DURAG GROUP

# Combustion Technology

Only those who handle combustion perfectly can set technical standards.

*„Only those who handle combustion perfectly, can set technical standards.“*

# Contents

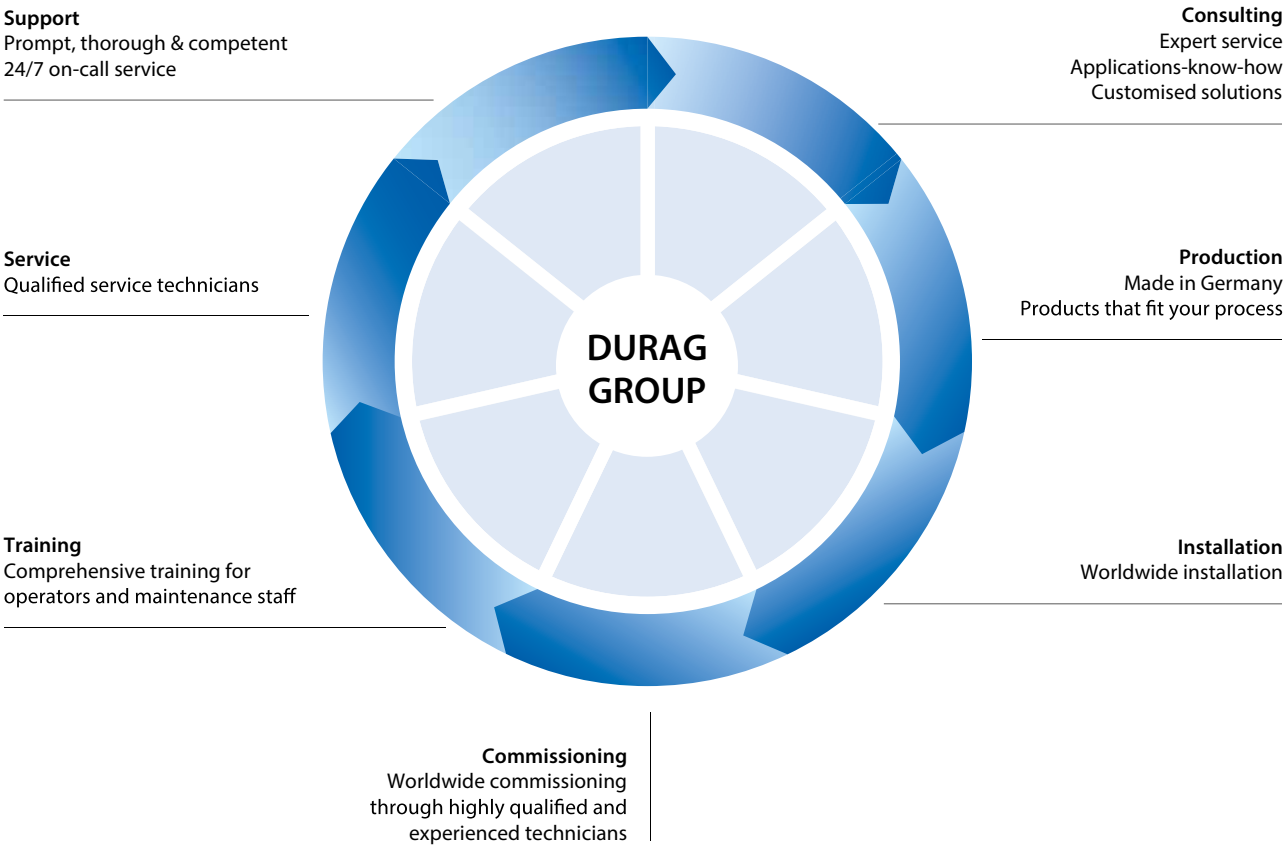
# 1 | DURAG GROUP

The DURAG GROUP is a market leader for intelligent solutions in combustion technology, emission and ambient air monitoring, multigas analysis, tunnel sensors as well as environmental and process data management. With around 500 specialists, we offer modern technology, certified instruments, and reliable services for the individual requirements of our customers around the world.

As a family owned company we hold ourselves to the highest standards in the development and manufacturing of our products. Our staff have extremely deep knowledge, and develop our products and solutions with innovative ideas.

## Our services

- We offer a comprehensive product portfolio for industrial combustion and flame control technology, the visualization and online analysis of thermal processes, gas analysis as well as the measurement and analysis of emissions and ambient air monitoring.
- Our products help comply with regulated emission limit values and minimize the environmental impact of industrial processes.
- Our specialists offer analysis, consulting, and product recommendations, ensure a smooth commissioning, and support our customers with training and full service.




## History of the DURAG GROUP

1948 – DURAG founded by H. Wilhelm Schaumann. The company name is taken from the duratron, a gamma ray detector.

1960 – Start of development of instruments for process monitoring, electronic counters and controls.

1970 – Start of development of dust measuring devices, monitoring and combustion systems.

1996 – Expansion of the product portfolio in combustion technology through acquisition of Hegwein GmbH in Stuttgart.

1997 – Acquisition of VEREWA Umwelt- und Prozessmesstechnik GmbH. Headquarters moved from Mülheim an der Ruhr to Hamburg.

2006 – Acquisition of Smitsvonk in the Netherlands, a leading supplier of high-energy ignition systems, pilot burners and ignition burners.

2015 – Acquisition of GRIMM, a world market leader in the field of optical measurement of fine particles.

2018 – 70-year anniversary of the DURAG GROUP. Expansion of the product portfolio with multigas analyzers through acquisition of ap2e.

# 2 | DURAG GROUP Companies

## DURAG

For more than 70 years **DURAG GMBH** has been an expert provider of combustion and emission monitoring equipment. Since 1948 we have offered modern technology, certified instruments, and reliable services for the individual requirements of our customers around the world. Our own rigorous quality standards in the development and manufacture of our products are our trademark. Our employees have deep knowledge, and continually develop our products and solutions with innovative ideas.

## DURAG DATA SYSTEMS

**DURAG DATA SYSTEMS** has over 40 years of experience in the manufacture of software and hardware for environmental and process data management. Our emissions data evaluation solutions are developed by experience engineers, software developers, and service technicians. We are pioneers in this special area of environmental protection, covering legal limit values, emissions data remote monitoring, and greenhouse gas trading. We advise small and large plant operators, industry-neutral and with long experience and worldwide expertise.

## DURAG SIENA

**DURAG SIENA** is geared to the South American and especially to the Brazilian market. Production, assembly, development and production of products for combustion technology take place with focus on the region. The product portfolio is supplemented by emission monitoring devices, which are supplied according to the requirements of our customers.

## ap2e

**ap2e** is an innovative company in the gas analysis business for scientific and industrial application such as environment, process optimization and ambient air monitoring. Since 2006, ap2e designs, manufactures and services on-line advanced TDL gas analyser systems, powered by two patented technologies (Extended cavity TDL with Low Pressure Sampling). ap2e multigas analyzers cover a wide & dynamic range, from PPT to %, with unmatched sensitivity, selectivity, stability, fast response time within simple or complex background gas mixtures with no need for sample conditioning/heating.

GRIMM AEROSOL TECHNIK

**GRIMM Aerosol Technik Ainring GmbH & Co. KG** in Ainring is one of the world leading suppliers of instrumentation in the field of environmental and occupational safety measurements, in service of governmental authorities, research and teaching facilities, safety engineers, or accredited bodies for air quality measurements. For over 30 years, GRIMM has been standing for the optical aerosol measurement „made in Europe". The measuring range of our systems extends from less than 1 nanometer to 35 micrometers. The measuring instruments are usable stand-alone or integrated in measuring containers. The analysis is made via an intelligent evaluation and control software. Many thousands of systems are in use worldwide, on a daily basis, reliably and with high precision, partly under the most extreme conditions. Our product portfolio for measuring aerosol and particle concentrations, ranges from measuring ultrafine and nano particles to fine dust measurements in indoor and outdoor applications, in the industrial field as well as in basic research.

SMITSVONK

**Smitsvonk** specializes in high-energy ignition systems, pilot burners, and ignition burners for use in industrial combustion processes. The company's electrical and electronic ignition systems have been used around the world for over 70 years, thanks to their high reliability under the most demanding conditions – ignition is not effected by dirt, air humidity, extreme temperatures, or aggressive gases. Smitsvonk is your expert for reliable ignition, and develops solutions tailored to any industrial need. About 75% of its business is within the petrochemical industry, and 10% within the iron and steel industry.

Hegwein

For 70 years, **Hegwein** has been the specialist in the field of gas and oil ignition burners as well as gas burners for industrial applications. Our experienced experts individually analyze your specific needs and supply pilot burner and gas burner systems that are specially tailored to your process requirements. For this purpose, solutions such as our „ZAVEX" series are available for use in all explosion-proof zones, as well as pilot burners and burners in a compact design with integrated ignition transformer, flame detector and automatic burner control. We are your reliable partner with our individual and expert advice as well as with our long-lasting products that have already been launched on the market.

# 3 | Business Units

## Emission Monitoring
Our solutions for emission monitoring are also prepared for further deducted emission limit values and stricter safety requirements in the near future.

## Combustion Technology
Our products ensure safe ignition and controlled combustion, as well as control and monitoring of various combustion systems.

## Gas Analysis
Our analyzers measure 30 different gases (pollutants or toxic or explosive or process) by laser spectroscopy for the safety, process optimization and pollution monitoring required by industries.

## Ambient Air Monitoring
Our product portfolio for measuring aerosols and particle concentration ranges from the measurement of ultrafine and nano particles to particulate matter monitoring indoors, in outdoor areas as well as for application in basic research fields.

## Data Management
Our new, certified D-EMS 2020 system is the next generation of environmental and process data management. Its modular structure enables individual adaption to any system requirement.

**Ignition**

**Combustion**

**Control**

**Monitoring**

**Measuring**

**Acquisition**

**Evaluation**

**Classification**

**Counting**

# 4 | Ignition + Combustion

Without the command of fire, the world would be a very different place. It was only the controlled use of fire for heating, cooking, and making that made human evolution possible. And even today, in industrial applications you can set technical standards only if you have full command of ignition and combustion.

That's why we offer safe, stable, and durable ignition sources for furnaces, burners, and flares, that are marked by full reliability even under the most demanding process conditions.

## Highlights in Ignition + Combustion

- We offer all industrial ignition technologies from a single source.
- We have decades of experience and a very large installed base.
- Our portfolio includes long-lasting, safe and stable gas burners with a wide control range up to 4.5 MW thermal power for use in industrial thermal processing plants.
- Our worldwide locations and contact persons ensure excellent, customer service.
- We fulfill all relevant legal and normative framework conditions and possess the appropriate certificates.
- We deliver high material and build quality, made in Germany.

**Find out more**
For more details, see www.durag.com or our app.

# 5 | Product Groups Ignition + Combustion

We offer the entire industrial ignition and combustion product portfolio from a single source, with the technical depth that comes from 70 years of experience.

## Gas Burners

We supply compact gas burners with integrated ionization flame monitor and high voltage ignition. With high flexibility in product design and versions, and a wide 15–4500 kW output range, we can configure the right burner for any application in industry and heating. All burners can be supplied in explosion-protected versions.

## Gas or Oil-Fired Igniters

We supply compact igniters with integrated ionization flame monitor and high voltage ignition. With high flexibility in product design and versions, and a wide output range (2–6000 kW for gas and 100–3600 kW for oil), we can configure the right igniter for any application in industry and heating. All igniters can be supplied in explosion-protected versions.

## Dual-Fuel Igniters

These specially designed igniters work with gas or oil, with 400/1000 kW or 1000/1000 kW heat release.

## Plasma Ignition System

This electric igniter provides safe, direct ignition of difficult fuels like coal dust. With optimum plasma distribution it outputs 1/3 kW at a plasma temperature of around 3500 °C.

## High Energy Igniters

Unlike high voltage igniters, high energy igniters are unaffected by moisture and dirt. They are used to ignite gases and liquid fuels. DURAG has the right igniter for virtually any industrial application, and supplies special solutions for power plants, refineries, waste incineration, steel industry and cement plants. Customized versions and project based adaptions are possible on request.

## Flare Igniters

For igniting waste gas from pipe flares, air and steam assisted flares, and ground flares. In most flare systems the pilot burner cannot be accessed for service or replacement while the flare is in operation. Flare pilot burners provide reliable ignition and stable burning even under the most difficult ambient conditions, ensuring safe operation.

## Mobile Ignition Systems

Our durable and lightweight portable high-energy ignition system is especially intended for the ignition of small gas burners, as found in furnaces in the petrochemical industry. The handy design, consisting of easily portable ignition unit and ignition lance, allows trouble-free one-person operation. Our mobile ignition units can be configured to customer requirements and are suitable for industrial use where no pilot burner or igniter can be installed and where simple high energy ignition is insufficient. The ignition system includes a high energy ignition unit to ignite an self-aspirating gas fired igniter. The mobile models are on two- or four-wheel trolleys and can take up to four standard gas bottles.

## Pneumatic Retraction Units

Pneumatic retraction units enable the precise and repeatable insertion and retraction of ignition lances and ignition devices at any time during burner operation. Retraction of the lance after successful ignition protects the tip from accelerated wear and damage through high temperatures in the flame area.

## Ignition Lances

Ignition lances and tips together with high-energy igniters form high-energy ignition systems. The tip produces a high-energy spark with low wear. We supply many different versions for ambient temperatures up to 1000 °C and pressures up to 25 bar. In addition to rigid lances up to 15 m long, we also offer flexible versions.

**More Information?**
The following products are only a portion of our full range. For more products, versions, and accessories see www.durag.com or our app.

# 6 | Products Ignition + Combustion

## Igniter

**Model**

## Gas fired igniter

**Benefits**

- Available in different sizes from 2 kW to 6 MW (according to NFPA classes 1, 2 or 3)
- Available with integrated ionization flame monitor and ignition transformer or burner control, thus no additional electrical installation and cabling effort
- Robust and easy to maintain: all electrical and mechanical components easily replaceable
- Gas burner for zone 1/21 and zone 2/22 available (ATEX and IECEx)
- Divisible solutions for large tube lengths available

## Igniter

**Model**

## Gas fired igniter

**Benefits**

- Self-aspirating gas fired igniter
- Capacity from 17 to 458 kW
- Integrated sparkplug(s) and ionisation electrode
- Standard diameter 38, 48,3 and 54 mm
- Special diameter 32 mm
- Self-aspirating, forced air supply or combination
- Insensitive for pressure fluctuations
- Explosion proof version (ATEX and IECEx)
- High energy ignition

## Igniter

**Model**

## Oil fired igniter/Dual fuel igniter

**Benefits**

- For the oil fired igniter: different sizes of 300 kW to 3600 kW available
- For the dual fuel igniter: Sizes: 400 kW (gas) and 1000 kW (oil) or 1000 KW (gas) and 1000 kW (oil) available
- Available with integrated ionization flame monitor and ignition transformer or burner control, thus no additional electrical installation and cabling effort
- Robust and easy to maintain: all electrical and mechanical components easily replaceable
- Gas burner for zone 1/21 and zone 2/22 available (ATEX and IECEx)
- Safety operation for different oil qualities
- Maintainability by compressed air operation

## Burner

**Model**

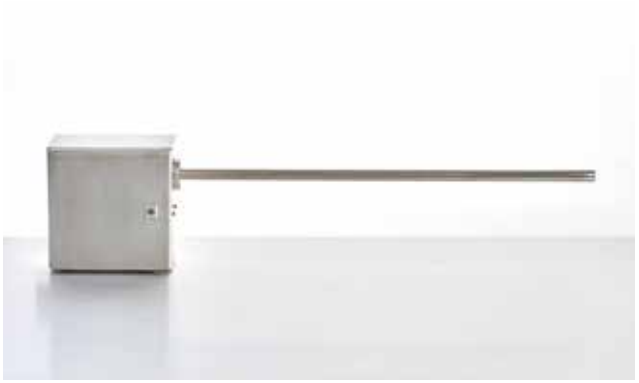
## Gas burner

**Benefits**

- Different sizes from 15 kW to 4.5 MW available
- Available with integrated ionization flame monitor and ignition transformer or burner control, thus no additional electrical installation and cabling effort
- Robust and easy to maintain: all electrical and mechanical components easily replaceable
- Operation 1-stage, 2-stage or modulating
- Gas burner for zone 1/21 and zone 2/22 available (ATEX and IECEx)

## Plasma ignition system

**Model**



## Microwave plasma ignition system

**Benefits**

- Available with 1 kW and 3 kW heat release
- Plasma temperature: approx. 3500 °C
- Direct ignition of flame resistant fuels and dusty solid fuels such as coal and biomass dust
- Saving on installation costs (for new plants) and operating costs
- Low wearing of the plasma ignition tip -> low maintenance

## E-LIGHT

### High energy ignition device

**Model**


**Benefits**

- Reliable ignition of gaseous fuels
- Thyristor controlled, non-wearing electronic design
- Cable length till max. 100 meter
- Spark energy: 2 J
- Spark frequency 3 sparks/s

## E-SPARK

### High energy ignition device

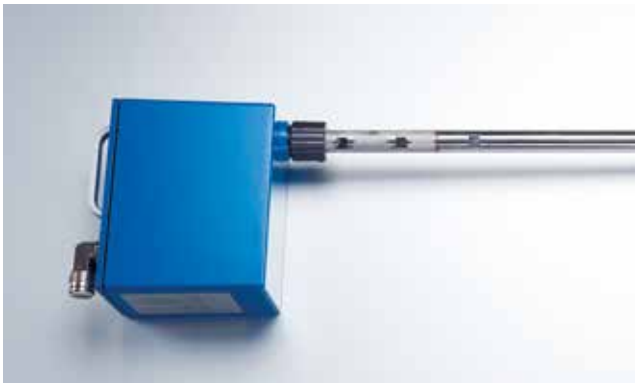
**Model**

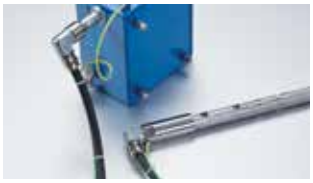
**Benefits**

- Reliable ignition of gaseous fuels
- Ignition of light fuel oil (diesel oil)
- Ideal for flare ignition
- Cable length till max. 300 meter
- Power supply: 20–30 Vdc or 85–264 VAC
- Spark energy 4, 8 or 12 Joule
- Spark frequency: till 20 sparks/s (4 Joule) and 6 Spark/s (12 Joule)

## D-HG 400

### Model





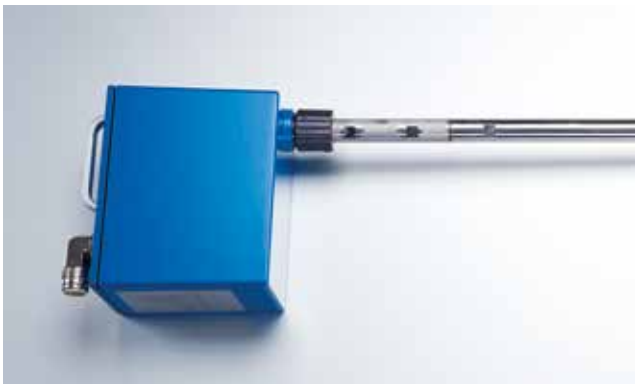
## High energy ignition device

### Benefits

- Reliable ignition of gas and liquid fuels
- Compact set-up for directly mounted rigid ignition lance or connection over high voltage cable
- Ignition feedback signal via potential-free relay output
- Ignition power: 90 J/s
- Ignition energy/spark: 4.5 J
- Ignition frequency: 20 sparks/second

## D-HG 500/550

### Model



## High energy ignition device

### Benefits

- Reliable ignition of gas and liquid fuels
- Ideal for direct ignition of start-up oil burners in power plant boilers
- Microcontroller for side configuration and device analysis via interface
- Parametrable ignition frequency and ignition time to reduce wear and costs
- Ready for ignition and ignition feedback signal via potential-free relay output
- Ignition power: 5.6–112 J/s
- Ignition energy/spark: 5.6 J
- Ignition frequency: 1–20 sparks/second

## SPI

**Model**


## Portable igniter

**Benefits**

- Compact and lightweight design for easy use
- Efficient design for one man operation
- Non-wearing electronic design for reliable operation
- Battery operated, no fixed power supply required
- LED-indication for battery status
- Spark energy: 2 J
- Spark frequency: 3 Sparks/s

## Explosion proof enclosure

**Model**

## For D-HG, E-LIGHT and E-SPARK

**Benefits**

- Explosion proof acc. to ATEX and IECEx
- Ex d and Ex de version
- Till 6 units in one enclosure

## D-ZL 441Ex, D-ZL 521, M22D, M30D, IZLX

**Model**

## High tension cable

**Benefits**

- Robust connection between high-energy ignitor and ignition lance
- Standard versions and explosion-proof versions according to ATEX and IECEx
- Temperature range –40° C ... +80°C (D-ZL) and up to 115 °C (Type M22/30D)
- Lengths up to 500 m, depending on ignition device
- High temperature versions up to 600 °C

## Pilot burner

**Model**

## Flare ignition systems

**Benefits**

- Pilot burner design acc. to API 537/ISO 25457
- High energy ignition and flame front ignition
- Complete scope of supply for cables, junction boxes and ignition-control unit
- Integrated and protected thermocouple(s)
- Sparkplugs outside of the high heat radiation zone

## Ignition and control unit (E-LIGHT, E-SPARK, SVECU)

**Model**

## Flare ignition systems

**Benefits**

- Multiple version for E-SPARK and E-LIGHT
- Option for explosion proof according to ATEX and IECEX
- Control by PLC
- Stainless steel enclosure
- Spark energy from 2 till 18 Joule
- Special option for continuous (24/7) operation (SVECU)
- Option for temperature control to DCS by Modbus

## Complete systems, engineered products

**Model**

## Customized solutions for the industry

**Benefits**

- Small 250 m3/hr (biogas) flares
- Gas and air trains according to EN 746
- Blower skids for combustion air
- Stainless steel Pneumatic retraction units
- Design according Pressure Equipment Directive (2014/68/EU)

## Ignition lances

**Model**

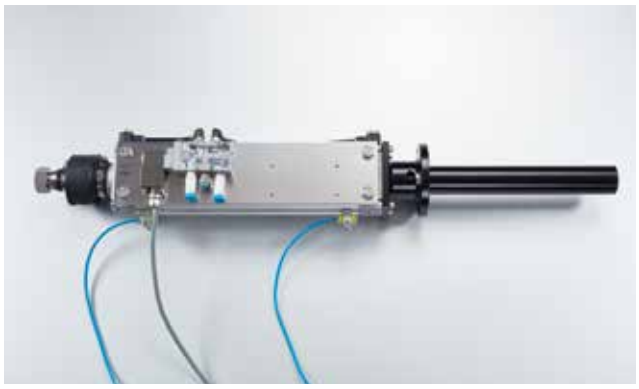
## Ignition lances

**Benefits**

- Standard diameter 12, 15, 17.2, 22, 25 and 26.7 mm
- Modular lance length till 15 meter
- Custom built solutions for reduced diameters and partible lances
- Flexible or angled ignition lances for tilting burners or direct spark ignition of flares
- Explosion proof cable connection

## D-VE 5xx, P.R.U, R0L

**Model**



## Retraction device

**Benefits**

- Precise and repeatable positioning of the ignition tip
- Safe retraction after successful ignition, to protect from damage due to high temperatures in the flame area
- Application specific stroke length
- Customized solenoid valves
- Special versions in stainless steel

## Sparkplugs

### Model

## Sparkplugs

### Benefits

- Design according to specification and diameters from 7 to 25 mm
- Angled sparkplugs
- Standard temperature range till 600 °C, short term till 800 °C.
- High temperature version till 1000 °C
- Special sparkplugs for ignition of heavy oil and high pressure application

# 7 | Monitoring + Control

Nature shows: Fire unleashes substantial amounts of energy that, if uncontrolled, have an immense destructive potential. Hence the monitoring and controlling of flames is a critical element of the safety concept of industrial applications.

Our components provide for safe control of the flame conforming to the relevant standards as well as the optimization of operation time and efficiency of the respective plant.

## Highlights in Monitoring + Control

- With decades of experience and a wide product range we master the most diverse demands of the industry.
- Our installations all over the world stand for our know-how and our high product quality.
- We meet all relevant legal requirements and possess all corresponding certificates.
- The best service for our customers – with our worldwide facilities.
- Our biggest wish: To assure the safety and stability of the complete combustion process and to safeguard production processes.
- The products in the field „Monitoring + Control“ provide the operator with additional information that allows controlled operation even in less stable situations.
- Due to our focus on the versatility and flexibility of our products, we can meet the most diverse requirements with just a few product families.

**Find out more**
For more details, see www.durag.com or our app.

# 8 | Product Groups Monitoring + Control

In the field Monitoring + Control the signals of the flames are evaluated – from the information derived combustions can be operated safely and efficiently.

## Flame Sensors

Flame sensors convert characteristic properties of the flame into an electric signal. They are applied for the monitoring of flames from various fuels and for applications with one or many burners.

## Control Units

The control units evaluate the flame radiation via the pulse signal of the flame sensor connected. They change the settings of the flame sensor where required, and ensure the fail safety of the flame ON/OFF message.

## Flame Monitors

Our flame monitors, the combination of flame sensor and control unit, are a core element of the safety engineering of combustion technology plants: They assess in a fail-safe manner the existence of a burner flame and, moreover, measure its properties and stability.

## Burner Controls

Burner controls perform the startup and controlling of gas or oil burners as well as combined gas/oil burners of any capacity in a fail-safe manner according to the relevant standards.

## Furnace Cameras

Our furnace cameras are inserted into the combustion chamber through the furnace or boiler wall to deliver a wide view of the process and the combustion. Due to the non automatic but remotely controlled exposure time radiation changes of the process or the flame can be detected immediately. We offer special flanges for fixed installation or systems with retraction unit.
A furnace camera can be combined with the D-VTA 200 to form a thermography and analysis system.

## Video/Thermography

Our thermography software measures the temperature distribution from the video delivered by the furnace camera. Measuring points (ROIs) can be freely defined by positioning with the mouse in the image. The software can be expanded with a range of modules for various applications.

**More Information?**
The following products are only a portion of our full range. For more products, versions, and accessories see www.durag.com or our app.

# 9 | Products Monitoring + Control

## D-LE 603

**Model**

## Flame sensor

**Benefits**

- Optical flame sensors for every spectral flame monitoring range from UV to IR: This allows the monitoring of flames from all fuels.
- Connection to the D-UG 120 control units, D-UG 660 control units as well as to the D-GF 150(-MB) burner controls
- Adjustable to many different combustion technologies
- Variants available for the common hazardous area (Ex-) certificates
- Variant available with double detector (UV and IR)

## D-LE 701

**Model**

## Flame sensor

**Benefits**

- Optical flame sensors for every spectral flame monitoring range from UV to IR: This allows the monitoring of flames from all fuels.
- Connection to the D-UG 120 control units, D-UG 660 control units as well as to the D-GF 150(-MB) burner controls
- Adjustable to many different combustion technologies
- Combination with fibre optic systems D-LL 701 and D-LL 702
- Functionality of electronics identical to D-LE 603

## D-LE 703

**Model**

## Flame sensor

**Benefits**

- Optical flame sensors for every spectral flame monitoring range from UV to IR: This allows the monitoring of flames from all fuels.
- Connection to the D-UG 120 control units, D-UG 660 control units as well as to the D-GF 150(-MB) burner controls
- Adjustable to many different combustion technologies
- Combination with fibre optic systems D-LL 703 and D-LL 704
- Functionality of electronics identical to D-LE 603

## D-LL 70x

**Model**

## Fibre optic systems

**Benefits**

- Flame monitoring a very high ambient temperatures (up to 350 °C w/o cooling)
- Flame monitoring of tilting burners or without direct optical view
- Flame monitoring for applications with strong vibrations or busy burner plates
- Long life time due to large number of fibres in the bundle
- Absolutely reproducible positioning and alignment after cleaning of optics
- Different Versions for a wide variety of applications
- Lengths of 20 m and more possible
- Different flame sensors/monitors can be used w/o change
- Fibre optic system not part of flame monitors Ex-certificate

## D-GT 800

**Model**

## Flame sensor

**Benefits**

- Optical flame sensor for the operation at very high ambient temperatures (w/o cooling 120 °C, with cooling up to 300 °C)
- Applicable for high combustion chamber overpressure up to 30 bar
- High vibration resistance
- Connection to the D-UG 120 control units, D-UG 660 control units as well as to the D-GF 150(-MB) burner controls
- Alternatively with or without cooling jacket
- Variants with Ex-certification available

## D-LE 103

**Model**

## Flame sensor

**Benefits**

- Optical flame sensors for every spectral flame monitoring range from UV to IR: This allows the monitoring of flames from all fuels
- Connection to the D-UG 120 control units, D-UG 660 control units as well as to the D-GF 150(-MB) burner controls
- Small space requirements at the burner plate

## D-UG 120

**Model**


## Control unit

**Benefits**

- Suitable for intermittent operation as well as continuous operation
- Compact design
- LED display
- Installation on DIN-rail
- Universally applicable with the flame sensors of the DURAG GROUP

## D-UG 660

### Model


## Control unit

### Benefits

- Suitable for intermittent operation as well as continuous operation
- Optional parallel operation of two flame sensors in any combination: UV/UV, UV/IR or IR/IR
- Three different settings supported for various operation modes
- Plain text display

## FD

### Model

## Pressure switch

### Benefits

- Pressure monitoring for G260 and air
- Product variants: FD02-010…, FD05-070…, FD010-250…
- Temperature range: –20 °C to +80 °C
- Using for commercial and industrial applications with increased requirements

## D-LX 100

### Model


## Compact flame monitor

### Benefits

- Compact setup, flame sensor and control unit in one housing
- Versatile detection
- LED display for settings and operational status
- Suitable for intermittent operation as well as continuous operation
- Confirmed for operation up to SIL3

## D-LX 110/710

### Model



## Compact flame monitor

### Benefits

- For ambient temperatures from –40 °C up to +75/70 °C, certified and without need for accessories
- Variants for common Ex approvals available, also in combination with fibre optic systems
- LED display for settings and operational status, visible for all versions at a single glance
- Suitable for intermittent operation as well as continuous operation
- Flame relay output as changeover relay (SPDT, 1 x NO, 1 x NC)
- Confirmed for operation up to SIL3

## D-LX 201/721

### Model

## Compact flame monitor

### Benefits

- For ambient temperatures from –40 °C up to +85 °C, certified and without need for accessories
- Wide sensitivity range
- Ideal support for Functional Safety up to SIL3
- Wide range of certifications and standards covered
- Suitable for intermittent operation as well as continuous operation
- Highest safety combined with highest availability through two channel design
- Selective monitoring even with a large number of burners by the advanced digital filtering
- Load/fuel flexibiltiy of plant
- Local display for status and flame intensity
- Optional flame stability analysis in real time

## AAC 76, AAL 76

### Model


## Ionisation flame monitor

### Benefits

- Effective and undisturbed monitoring of the flame by ionisation
- National and international approvals available
- Optional available with flame signal converter 4…20 mA and bargraph display
- Temporary acquisition of the µA signal for simplified adjustment of operating pressures of igniter/burner

## D-LX 200 Test kit

**Model**

## Flame monitor

**Benefits**

- Software guided tests of the compact flame monitors including printed output of protocols
- For product families D-LX 200/720 and D-LX 201/721
- Mobile use, including robust transport case
- Electrical connection 100–240 VAC/50–60 Hz

## D-GF 150(-MB)

**Model**


## Burner control

**Benefits**

- Controlling and monitoring of gas and oil burners of any capacity
- Integrated gas valve monitoring system
- Quick fuel change „on the fly“ without burner shut down
- Integrated flame monitor and input for external flame monitor
- D-GF 150-MB: Integrated clear text display
- D-GF 150-MB: Direct Modbus interface

## D-AM 150

**Model**


## Burner control

**Benefits**

- Extension module with plain text display for the burner control D-GF 150
- Initial value indicator with 24 inputs in three groups
- Error memory and text editor for plain text display
- Output relay for control via Fieldbus
- Operational hours counter and operational cycles counter

## D-GF 75/ASD-75

**Model**


## Burner control

**Benefits**

- Controlling and monitoring of gas and oil burners/igniters of any capacity
- Suitable for intermittent operation and continuous operation
- Prepurge of the boiler with changeable prepurge time and optional air pressure check
- Changeable safety times
- Input for external flame monitor
- Optional re-cycling after flame loss in operating position
- (for D-GF 75): Integrated ionisation flame monitor
- (for ASD-75): Input for a 90-110 VDC flame signal

## D-FS 50

**Model**

## Furnace camera

**Benefits**

- Brilliant live images
- Wide view inside the combustion chamber
- Digital colour camera 1280 x 960p
- Air or water cooled for up to 2000 °C in the combustion chamber
- Temperature monitoring with PT100
- Length up to 1500mm (60“)
- Can be combined with the D-VT 50 and the D-VTA 200 software systems

## D-FS2

**Model**

## Furnace sensor

**Benefits**

- Camera outside the combustion chamber
- Special endoscope with high optical resolution
- Straight oriented and elbowed versions available
- Air or water cooled for up to 2000 °C in the combustion chamber
- Different digital cameras (e. g. 1280 x 960)
- Also available as IR version
- Can be combined with the D-VT 50 and the D-VTA 200 software systems
- Can optionally be combined with retraction unit and sensor control unit

## D-RU2

### Model

## Pneumatic retraction unit

### Benefits

- For safe insertion and retraction of the furnace sensor from the combustion chamber
- Spare tank for retraction even in case of compressed air fault
- Linear cylinder with up to 1100 mm travel
- Protection flap for closing the combustion chamber
- Monitoring of cooling media
- Remote control by D-SCU

## D-SCU

### Model

## Sensor control unit

### Benefits

- Monitors and controls the retraction unit
- Includes the conversion of the digital video signal and the control signals to fiber optics
- Remote controllable via the D-VT 50 or D-VTA 200 software system

## D-VT 50

### Model

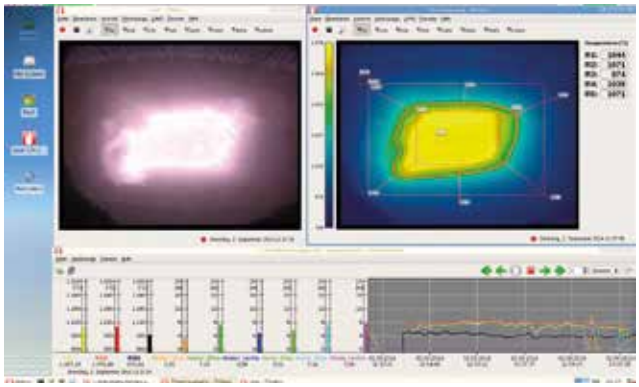
## Video viewer

### Benefits

- Display of live video via HDMI
- Control of Furnace Camera
- Fast detection of process and radiation changes
- Monitoring of Furnace Camera tip temperature
- Control of retraction unit, if available

## D-VTA 200

### Model



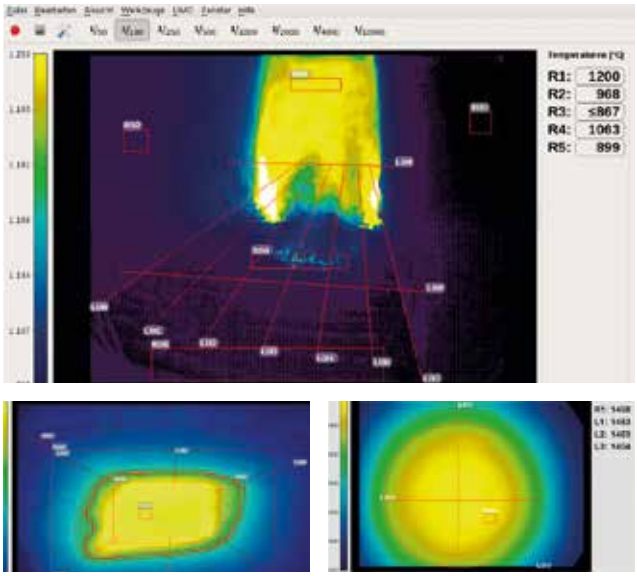
## Video and thermography system

### Benefits

- 19" industrial PC with Thermography and Analysis software
- Displays the live video and temperature distribution out of the combustion chamber
- Freely definable ROIs for temperature measurement
- Modular software design, connection of up to 8 Furnace Cameras
- Video- and data recording to HDD
- Historical trend and alarm display
- Expandable with application specific software modules

## D-VTA 200 Software modules

### Model




## Application specific software modules

### Benefits

- Application specific solutions
- Flame front for grate firing as optimisation aid to control primary air and fuel rate
- Flame Profile for grate firing as optimisation aid of the SNCR
- Fire ball detection in tangential fired boilers
- Ignition point detection

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