oilon®

Power Plant and Process Burners

Group
6
Capacity
6,800 - 273,000
MMBtu/h

Power plants
District heating plants
Pulp and paper
Chemical industry
Metallurgic processes
Municipal waste incineration
Odorous gas incineration
Fluidized bed boilers
Recovery boilers
Marine boilers
Steam boilers
Hot water boilers
Thermal oil boilers
Process furnaces
Hot air generators
Other applications

Oilon burner expertise for power plants and industrial processes

Oilon has been designing and delivering complete combustion systems since 1961.

Through our extensive knowledge of valve units, pumping stations and burner automation, we have pioneered the engineering and development of specialized solutions for the marketplace. Such as, perfecting the atomizing of fuel by means of steam or compressed air, and integrating the combustion air blower as a separate unit, both options which can be included in the Oilon product design and delivery.

Benefits to plant owner
Experienced in combustion technology since 1961, our main objective has always been research and development. Staying focused on this has led to our manufacturing of quality industrial burners with high efficiencies, reliable operation, environmentally friendly combustion and low emissions.

Applications
Oilon's burner technology is utilized in power plants and various other industrial processes. Steam and hot water boilers, district heating plants, pulp and paper industries, oil industries, metallurgic processes, hazardous and municipal waste incineration, and hot air generators, are but a few of many industrial applications where Oilon technology can be applied.

Fuels
In addition to standard, commercially available liquid and gaseous fuels, Oilon has experience in the combustion of numerous other fuels. These include a wide variety of process gases, bio fuels and gases with low heating value as well as wastes. All Oilon burner families are engineered to operate as multi-fuel burners in which liquids and gases can be combusted either separately or simultaneously.

Metallurgic processes

Pulp and paper

World-wide expertise
Oilon has world-wide experience and delivers equipment to every continent. Local legislation and standards are continually monitored and followed. In case of additional emission requirements due to environmental permitting, the equipment and processes will be designed to meet those. Oilon experts remain informed of all industrial standards and circumstances affecting differing plants, and have competence to support all decisions concerning combustion.

Hazardous and municipal waste incineration

Aluminum production

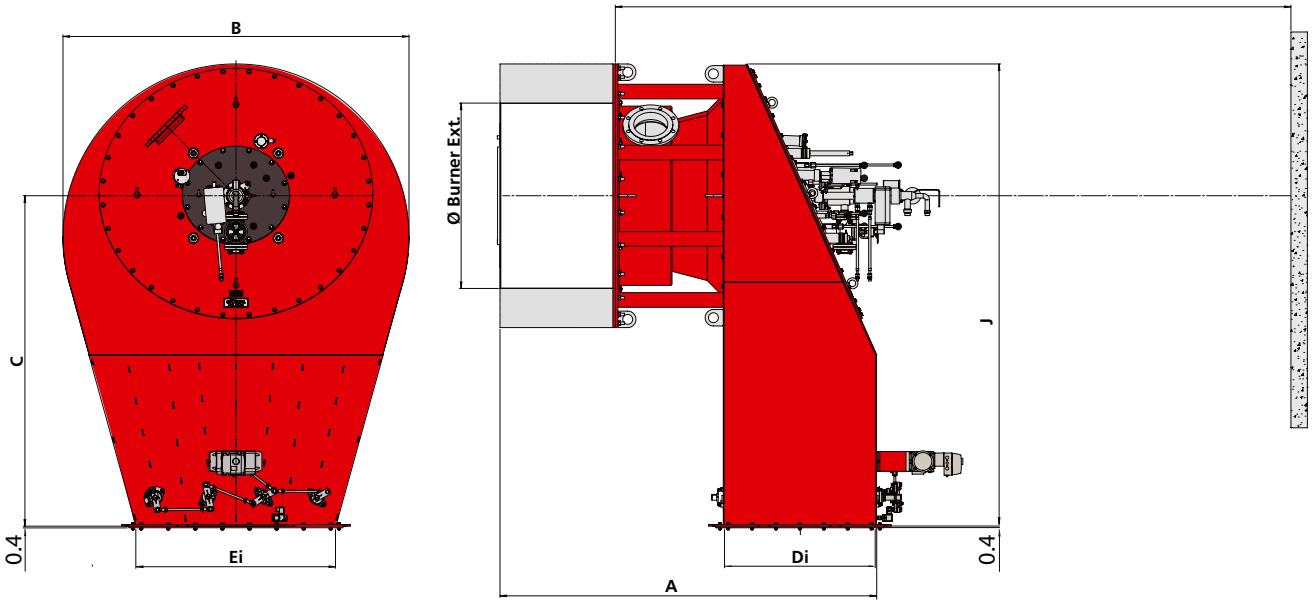
ULTRAX Low-NOx burners

Ultrax is a low-emission burner suitable for various boilers. The low NOx emission level is achieved by combining several emission reduction technologies, including staged direction of fuel and air, as well as internal recirculation of flue gas. Fuel is fed into various different zones of the flame, and combustion air is divided into individually controlled chambers in the wind box, and directed in stages to the flame. This results in controlled mixing of fuel and air, low combustion temperature and low emissions. The design of the Ultrax combustion head recycles flue gases from the combustion chamber to the flame, which significantly decreases NOx emissions. The combustion air blower must be equipped with a frequency converter. If required, external flue gas recirculation (FGR) can also be implemented with the Ultrax burner.

Maximum pressure loss ≤ 14 "WC.*)

GT-..U = gas burner
GKT-..U = gas/light fuel oil burner
GRT-..U = gas/heavy fuel oil burner

K1 (type GT-...U)
K3 (type GKT-...U, GRT-...U)

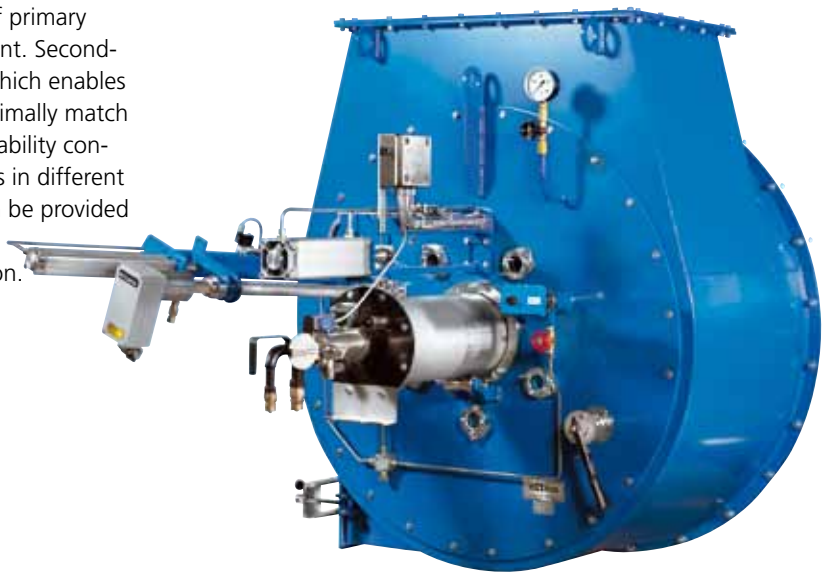


Burner	Nominal capacity *) MMBtu/h	A in	B in	C in	Di in	Ei in	Ø Burner Ext. in	J in	K1 in	K3 in
GT/GKT/GRT -25U	17,1 - 85,3	62.4	60.6	63.2	25.6	33.5	31.9	90.4	129.9	165.4
GT/GKT/GRT -35U	23,9 - 119,4	74.2	72.0	74.8	30.6	40.4	38.0	104.0	145.7	181.1
GT/GKT/GRT -50U	34,1 - 170,6	90.0	82.7	78.9	36.2	47.2	44.1	110.8	161.4	196.9
GT/GKT/GRT -70U	47,8 - 238,8	104.5	90.6	86.6	43.3	55.5	52.2	115.4	185.0	220.5
GT/GKT/GRT -80U	54,6 - 273,0	110.2	90.6	86.6	46.1	60.0	55.5	122.9	196.9	232.3

*) Valid, when combustion air temperature is +95 °F , λ = 1,17 and ambient air pressure 1,013 bar a.

S-burners for a wide range of applications

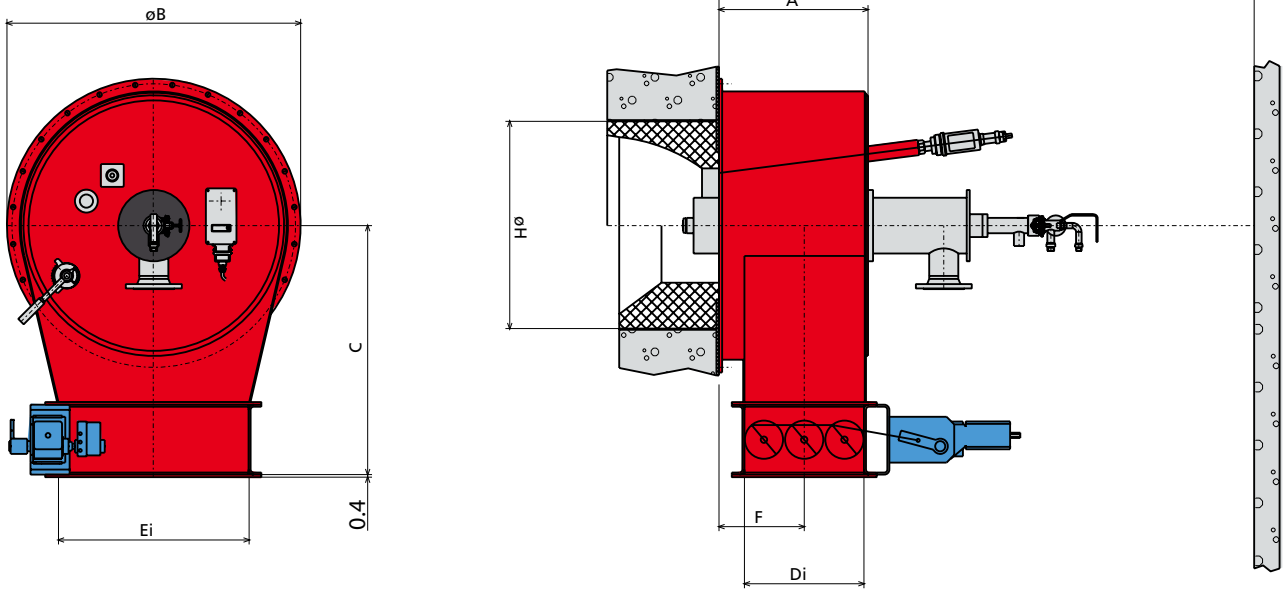
The Oilon S-burner is typically used in hot water and steam boilers, but is also suitable in a variety of other applications. The S-Burner allows for the amount and ratio of primary and secondary air to be adjusted, per requirement. Secondary air is guided through adjustable air vanes, which enables the formation of the desired flame shape to optimally match the furnace dimensions. Additionally, the adjustability contributes to achieving the required emission levels in different furnace sizes and forms. The Oilon S-burner can be provided with a single or dual-fuel liquid nozzle, gas nozzle, and/or gas ring, per your specification.



Maximum pressure loss 14 "WC.*)

GT-…S = gas burner
KT-…S = light fuel oil burner
RT-…S = heavy fuel oil burner
GKT-…S = gas/light fuel oil burner
GRT-…S = gas/heavy fuel oil burner

K1 (type GT-...S)
K2 (type KT-...S, RT-...S)
K3 (type GKT-...S, GRT-...S)

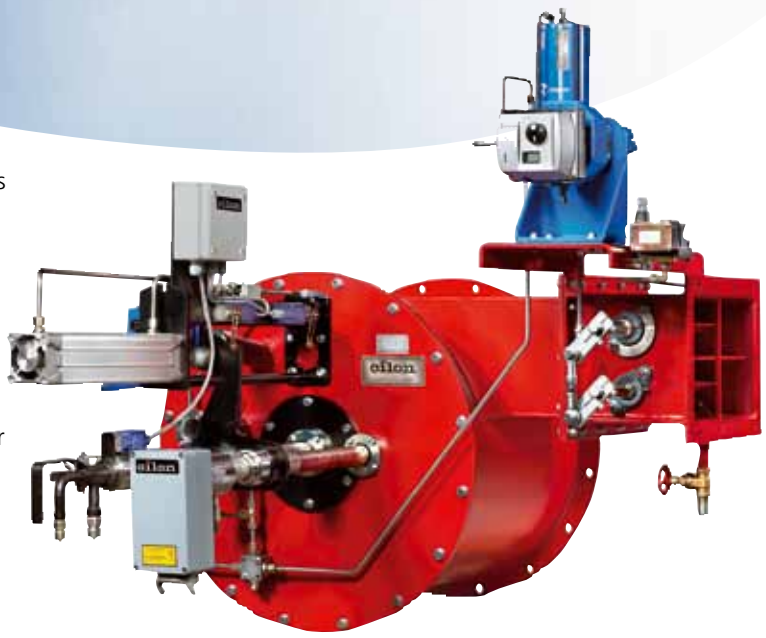


Burner	Nominal capacity *) MMBu/h	A in	B in	C in	Di in	Ei in	F in	H Typical in	K1 in	K2 in	K3 in
GT/KT/RT/GKT/GRT -5S	3,1 - 15,4	15.4	28.9	29.1	10.2	16.7	9.6	20.5	66.9	82.7	106.3
GT/KT/RT/GKT/GRT -8S	4,8 - 23,9	18.1	34.1	31.3	12.2	19.7	11.4	23.6	74.8	90.6	114.2
GT/KT/KT/GKT/GRT -12S	7,5 - 37,5	21.3	39.2	34.1	15.6	24.6	12.9	28.0	82.7	98.4	129.9
GT/RT/RT/GKT/GRT -18S	10,9 - 54,6	23.1	45.5	38.6	18.5	29.5	13.2	32.3	106.3	114.2	137.8
GT/KT/KT/GKT/GRT -25S	15,0 - 75,1	29.1	51.8	43.3	20.9	35.4	17.9	37.0	102.4	114.2	157.5
GT/KT/RT/GKT/GRT -35S	21,2 - 105,8	33.6	63.4	49.2	24.8	40.4	20.9	40.6	114.2	137.8	169.3
GT/KT/RT/GKT/GRT -50S	30,7 - 153,5	40.3	68.9	51.2	30.9	47.2	24.0	48.0	128.0	137.8	183.1
GT/KT/RT/GKT/GRT -70S	43,0 - 215,0	47.7	82.7	59.1	41.3	61.0	28.1	55.5	137.8	161,4	185.0

*) Valid, when combustion air temperature is +95 °F, λ = 1,17 and ambient air pressure 1,013 bar a.

K-burners for various processes

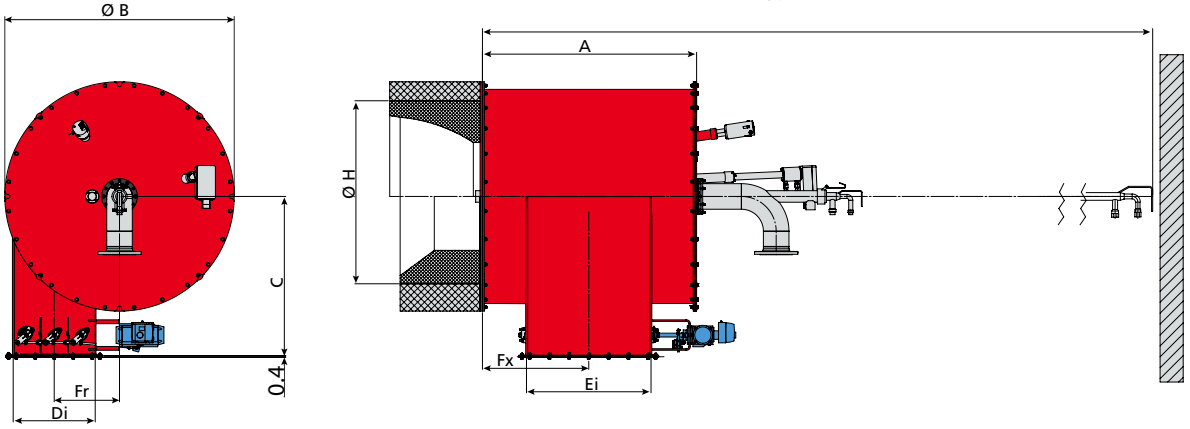
The Oilon K-burner is the right choice for many different types of industrial processes, such as, for hazardous waste and municipal waste incineration plants. The combustion air inlet is located eccentrically on one side of the burner, thus guiding the combustion air tangentially to the wind box, which causes a strong swirl and stable flame. The burner construction is designed for heavy duty operation to guarantee good availability in extreme process conditions. The Oilen K-burner can be equipped with several nozzles according to the number of different fuels.



Maximum pressure loss 14 "WC.*)

GT-…K = gas burner
KT-…K = light fuel oil burner
RT-…K = heavy fuel oil burner
GKT-…K = gas/light fuel oil burner
GRT-…K = gas/heavy fuel oil burner

K1 (type GT-...K)
K2 (type KT-...K, RT-...K)
K3 (type GKT-...K, GRT-...K)



Burner	Nominal capacity *) MMBtu/h	A in	B in	C in	Di in	Ei in	Fx in	Fr in	H Typical in	K1 in	K2 in	K3 in
GT/KT/RT/GKT/GRT -3K	1,7 - 9,2	16.9	20.5	20.5	9.1	6.1	8.3	5.0	19.7	80.7	94.5	114.2
GT/KT/RT/GKT/GRT -5K	3,1 - 15,4	21.7	25.2	22.8	11.6	7.5	10.6	6.7	22.8	84.6	98.4	122.0
GT/KT/RT/GKT/GRT -8K	4,8 - 23,9	27.2	30.7	28.0	14.8	9.8	13.4	8.3	26.4	94.5	106.3	129.9
GT/KT/RT/GKT/GRT -12K	7,5 - 37,5	33.1	36.6	28.5	17.9	12.0	16.3	10.2	30.3	110.2	116.1	139.8
GT/KT/RT/GKT/GRT -18K	10,9 - 54,6	40.2	43.7	32.1	21.9	14.6	19.9	12.4	35.4	126.0	137.8	169.3
GT/KT/RT/GKT/GRT -25K	15,0 - 75,1	47.2	50.8	35.6	26.6	17.7	23.4	14.4	40.6	145.7	153.5	192.9
GT/KT/RT/GKT/GRT -35K	21,2 - 105,8	55.5	59.4	41.3	32.3	21.3	27.6	16.9	46.1	161.4	177.2	216.5

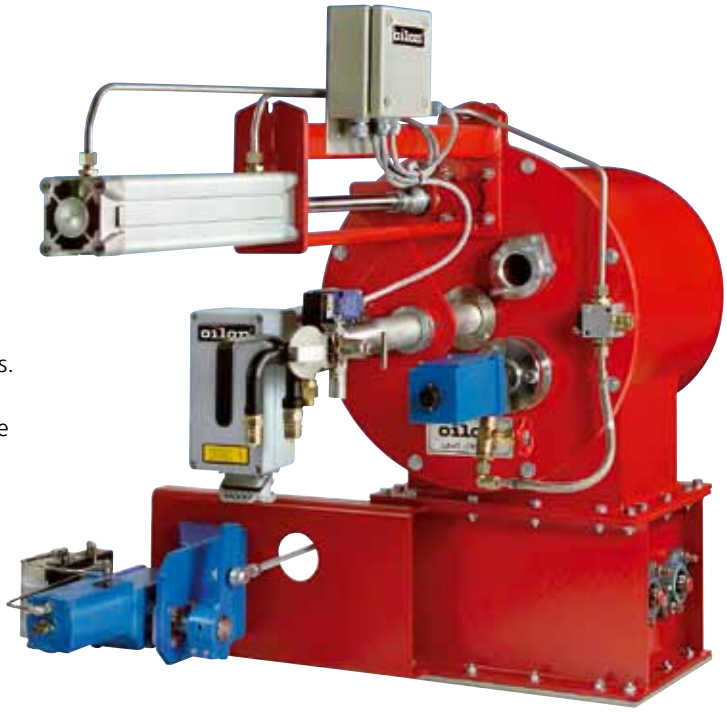
*) Valid, when combustion air temperature is +95 °F, λ = 1,17 17 and ambient air pressure 1,013 bar a.

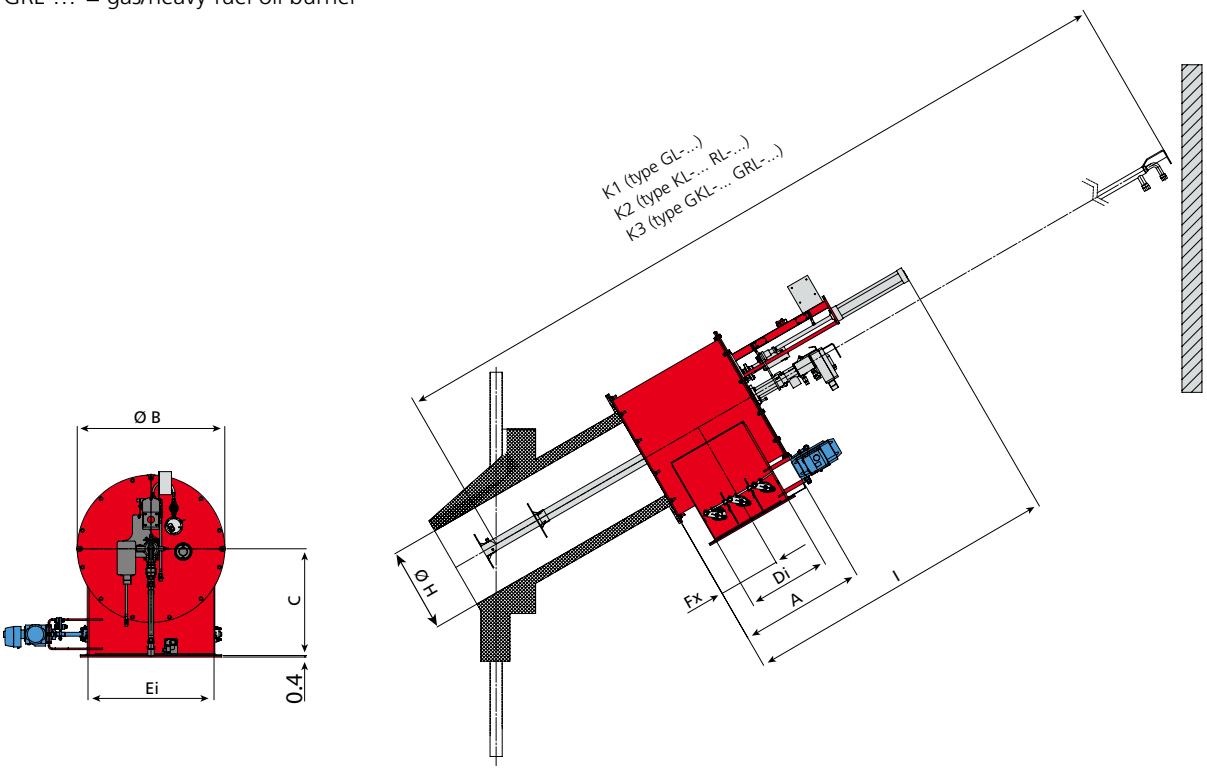
Lance burners especially for fluidized bed boilers

The Oilon Lance burner presents specialized technology for different demanding industrial purposes, such as the start-up and support burner in fluidized bed boilers. With this type of burner, it is essential, that the parts will tolerate the effects of the sand bed. This is achieved in the Oilon Lance burner by optimizing the cleaning and cooling air flow through the burner. When the burner is stand-by, the critical parts are retracted automatically. With the Oilon design, the small diameter of the lance burner minimizes the burner openings on the boiler walls.

Pressure loss is from 10" WC upwards, dependent on the circumstances, and will be engineered per your actual requirements.

GL-… = gas burner
KL-… = light fuel oil burner
RL-… = heavy fuel oil burner
GKL-… = gas/light fuel oil burner
GRL-… = gas/heavy fuel oil burner





Burner	Nominal capacity*) MMBtu/h	A in	B in	C in	Di in	Ei in	Fx in	H in	I Typical in	K1 Typical in	K2 Typical in	K3 Typical in
GL/KL/RL -250	5,5 - 22,2	21,7	21.7	20.3	9.8	14.8	10.6	9.8	63.1	137.8	149.6	N.A.
GL/KL/RL/GKL/GRL-350	10,6 - 42,7	22.8	26.0	22.8	14.6	21.9	11.0	13.8	63.9	157.5	177.2	192.9
GL/KL/RL/GKL/GRL -450	18,1 - 71,7	28.3	31.9	23.4	17.7	26.6	14.0	17.7	78.0	185.0	200.8	220.5
GL/KL/RL/GKL/GRL -550	26,6 - 105,8	32.3	37.8	27.4	21.3	32.2	15.9	21.7	82.0	208.7	224.4	244.1

*) Valid, when combustion air temperature is +95 °F, λ=0,8 and ambient air pressure 1,013 bar a.

Standard burner selection

Coding presented below covers only our standard burner selection. In addition, there are numerous other burner models in our product range and, when required, we provide tailor-made solutions for various needs.

GRT-35S-abcde

GRT-35S burner type
(from pages 4 - 7)

a **ATEX classification**
- a=1 non-ATEX
- a=2 ATEX, Zone 2, complies with EN

b **Regulation method, type of air damper actuator**
- b=1 electronic compound regulation, pneumatic actuator, compatible with WiseDrive 2000
- b=2 mechanical compound regulation, electric actuator (only non-ATEX)
- b=3 electronic compound regulation, electric actuator compatible with WiseDrive 1000 (only non-ATEX)
- b=4 electronic compound regulator, electric actuator, compatible with WiseDrive 2000

c **Combustion air temperature**
- c=1 combustion air temperature < 248 °F
- c=2 combustion air temperature 248 °F < t < 608 °F

d **Secondary air swirl**
- d=1 counter-clockwise
- d=2 clockwise

e **Pilot burner fuel**
- e=1 natural gas
- e=2 propane
- e=3 light fuel oil

E.g. GRT-35S-21111
- ATEX, Zone 2
- electronic compound regulation, pneumatic actuator
- combustion air temperature < 248 °F
- secondary air swirl counter-clockwise
- pilot burner fuel: natural gas

Auxiliary equipment

Correctly dimensioned and designed auxiliary equipment is essential to guarantee optimal performance of the burner. The right instruments, piping materials and process values are chosen on the basis of our long experience. All the equipment is assembled and tested at the factory and includes the necessary wiring and instrument piping

Valve units for process gases

The nature and amount of process gases vary considerably depending on the process in question. Corrosive gases, demanding conditions and surroundings etc. are taken into account.

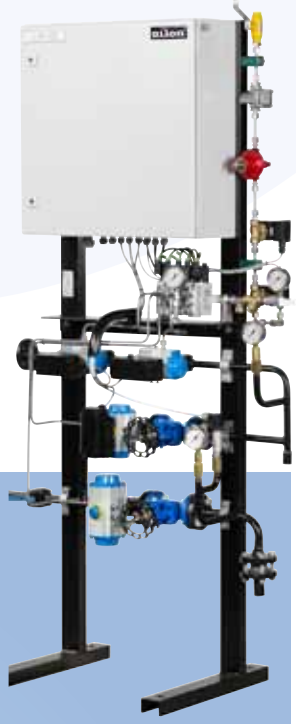
Valve units for liquid fuels

Units for several burners can be assembled into one common rack. It is also possible to combine several different fuels into one unit.

Valve units for natural gas

The natural gas filtering, measuring and controlling unit can be individual for each burner. Multi-burner installations, however, can be provided with a common unit for all burners or burner groups.

Standard shut-off valve units



The coding presented here covers our selection for standard shut-off valve units and standard measuring and control units. Our product range also includes numerous other models, and when required, we provide tailor-made solutions for various needs.

YXXPSR-abcde

Fuel Y
K=light fuel oil
R=heavy fuel oil
G=natural gas

Pipe size (DN) XX

For light and heavy fuel oil

15	< 2200 lb/h
20	2200 lb/h - 4410 lb/h
25	4410 lb/h - 9370 lb/h
32	9370 lb/h - 16540 lb/h

For natural gas (gas amount will be determined case by case)

40
50
65
80
100
125
150

Shut-off valve unit PSR

a **ATEX-classification**
a=1 non-ATEX
a=2 ATEX, Zone 2, complies with EN

b **Method of regulation, compatibility with burner automation**
b=1 electronic compound regulation, pneumatic control valve (gas), compatible with WiseDrive 2000
b=2 electronic compound regulation, electric control valve, compatible with WiseDrive 1000 (only non-ATEX)
b=3 electronic compound regulation, electric control valve (gas), compatible with WiseDrive 2000

c **Handedness**
c=1 from left to right
c=2 from right to left

d **Equipment for pilot burner fuel**
d=1 no pilot burner fuel equipment
d=2 includes pilot burner fuel equipment for gas (propane or natural gas)
d=3 includes pilot burner fuel equipment for light fuel oil (oil inlet pressure 20 bar g)

e **Electric cabinets**
e=1 junction box
e=2 local control panel oil or gas
e=3 local control panel oil and gas

E.g. K25PSR-21122
- Light fuel oil as fuel
- Pipe size DN 25
- ATEX, Zone 2
- electronic compound regulation, pneumatic control valve (gas), compatible with WiseDrive 2000
- handedness: from left to right
- includes pilot burner fuel equipment (suitable for propane and natural gas)
- local control panel for oil

Standard measuring and control units

YXXMSR-abc

Fuel Y
K=light fuel oil
R=heavy fuel oil
G=natural gas

Pipe size (DN) XX

For heavy and light fuel oil
15 < 2200 lb/h
20 2200 lb/h - 4410 lb/h
25 4410 lb/h - 9370 lb/h
32 9370 lb/h - 16540 lb/h

For natural gas
(gas amount will be determined case by case)
40
50
65
80
100
125
150

Measuring and control unit MSR

a
a=1 non-ATEX
a=2 ATEX, Zone 2, complies with EN

ATEX classification

b

method of regulation, compatibility with burner automation

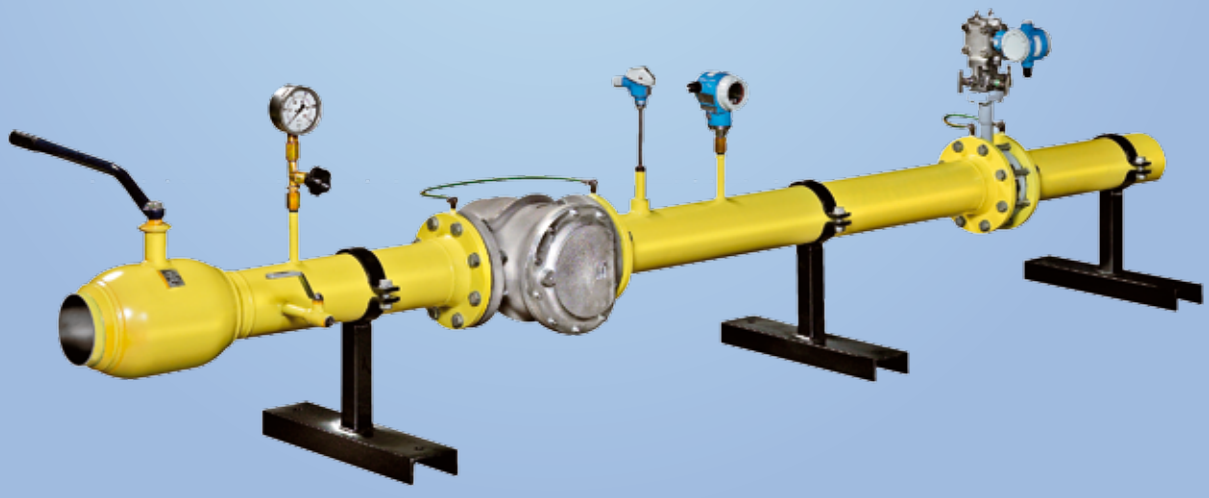
b=1 electronic compound regulation, pneumatic control valve (oil), compatible with WiseDrive 2000

b=2 electronic compound regulation, electric control valve (oil) compatible with WiseDrive 1000 (only non-ATEX)

b=3 electronic compound regulation, electric control valve (oil) compatible with WiseDrive 2000

c
c=1 from left to right
c=2 from right to left

Handedness



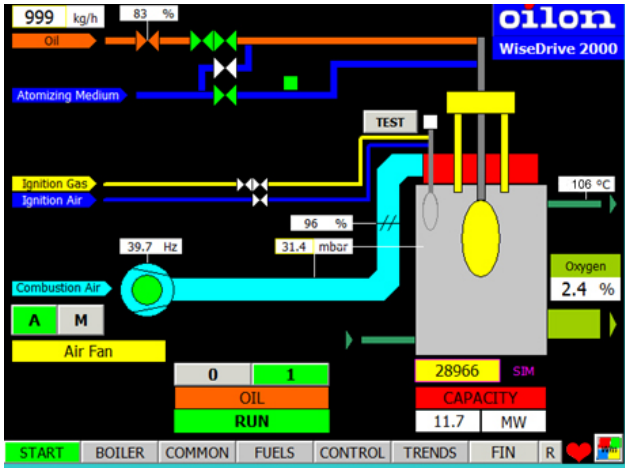
Burner management systems

Oilon has a long history designing and manufacturing Burner Management Systems (BMS) for combustion processes. Oilon BMS utilize optimized controls that ensure the proper sequence and finely-tuned timing. Consequently, the optimized performance of the combustion delivers high efficiency and low emissions.

For typical solutions there are standard Oilon BMS packages available. As well as customized systems for specific applications or requirements, the extent of which can be engineered to your specification. Normally BMS will be included in the main control system of the Plant (DCS). Additionally, BMS can be based on Programmable Logic Control (PLC) controller or control relay systems. Safety and availability are among the most important considerations in designing and realizing an automation system. The proper safety level and the need for redundant functionality will be determined to meet the requirements of the entire process. Every BMS is factory tested (FAT) to guarantee smooth and fast start-up of the combustion system in the plant.

BMS with touch panel for four burners.

BMS safety devices.



Touch panel screen for combustion system.

Standard burner automations

The standard burner automation devices intended for the group 6 burners are WiseDrive 1000 ja WiseDrive 2000.

They both have the following features:

- Controls, interlocking, monitoring and regulation required by the burner are included
- Two types of fuel at maximum.
- Start and stop from the main automation system is performed with binary HW signals and/or local control panel.
- Power regulation is based on incoming 4-20 mA signal (for example, steam pressure, temperature of the boiler water, the output capacity of the burner).
- O_2 regulation may be added to burner automation.
- Burner automation may be installed either in a separate control room or near the boiler. The maximum temperature of the automation environment is 104 °F without separate cooling. Higher temperatures require instrument air extrusion or coolers. Cooling system can be provided as an option.

WiseDrive 1000

- The burner control unit is EN 298, EN 230 and TÜV-approved.
- Compound regulation of fuel/combustion air is implemented on the basis of regulating units' position signals.
- CO regulation can be added to the automation system alongside O_2 regulation.
- 5 binary tripping circuits have been reserved for external interlocking.
- Supply voltage 230 VAC, internal and external controls 230 VAC. Includes a power supply unit 230 VAC / 24 VDC.
- Painted steel cabinet 31.5 x 47.2 x 15.7 inches (W x H x D), IP55, no ATEX classification for the cabinet itself.
- The whole system is always non-ATEX.

WiseDrive 2000

- Based on programmable logic Siemens S7-315F.
- Logic has been approved for safety man-machine use in accordance with EN 61508 standard.
- Compound regulation of fuel/combustion air is implemented on the basis of fuel and combustion air flow measurements.
- The logic can be linked with the main automation system through a Profibus channel. Interruption in the operation of the channel will not interfere with the operation of the burner.
- 6 binary tripping circuits have been reserved for external interlocking.
- Supply voltage 230 VAC, internal and external controls 24 VDC. Includes a power supply unit 230 VAC / 24 VDC.
- Painted steel cabinet 31.5 x 39.4 x 11.8 inches (W x H x D), IP55, no ATEX classification for the cabinet itself.
- The whole system can be either ATEX or non-ATEX.
- Includes an interface option for touchscreen (touchscreen may be delivered as an option).

In addition to these standard burner automations, we tailor burner automations for various customer and plant requirements.

Pumping units

Pumping units for liquid fuels

Pumping units handle the filtering, pumping and pre-heating of fuel as required per application. In order to ensure high availability, our standard pumping configurations have two parallel lines. Fuels with high viscosity are heated with steam or water to the optimal atomization temperature. For cold starting a plant, the pumping units can be equipped with an electric heating exchanger.

The coding below covers standard pumping units. In addition to these, our product range includes numerous other models, and when required, tailored solutions to meet various needs are available.

X2000PK-abc

Fuel X
K=light fuel oil
R=heavy fuel oil

Net capacity
Fuel amount for burners

For light fuel oil (lb/h)
9150
13190
15150
20840
27740

For heavy fuel oil (lb/h)
11000
15880
18460
26640
35020

Pumping unit PK

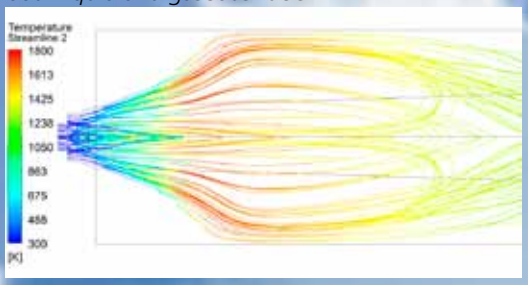
a **ATEX classification**
a=1 non-ATEX
a=2 ATEX, Zone 2, complies with EN

b **Pressure control**
b=1 mechanical pressure control (turn-down ratio 1:5)
b=2 electro-pneumatic pressure control

c **Handedness**
c=1 from left to right
c=2 from right to left

EN_US6/1.00/072014

Oilon invests over 5% of its turnover in research and product development. Our modern product development centers meet all European and US standards, enabling Oilon to efficiently engineer advanced combustion technology solutions for both liquid and gaseous fuels.



Computational fluid dynamics (CFD) is an essential part of our research and product development cycle. CFD enables faster development of new products, and ensures exacting critical factors in more extensive projects, including combustion air channels, burner positioning, furnace temperatures, etc., using numerical methods and algorithms to solve and analyze problems that involve fluid flows. Computers are used to perform the calculations required to simulate the interaction of liquids and gases with surfaces defined by boundary conditions. With high-speed supercomputers, better solutions can be achieved.

Our production capacity enables the implementation of even larger orders and a short delivery cycle. Our products are comprehensively tested at the factory (FAT), which ensures the smooth commissioning of the burner system at the plant.

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