

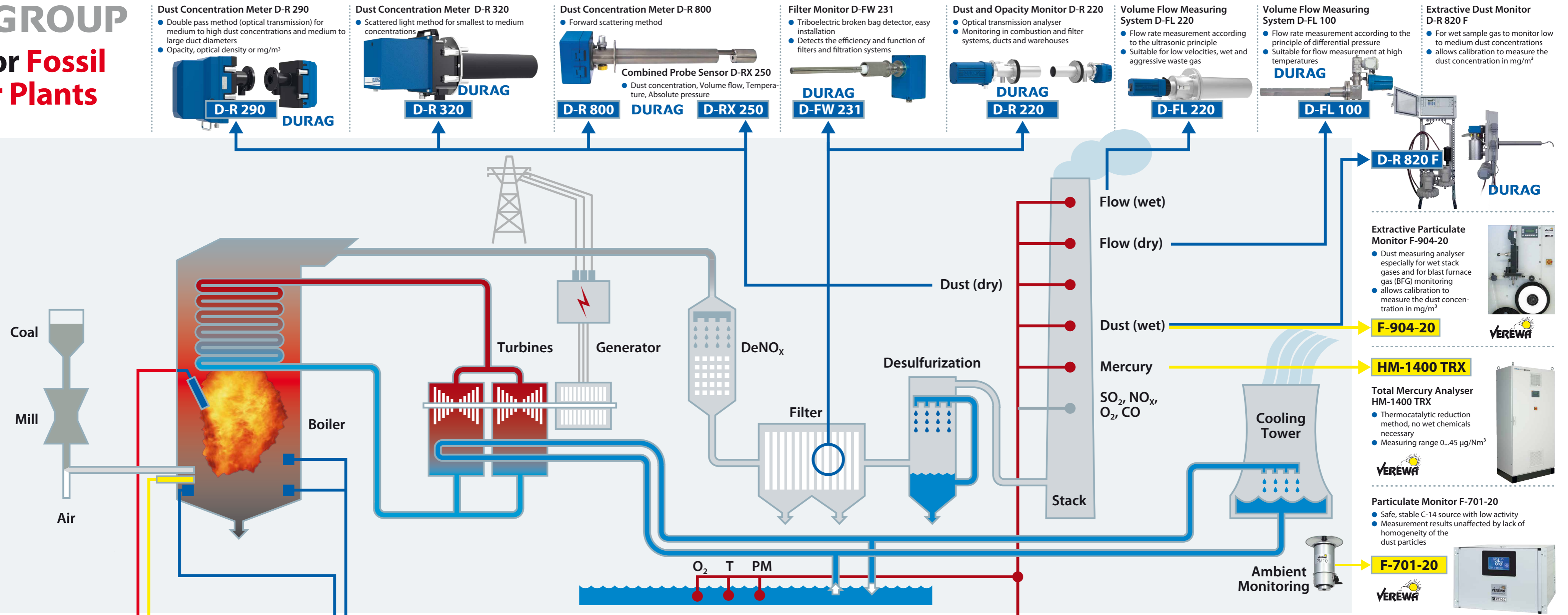
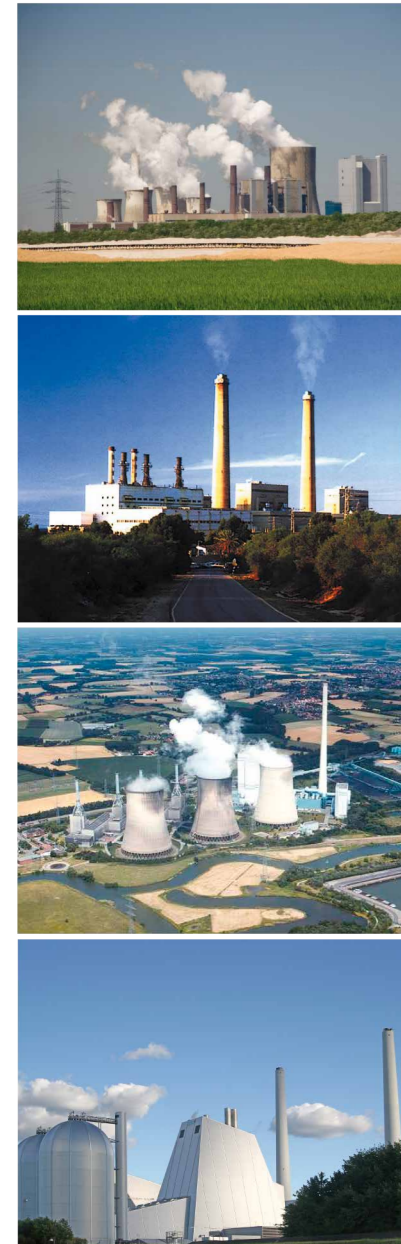
Products for Fossil Fuel Power Plants

- **Combustion Technology**
- **Thermography and Video Systems**
- **Environmental Monitoring**
- **Environmental Data Management**



DURAG GROUP

Products for Fossil Fuel Power Plants



Dust Concentration Meter D-R 290

- Double pass method (optical transmission) for medium to high dust concentrations and medium to large duct diameters
- Opacity, optical density or mg/m³

Dust Concentration Meter D-R 320

- Scattered light method for smallest to medium concentrations

Dust Concentration Meter D-R 800

- Forward scattering method

Combined Probe Sensor D-RX 250

- Dust concentration, Volume flow, Temperature, Absolute pressure

Filter Monitor D-FW 231

- Triboelectric broken bag detector, easy installation
- Detects the efficiency and function of filters and filtration systems

Dust and Opacity Monitor D-R 220

- Optical transmission analyser
- Monitoring in combustion and filter systems, ducts and warehouses

Volume Flow Measuring System D-FL 220

- Flow rate measurement according to the ultrasonic principle
- Suitable for low velocities, wet and aggressive waste gas

Volume Flow Measuring System D-FL 100

- Flow rate measurement according to the principle of differential pressure
- Suitable for flow measurement at high temperatures

Extractive Dust Monitor D-R 820 F

- For wet sample gas to monitor low to medium dust concentrations
- allows calibration to measure the dust concentration in mg/m³

Extractive Particulate Monitor F-904-20

- Dust measuring analyser especially for wet stack gases and for blast furnace gas (BFG) monitoring
- allows calibration to measure the dust concentration in mg/m³

Total Mercury Analyser HM-1400 TRX

- Thermocatalytic reduction method, no wet chemicals necessary
- Measuring range 0...45 µg/Nm³

Particulate Monitor F-701-20

- Safe, stable C-14 source with low activity
- Measurement results unaffected by lack of homogeneity of the dust particles

Thermography D-VTA 200

Video-based Thermography System

- Detection of the temperature distribution inside combustion chambers
- Analysis of unbalanced combustion processes
- Burning analysis and slag monitoring in power plants

Ignition Burners ZA.../ZDA...

Igniters D-HG 400

High Energy Ignition Device

- Ignition of liquid or gaseous fuels with large power ratings
- Compact design: control unit and ignition lance form one unit
- Retraction Unit D-VE 500

Flame Monitoring D-LE 603

Flame Sensor

- Flame sensor for the monitoring of gas, oil and coal flames
- Primarily in multi-burner furnaces
- Versions available for use with fibre optic systems

Flame Monitoring D-UG 660

Control Unit

- Self-monitoring and fail-safe
- For the monitoring of gas, oil and coal flames with DURAG UV, UV+IR or IR- flame sensors
- Primarily in multi-burner furnaces

Flame Monitoring D-LX 200

Compact Flame Monitor

- Wide sensitivity range
- For ambient temperatures from -40°C up to +85°C
- Dual channel design throughout
- Measurement of flame flicker frequency
- Selective to individual burners and fuels

Process- and Environmental Data Management D-EMS 2000

Control Room **D-EFUE.www** **Authority**

Environmental Data Management System D-EMS 2000

- Capturing, storing and evaluating of environmental data according to European Directives and national regulations in compliance with EN 14181
- Emission data, immission data, waste water data, meteorological data, process conditions, time diagrams, correlation diagrams
- Including QAL3 CUSUM-card
- Internet representation

DURAG GROUP Products in Fossil Fuel Power Plants

Flame Monitoring

The monitoring of the flame is a safety engineering element for industrial combustion technology – fuel may only enter the combustion chamber if safe combustion is guaranteed. Therefore high demands are made on the availability and safety of the equipment used. For intermittent operation it is sufficient when the flame monitoring hardware performs a self test during the startup procedure. Continuous operation requires a permanent verification of error free operation.

The monitoring can be performed by the combination of a flame sensor (also flame scanner) with a control unit. Where the flame sensor transforms characteristic properties of the flame into an electrical signal and the control unit provides the flame signal and ensures error free operation. Alternatively these two parts are combined in one compact flame monitor.

Besides the proper selection of the flame monitor also its correct placement and alignment are important prerequisites for the successful monitoring of the flame. The presence of a flame must be correctly detected independently of the construction of the furnace or its operational mode.

Ionisation detection

Flame monitors with ionisation detectors. They are used primarily on smaller gas burners and pilot burners.

Detection of the optical signal

Larger burners are monitored solely by optical flame monitors. Depending on the fuel and combustion technology of the process optical sensors with different spectral sensitivities or combinations of them are used:

Infra-red detectors (IR) react to radiation having a wavelength of 800 nm or higher. It is only the flickering of the flame which is analysed. Constant radiation sources, such as the glowing of the furnace walls, are not detected as a flame.

Flames radiating in the UV range, but whose UV component is absorbed by dust, steam or other substances, can often also be monitored using infra-red detectors.

Ultra-violet detectors (UV) detect the flame radiation below 400 nm. Ultra-violet detectors are well suited for monitoring gas flames, but can also be used for oil flames. Products with the codes UL, US, UH, UA, and UAF use these detectors.

Visible radiation detectors (VIS) are suitable for the monitoring of oil and coal flames between 400 and 800 nm. However, product guidelines in some countries stipulate that gas flames must not be monitored in this spectral range. Products with the codes IS, ISE, and ISO use these detectors.

Video-based Thermography

Disturbances of the local fuel-/air ratio of boiler plants and steam generators result in the following operational conditions:

- Localized combustion areas with high combustion temperatures and high formation of thermal NO_x
- Localized combustion areas with incomplete combustion and high formation of CO
- High flue gas losses and high amounts of unburned carbon (UBC) or loss of ignition (LOI)
- Local displacement of the main combustion zone compared to the design position
- Local overheating of boiler construction material
- High temperature corrosion and thermal stresses combined with boiler tube ruptures

Measures

Control of the combustion process through derived variations of firing parameters like:

- Uniform distribution of fuel
- Control of the combustion air distribution over the entire combustion zone

To achieve these targets, the online analysis of the actual firing situation has to deliver the following information:

- Detection of the local position of the main combustion zone
- Flame temperature distribution
- Local flame propagation
- Ignition point of flame
- Local fouling

Video System: Presentation of the Flame Picture

The furnace camera sensor of the DURAG Video System supplies online visual information directly from the combustion chamber to assist the operator in adjusting the complete combustion process optimally.

Thermographic System: Analysis of the Flame Temperature Distribution

The DURAG Thermographic System provides methods for:

- The thermal analysis of the spatial temperature distribution out of the combustion chamber
- Temperature determination within freely definable areas and lines (ROI-Region Of Interest and LOI- Line Of Interest)
- Detection of actual position of the combustion zone.

For automatic closed loop control measures all data of the thermographic systems can be transferred to the main process control system (DCS) at the customer site through standardized data interface.

Environmental Monitoring

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 many 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 standards
- **EN 14181** – European quality assurance standard for automated measuring systems
- **EN 15267** – European standard for type approval & certification of AMS/CEMS
- **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
- **EN 14907** – European standard for determining PM2.5 airborne dust
- **ISO 10473** – International standard for beta absorption method
- **ASTM D-6216.98** – American standard practice for opacity monitors.

DIN EN 14181

DIN EN 14181 defines three quality assurance levels (QAL) and an annual functional test (AST) for automated measuring systems AMS:

- **QAL 1:** Requirement for suitability evaluation of automated measuring equipment (the test complies with EN ISO 14956, EN 15267)
- **QAL 2:** Installation of automated 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 (monitoring drift and precision of the AMS, verification on control card)
- **AST:** Annual surveillance test including SRM measurements to control the performance and function of the AMS and evaluate the validity of the calibration function.



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