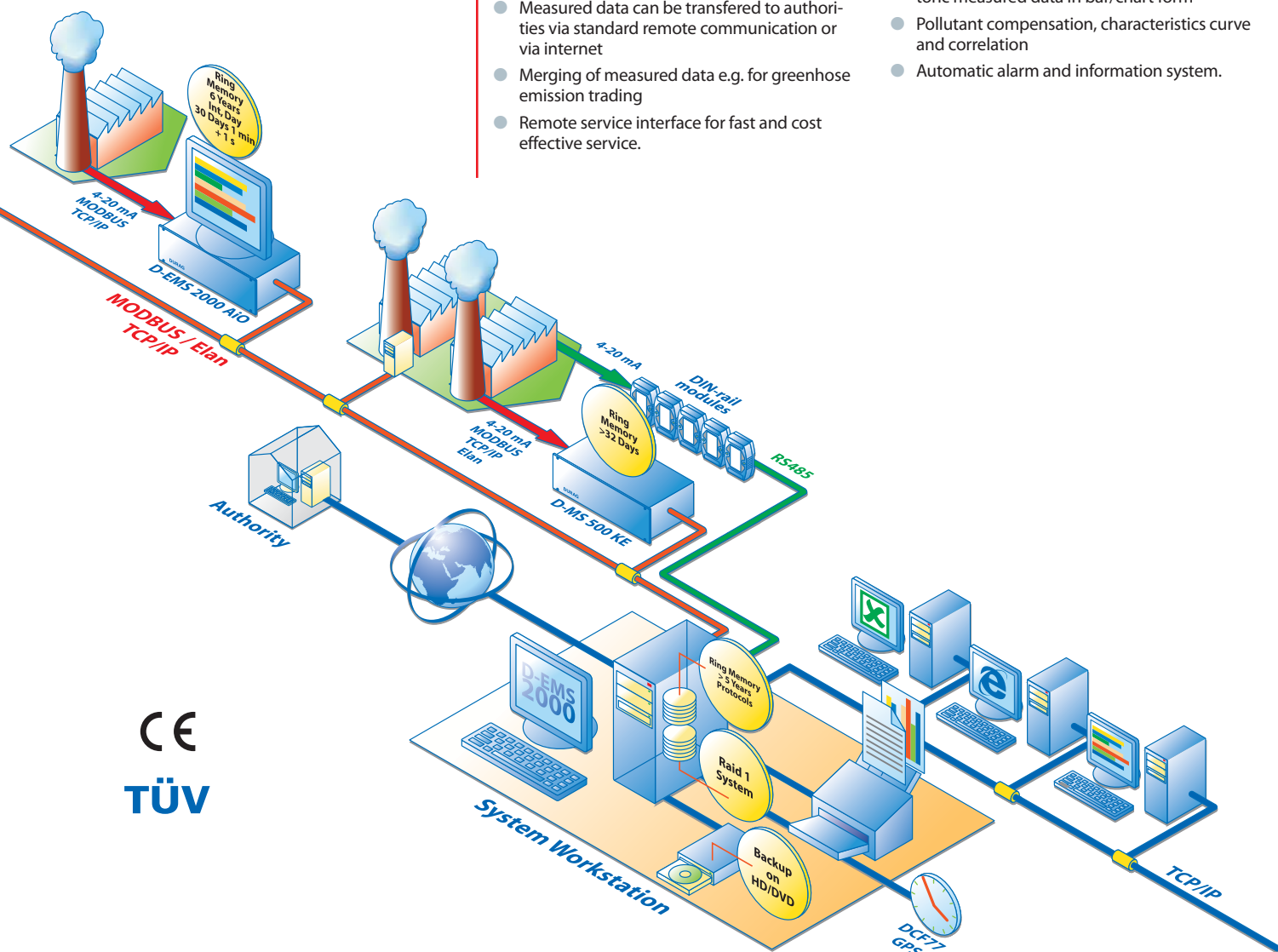
- Paperless data storage to replace recorders and printers is possible through integrated data security, which is guaranteed on several levels in the system
- Intermediate storage of the raw input values at minute intervals in data communication unit D-MS 500 KE
- Double data storage on two separate hard disks in a RAID1 set
- Storage of analog raw values at second intervals
- Data backup on external redundant drive.

Internet/Intranet connection

- Data transfer to an Internet server with HTML standard masks via standard software (MS-Internet-Explorer)
- Password-protected control of daily emission values including classification records.

Visualisation

- Measured data recording according to official regulations
- Classification tables, daily, monthly and annual records
- Representation of current, prognostic and historic measured data in bar/chart form
- Pollutant compensation, characteristics curve and correlation
- Automatic alarm and information system.



Emissions evaluation computer with solid state drive

Economically priced all-in-one module with modern flash memory technology instead of hard disks.

Features

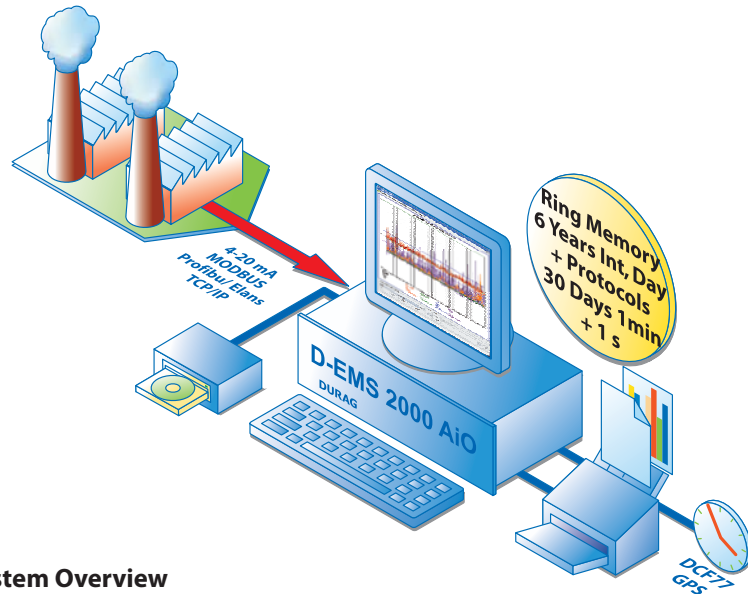
- Freely parameterisable
- Independently operating module for acquisition, long-term storage, calculation and visualisation of environmental and process data
- Component of the modular D-EMS 2000 system
- Instrument for monitoring officially prescribed limit values with automatic logging
- Continuous monitoring of 1 to 64 components connected via bus communication or hard wired
- „All-in-one“ system no additional evaluation PC required
- Can also be used as a module of the complete D-EMS 2000 system.

Applications

- Emissions evaluation computer for small to medium-sized installations in energy and heat generation, for waste incineration plants and in crematoriums as well as for installations in the chemical and cement industry.

Approvals

- Suitability-tested by TÜV Munich, test report 24108990 in accordance with German TA-Luft, 13., 17., 27. 30. and 31.BImSchV as well as the European Directives 2000/76/EC for waste incinerators and 2001/80/EC for large combustion plants, considering EN 14181.



System Overview

The system provides the following screens:

Parameterisation

System adaptation in accordance with licensing requirements and orders

Information

Group-oriented event display with commentary option and colour status information

Evaluation

Display of current and historic data in bargraph and line diagrams

Logging

Classification protocols and individual values in daily, monthly and annual tables

Options

Three device types are available

- Compact system in 19" 3HU rack
- Desktop version with monitor/keyboard/mouse
- 19" plug-in unit with pullout keyboard / display unit



Device types	- Compact system in 19" 3HE rack - Desktop version with monitor/keyboard/mouse - 19" plug-in unit
Computer	Power PC with Linux operating system, 1 GByte RAM and 4 GB Solid State Flash Drive
Data Security	Protected storage of all official data including protocols for all legally required periods on external hard disk or server
Inputs / outputs	Analogue/digital inputs: 8/15 per card max. 6 cards Analogue outputs: 8 per card max. 4 cards Digital outputs: 16 per card max. 4 cards Capacity of the system max. 11 boards
Connection of bus systems	(Modbus, Profibus, Elan) Analogue/digital inputs: 64/128 Analogue/digital outputs: 64/128
Interfaces	2x Ethernet RJ 45 4x USB 2.0 DCF 77 aerial socket BNC Analogue modem/ ISDN RJ 45 2x RS 232 1x RS 485 (up to 3x RS 485 also optionally possible)
Operating voltage	115/230 VAC / 50/60 Hz / 100 VA

Software modules for the complete D-EMS 2000 system

D-PM.www

Provision of emission data for person in charge via Internet

D-EFÜ.www

Provision of emission data for the authority via the Internet

D-RWS

Storage of raw values with a resolution of 1 s

D-RED

External redundant storage of measured values and logs

D-EVA-Win

Visualisation software for workstation PCs in customer's data networks

D-PM.MS

Direct access by MS-Excel to the D-EMS 2000 database

D-QAL

Automated calculation of drift and precision, creation of CUSUM cards as well as complete documentation of the AMS.

Fulfills the requirements of EN 14181.

D-JEK

Automated creation of emission declaration in accordance with German 11th BImSchV

D-CDM

Certified software for greenhouse gas projects according to UNFCCC methodologies. Meets the requirements of AM 0021, AM 0028, AM 0034, AM 0051 and ACM 0001.

CUSUM - card (EN14181)

Date: 30.09.02 15:09 Name of technician: Peter Müller

Type of AMS: Dust Measurement System
Name: D-R300-40
Registration number: 123456
Manufactured / delivered by: DURAG
Location: Stock West
Measuring range and unit: 0-108 mg/m³

Zero point		Reference point	
μ_{AMS}	5.000 mg/m³	μ_{AMS}	8.000 mg/m³
$\sigma_{Reference}$	0.130 mg/m³	$\sigma_{Reference}$	19.368 mg/m³
$\sigma_{Current}$	25.000 mg/m³	$\sigma_{Current}$	5.000 mg/m³
σ_0	24.670 mg/m³	σ_0	-14.308 mg/m³

Precision

μ_0	μ_1	μ_2	μ_3	μ_4	μ_5	μ_6	μ_7	μ_8	μ_9
172.500	49.250	441.600	118						
243.183		6.420							
203.182		6.420							

Reduced precision? Yes

Driftcheck can not be done

Drift

μ_0	μ_1	μ_2	μ_3	μ_4	μ_5	μ_6	μ_7	μ_8	μ_9
14.260	2.908								
23.218	-27.375								
23.218	0.000								

Drift? Positiv

Readjustment required

Date, signature technician

D-QAL:
Calculation sheet for CUSUM cards

D-QAL

CUSUM control card with detailed information about precision and drift as well as the decision for readjustment

D-QAL: Documentation of AMS

Quality assurance for automated measuring systems according to EN 14181

Configuration: H/W Reuter Edit Data transfer Close Help

Test: Dust [UREAA1 Staub] Block A CO A1a Block A CO A1b KAS A1 S02-Fix [UREAA1 S02]

Documentation [Σ CUSUM] [T Data] [E Time diagram] [F Edit]

Identification

Type of AMS: Dust Measurement System
Name: D-R300-40
Registration number: 123456
Manufactured / delivered by: DURAG
Location: Stock West
End of warranty: 31.12.2005
Date of delivery: 31.12.2004
Date of startup: 31.12.2004
Order number: 765432
Measuring range and unit: 0-108 mg/m³

Base values of this AMS

	Zero point	Reference point
μ_{AMS} conformance test	0.130	0.190
μ_{AMS} at the location	5.000	8.000
$\sigma_{Reference}$	0.130	19.368

Current value / manual input

18.11.2005 Zero point Reference point
06.00.00 0.456 20.01

Results of 18.11.05 07.00

	Zero point	Reference point
Reduced precision	Yes	No
Drift	No	No

End time for report and time diagram: 01.10.2005 23:59:00

Report Printer: Name of technician: Peter Müller create

D-EMS 2000

Kaifeng Jinkai N2O Abatement Project Overview

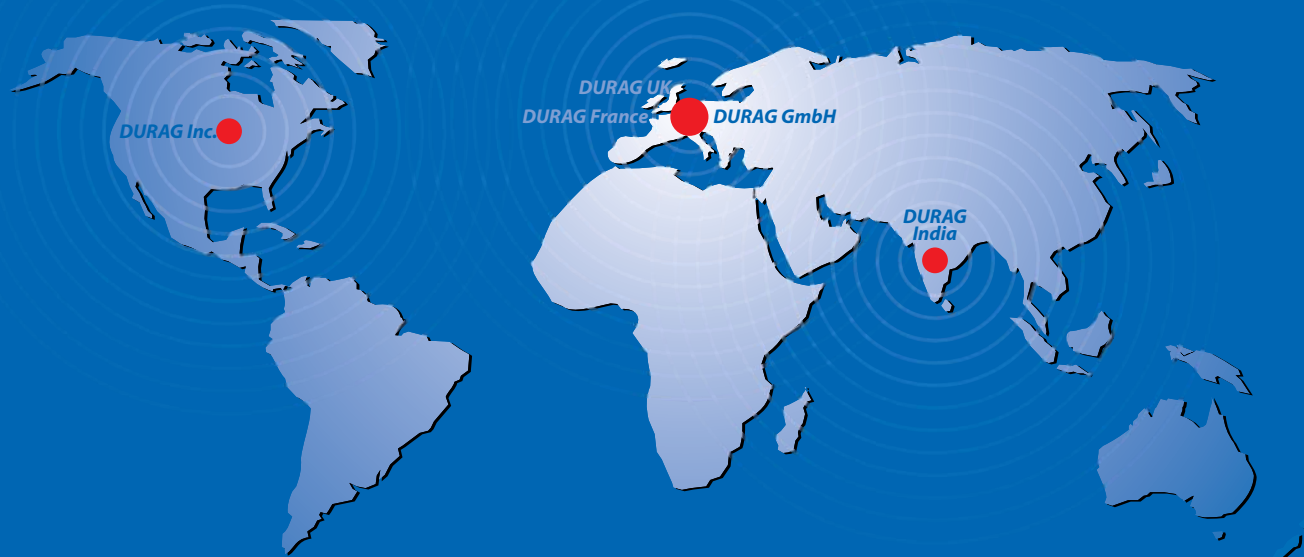
24h average values of emission concentration

Monthly Report CDM Project 06.2007

Campaign Report CDM-Project AM0034

D-EMS CDM Internet Module

To inform person in charge about the details of current and historical data (measured and evaluated values) as well as the results of all realised campaigns



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