WELCOME TO OILON OY
JUKKA JAATINEN
Export Manager
SUOMI FINLAND

www.oilon.com
INFORMATION ABOUT FINLAND

- INDEPENDENCY 1917 (PARLIAMENTARY REPUBLIC)
- CAPITAL CITY HELSINKI
- POPULATION 5.5 MILLION
- LANGUAGES: FINNISH AND SWEDISH
- TOTAL AREA 337.030 SQ KM
- MORE THAN 180.000 LAKES
- GDP PER CAPITA EUR 36.000
- MEMBER OF EUROPEAN UNION 1995

SOME ITEMS WHICH FINLAND IS FAMOUS OF:
- SAUNA
- HOT SUMMERS AND COLD WINTERS, TEMPERATURE DIFFERENCE HUGE -50 ... +37 C!
- BEST COUNTRY TO LIVE 2010, BEST COUNTRY 2012
- NO CORRUPTION (TRANSPARENCY INTERNATIONAL)
- SANTA CLAUS
FACTS ABOUT OILON

• A private shareholder company, established in Lahti, Finland 1961

• Turnover: 60 million EUR, over 60 % comes from export, industrial burners over 90 % export

• Personnel: >340

• Products: - oil, gas and multifuel burners, cap. 12 kW - 90 MW
- burner control and regulation systems
- filtering, pumping and preheating units for HFO & LFO
- Geopro ground source heat pumps
- Scancool cooling & heat recovery systems

• ISO 9001 Quality system,
• ISO 14001 Environmental management system
Oilon - Locations

We are Global & Local!
Energon – Modern training facility
Oilon Wuxi, China
Oilon US Inc

- Sales to USA since 1997,
- Founded in July 2014, Thomasville, Georgia
- 100% owned by Oilon Group
- Activities
  - 110V/460 60HZ CSA/UL production center
  - Sales and Marketing in North and Central America
  - Customer Service
  - Technical support
  - Spare parts
  - Warranty
  - Technical trainings
  - Local warehouse
Scancool, Kokkola, Finland

Cooling and heat pump technology for industry and energy production
Oilon Burners 12 – 90.000 kW
Biggest & Smallest

Biggest product range in the world

Power plant burner 90 000 kW and burner for domestic heating 20 kW
## BURNER SERIES

<table>
<thead>
<tr>
<th>Number</th>
<th>Burner Type</th>
<th>Power Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Junior burners</td>
<td>17 - 82 kW</td>
</tr>
<tr>
<td>2, 2C</td>
<td>6 - 26 burners</td>
<td>42 - 400 kW</td>
</tr>
<tr>
<td></td>
<td>50 – 90 burners</td>
<td>200 - 1540 kW</td>
</tr>
<tr>
<td>3</td>
<td>130 – 280 burners</td>
<td>390 – 3500 kW</td>
</tr>
<tr>
<td></td>
<td>350 – 450 burners</td>
<td>880 – 5500 kW</td>
</tr>
<tr>
<td>4, 4A</td>
<td>300 – 700 burners</td>
<td>770 - 9700 kW</td>
</tr>
<tr>
<td></td>
<td>Monox 1000, 1200 M</td>
<td>1800 – 13300 kW</td>
</tr>
<tr>
<td>5</td>
<td>400 - 2500 ME, 1200</td>
<td>1200 - 29500 kW</td>
</tr>
<tr>
<td></td>
<td>- 29500 kW</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Power Plant and Process Burners</td>
<td>2 - 90 MW</td>
</tr>
</tbody>
</table>
Series 6, 24, 26, 42-400 kW and 50, 90, 200-1540 kW

APPLICATIONS: Heating of larger dwellings, paint and glass ovens, tea and grain dryers, steam and hot water boilers, green houses, cooking, etc.
Series 130 – 150, Series 250, 280, 390-3500 kW

MCR
WD 33 – 34
WD 100 & 200

FUELS: LFO (KP), HFO (RP), GAS (GP), GAS/LFO (GKP), GAS/HFO (GRP)

APPLICATIONS: District heating plants, hospitals, transportation and shipping (sludge utilization in ships, tank heating), textile industry, food industry, metal industry, hot air generators, glass and ceramic industry, paper and chemical industry, process industry, etc.
Series 300 - 700, 770-10500 kW
Series Monox 1000 M and 1200 M, 1800–13300 kW

FUELS: LFO (KP), HFO (RP), GAS (GP), GAS/LFO (GKP), GAS/HFO (GRP)

APPLICATIONS: District heating plants, hospitals, transportation and shipping (sludge utilization in ships), textile industry, food industry, metal industry, hot air generators, paper and chemical industry, process industry, etc.
Series 400 – 2500 ME Duoblock Burners, 1200–29500 kW

FUELS: LFO (KP), HFO (RP), GAS (GP), GAS/LFO (GKP), GAS/HFO (GRP).

HOT COMBUSTION AIR UP TO 250 C

APPLICATIONS: District heating plants, hospitals, textile industry, food industry, hot air generators, paper and chemical industry, process industry, asphalt drums, etc.
For ME-Burners:

HFO Pumping & preheating unit PKYR:

- capacities up to 1950 kg/h
- viscosity max 650 cSt @ +50°C
- electric heaters 18 – 60 kW
RP-1000 ME
12 MW
ULTRAX, Ultra Low NOx Burner
Capacity range 2…90 MW

Low NOx solution for:
• steam boilers
• hot water boilers
Oilon ACE 0,8 – 90 MW

- Latest low emission technology
- Nox <60 mg/nm3, O2 3%
- Nox <30 mg/nm3 with external FGR
- Air & Fuel distribution & Staging
- Internal FGR
Combustion Solutions for Low-Heating-Value Gases

Example: A steel factory:
Burner + pre-combustion chamber

Blast furnace gas: Heat value 3 – 4 MJ/nm³
No supporting fuel required
Waste Incineration
Hazardous Waste Incineration Plant

Ekokem – Riihimäki, Finland
Pulp and Paper Industry
Oilon Marine Burners

- Main supplier of pressure jet burners for Kangrim Industries and Alfa Laval
- Deliveries all over the world (containers, tankers, cruise ships, river boats, etc.)
- Shipyards: Hyundai, STX, Samsung, Mipo, Daewoo, etc.
- Deliveries according to the rules of 10 classification societies
- HFO up to 700 cSt/50 °C with pressure jet burner
- Sludge combustion
- LNG
CONTINUOUS DEVELOPMENT OF BURNERS

R&D CENTER

- fulfilling EU-standard
- testing facility for burners up to 50 MW
- combustion tests and precise measurements with oils and gas
- computer modelling of combustion processes, using computational fluid dynamics (CFD)
- min. 5% of Oilon’s turnover is invested in product development
HOT BOX PUMPING AND PREHEATING UNIT FOR HFO

HB 500 … 2000 R Series
Heating capacity 500 - 2000 kg/h
Heavy Oil Preheater

- Electric mass preheater with an electronic temperature regulating system
- Accuracy ± 1°C
- Ensures optimal burning conditions -> better efficiency.
Standard Components

- Gas valves
- Burner controller
- Leakage tester
- Capacity controller
- Plug Connector
- Solenoid valve
- Nozzles
- Oil pumps
- Pressure Switches
- Electric motors
- Servomotors
- Pressure gauges
- Thermostats and pressure controls
- Oilon Plus

www.oilon.com
### Range of applications of Oilon

<table>
<thead>
<tr>
<th>Category</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HEATING APPLICATIONS</strong></td>
<td>One family houses, larger dwellings, hospitals and hotels district heating plants</td>
</tr>
<tr>
<td><strong>GREEN HOUSES</strong></td>
<td>Heating of premises and soil CO2 production</td>
</tr>
<tr>
<td><strong>FOOD INDUSTRY</strong></td>
<td>Bakery ovens, Steam boilers in breweries, Roasters, Spray dryers</td>
</tr>
<tr>
<td><strong>GLASS AND CERAMIC INDUSTRY</strong></td>
<td>Drying of sand and brick works, Building dryers, Glass ovens</td>
</tr>
<tr>
<td><strong>PAPER AND CHEMICAL INDUSTRY</strong></td>
<td>Producing of process steam Cooking of cellulose Different chemical industrial processes</td>
</tr>
<tr>
<td><strong>AGRICULTURE</strong></td>
<td>Grain, grass, rice and fodder drying Tea drying Sterilisation of raw material Cooking</td>
</tr>
<tr>
<td><strong>METAL INDUSTRY</strong></td>
<td>Lacquer drying, Smelting ovens, Paint ovens, Galvanising and electroplating</td>
</tr>
<tr>
<td><strong>TEXTILE INDUSTRY</strong></td>
<td>Cleaning and ironing, Drying of fabric and yarn</td>
</tr>
<tr>
<td><strong>TRANSPORTATION AND SHIPPING</strong></td>
<td>Steam and hot water boilers in ships Heating of tanks, Sludge utilisation in ships, Asphalt drums, Heating of train carriages</td>
</tr>
<tr>
<td><strong>OTHER APPLICATIONS</strong></td>
<td>Incineration of different waste Ignition burners, Sludge burning equipment, Incineration of animal remains, Utilisation of tall oil</td>
</tr>
</tbody>
</table>
Low NOx
Environmentally Friendly Combustion Technology
Nox Classes, limit values acc. to EN267 and EN676 for Low Nox burners

<table>
<thead>
<tr>
<th>Class</th>
<th>Natural gas / ppm</th>
<th>LPG /ppm</th>
<th>Light fuel oil / ppm</th>
<th>CO / mg/kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1</td>
<td>83</td>
<td>113</td>
<td>116</td>
<td>110</td>
</tr>
<tr>
<td>Class 2</td>
<td>59</td>
<td>88</td>
<td>86</td>
<td>110</td>
</tr>
<tr>
<td>Class 3</td>
<td>39</td>
<td>69</td>
<td>56</td>
<td>60</td>
</tr>
</tbody>
</table>

Nox-values should always be compared at reference circumstances determined by EN 267 and EN 676
Oilon Low-NO$_X$ Natural Gas Burners
Available in series 2C, 3A, 3B, 4 and 5 (200 kW - 25,000 kW)

NO$_X$ combustion escape values

With O$_2$ 3%
Flue Gas Recirculation on Monoblock Burners

**Required components:**
- Special combustion manager
- Flue gas damper with actuator
- Temperature sensor, max
- Flue gas inlet adapter
- \( O_2 \) sensor
- Recirculation pipe (by client)

10 -15 % of flue gas on top of total combustion air amount
FGR – Industrial Burners, 1 – 24 MW

Natural Gas

• Monoblock version, group 3 and 4 (capacities 1 – 11 MW)
• Duoblock version, group 5 (capacities 6 – 24 MW)
• Recirculated flue gas amount normally 10 – 15 %
• Reachable NOx-level < 60 mg/m³n (O₂ = 3 %)
• Gas mixture temperature < +55°C (when flue gas temperature < 160°C)
• Burner capacity reduced 15 – 20 %
• Boiler efficiency affected
Example of FGR
Product Training

• For all products
• All fuels, HFO, LFO, NG
• Can be suited for your demands
• Skilled personnel
• Small groups 10-15 persons – efficient!
• Training facilities in Lahti & Wuxi
• Training at customer’s site
• App. 1000 customers trained every year
Training Facilities

Class room

Domestic burners
Burners tested to match performance...

- all burners tested
- individual manufacturing card for each burner
Manufacturing number
Why Oilon Burners?

- Wide product range, more than 600 different options
- Tailor-made planning and flexibility
- Long lifetime and easy service, designed from operator’s point of view
- High quality components and manufacturing
- Experience of special fuels & bio fuels
- Experience with low quality Heavy Fuel Oil
- Constant research and development activities
- Efficient maintenance and training services
- Global service network
- Excellent customer care and after sales services
LAHTI Skiing Stadium

Torch burner designed and delivered by OILON
Bio Gas

-Bio Gas energy, readily available, cheap and decentralized
-Bio gas emissions big environmental problem in landfills, waste water plants etc.
-Advantages: free energy, environmental protection, less odours, volume of waste decreases, BG plant waste is good fertilizer
-Carbonhydrates & Proteins, agricultural and animal wastes are good sources to produce bio gas
-Bio gas yield 0,25…0,88 m³/kg (no water & ash)
PROPERTIES OF BIO GAS

• Energy content (EC)  app 15…24 MJ/Nm³

NOTE:
• delivery pressure sometimes low <200 mbar
• water & impurities
• NOx emission: 18 – 25 ppm
• Energy content must be >10 MJ/kg
## Application hints:

- **max 0,1 vol-% H2S dry**
- **max H2O < 5 %**
- **gas controls inspection every 6 months**
- **good dewatering and dirt separation ensures carefree operation for many years with biogas**

### DÜNGS® Application hints

<table>
<thead>
<tr>
<th>Gerät / Product</th>
<th>Produktgruppe / Product group</th>
<th>Kennzeichen / Short cut</th>
<th>H2S</th>
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<tbody>
<tr>
<td>Doppelsolenoid</td>
<td>Double solenoid valve</td>
<td>DMK.../11</td>
<td>ja / yes</td>
</tr>
<tr>
<td>Doppelsolenoid</td>
<td>Double solenoid valve</td>
<td>DMK.../12</td>
<td>max 0,1 vol-% H2S trocken / dry</td>
</tr>
<tr>
<td>Entmagnetventil</td>
<td>Single solenoid valve</td>
<td>MV, SCD</td>
<td></td>
</tr>
<tr>
<td>Entmagnetventil</td>
<td>Single solenoid valve</td>
<td>SK</td>
<td></td>
</tr>
<tr>
<td>Längennetz</td>
<td>Long wire</td>
<td>LGW</td>
<td></td>
</tr>
<tr>
<td>Gasdruckregler</td>
<td>Gas pressure regulator</td>
<td>FR</td>
<td></td>
</tr>
<tr>
<td>Gasdruckregler</td>
<td>Gas pressure switch</td>
<td>GW</td>
<td></td>
</tr>
<tr>
<td>Gewinderohr</td>
<td>Threaded version</td>
<td>GR</td>
<td></td>
</tr>
<tr>
<td>Kugelhahn gefederte Version</td>
<td>Ball valve geared</td>
<td>KH 16</td>
<td></td>
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<tr>
<td>Luftpumpe Schütter</td>
<td>Air pressure switches</td>
<td>LSQ, A4</td>
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<tr>
<td>Nockenflügel</td>
<td>Motor butterfly valve</td>
<td>DMA</td>
<td></td>
</tr>
<tr>
<td>Gasventil</td>
<td>Gas valve</td>
<td>MIK, WIK</td>
<td></td>
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<tr>
<td>Ventilanschaltung</td>
<td>Valve control system</td>
<td>VPS</td>
<td></td>
</tr>
<tr>
<td>2-stufiges Entmagnetventil</td>
<td>2-stage solenoid valve</td>
<td>ZR</td>
<td></td>
</tr>
<tr>
<td>Entmagnetventil</td>
<td>Single solenoid valve</td>
<td>MV</td>
<td></td>
</tr>
<tr>
<td>Gasdruckregler</td>
<td>Gas pressure switch</td>
<td>GW</td>
<td></td>
</tr>
<tr>
<td>Kugelhahn geschraubte Version</td>
<td>Ball valve threaded version</td>
<td>KH 5</td>
<td></td>
</tr>
<tr>
<td>Luftdruckanschlag</td>
<td>Air pressure switch</td>
<td>LSQ</td>
<td></td>
</tr>
</tbody>
</table>

Zur Sicherstellung der Anlagenverfügbarkeit empfehlen wir bei Biogasanlagen eine 1/ Jahrliche Überprüfung der eingebauten Geräte. To ensure the operational availability of biogas applications we recommend a half year inspection of the gas controls.
Tapioca Starch Factory, Thailand
Biogas & boiler plant

Tapioca Starch Factory, Thailand

Oilon GP-400 M-I
Gaseous and Liquid Bio Fuels

Waste to Energy

Hartwall brewery – Lahti, Finland

CH4

Thermal Energy

Gas Collection Pipe

Thermal Energy
Brewery, Lahti
Finland, 3 x 10 t/h

- 3 pcs GKP-700 M
- 1 pc GP – 300 M II

5 t/h biogas
Liquid Bio Fuels

Pyrolysis Oil Concept

Biomass transportation

Pyrolysis oil refinery

Forest residue

CO₂ from flue gases forming new biomass

Oil transportation

Energy
SOME OILON INSTALLATIONS...
District Heating with Liquid and Gaseous Fuels

District Heating with Liquid and Gaseous Fuels
Finland…
Container boiler plant, Finland
Thermax LTD,
India
OILON’s
Partner
Since 2005

More than 1500 deliveries
More than 800 deliveries to Thailand…
Poland…
Lithuania
Russia...
Tanzania
Coca Cola, Mozambique
Romania...
New Zealand
Oilon references in China

- Over 8000 burner units in China
- Oilon burner capacity in Beijing > 9000 MW
- Production, customer service and training centre in Wuxi

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- **Latest deal:** 83 pcs Low-NOx burners, total capacity ~2000 MW,
Oilon Home

Oilon Hybrid Heating Solutions

- Ground Source Heat Pumps
- Solar Heat Collectors
- Oil and Bio Oil Burners
- Gas and Bio Gas Burners
- Air to Water Heat Pumps
IT CONCERNS US.
WE HAVE MEANS TO IMPROVE.
WE WANT TO START WITH YOU.
Representative in Serbia & Macedonia:

- **Macedonia:**
- **MACEF-MACEF INT G.m.b.h.**
- Mr. Goran Kapac  
  St. Nikola Parapunov 3, A/52, 1000 SKOPJE  
  phone: +389 2 3090 130  
  fax: +389 2 3090 179  
  mobitel: +389 70 221 214  
- **e-mail:** [teking@t.mk](mailto:teking@t.mk) / [www.macef.org.com](http://www.macef.org.com)
Bio oil and bio gas burner laboratories
Heat pump laboratory
1. BALL VALVE, 2. GAS FILTER, 3. PRESSURE GAUGE WITH BALL COCK VALVE, 4. PRESSURE REGULATOR WITH SAFETY SHUT-OFF VALVE AND BLOW-OUT VALVE, 5. PRESSURE GAUGE WITH PUSH BUTTON COCK, 6. BELLOW COMPENSATOR

GAS PRESSURE REGULATION ASSEMBLY
Required when gas pressure is higher than operation pressure of the burner.
Gas pressure set point recommendations

Safety relief valve
1.3 x Outlet pressure

Safety shut-off valve
1.6 x Outlet pressure

Minimum pressure switch
(0.6 - 0.8) x Outlet pressure

Maximum pressure switch
1.45 x Outlet pressure
Boiler 5.5 MW
Efficiency 90%
Burner 6.1 MW

Gas flow capacity control

18 mbar (backpressure)
Delivery pressure 3 bar

150 mbar (reduced pressure)

BURNER SELECTION

5.5 MW

6.1 MW

[Graph and diagram showing gas flow capacity control and burner ratings]
Oilon WiseDrive

Digital combustion management
<table>
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<tr>
<th>CONTROL SYSTEMS</th>
<th>WD33</th>
<th>WD34</th>
<th>WD100</th>
<th>WD200</th>
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<tbody>
<tr>
<td>Operation principle</td>
<td>Electronic fuel/air</td>
<td>Electronic fuel/air</td>
<td>Electronic fuel/air</td>
<td>Electronic fuel/air</td>
</tr>
<tr>
<td>Control unit</td>
<td>Lamtec BT320</td>
<td>Lamtec BT340</td>
<td>Siemens LMV 51</td>
<td>Siemens LMV 52</td>
</tr>
<tr>
<td>Available for fuels</td>
<td>LFO (KP) - GAS (GP) -</td>
<td>LFO (KP) - GAS (GP) - GAS/LFO (GKP) -</td>
<td>LFO (KP) HFO (RP) GAS (GP) GAS/LFO (GKP) GAS/HFO (GRP) -</td>
<td>LFO (KP) HFO (RP) GAS (GP) GAS/LFO (GKP) GAS/HFO (GRP) -</td>
</tr>
<tr>
<td>O₂ control</td>
<td>Optional</td>
<td>Optional</td>
<td>Not available</td>
<td>Standard</td>
</tr>
<tr>
<td>CO control</td>
<td>Optional</td>
<td>Optional</td>
<td>Not available</td>
<td>Not available</td>
</tr>
<tr>
<td>VSD control</td>
<td>Optional</td>
<td>Optional</td>
<td>Not available</td>
<td>Standard</td>
</tr>
<tr>
<td>Control panel interface</td>
<td>Symbol display</td>
<td>Symbol display</td>
<td>Text display</td>
<td>Text display</td>
</tr>
<tr>
<td>External communication</td>
<td>Hardwired + Profibus (Optional)</td>
<td>Hardwired + Profibus (Optional)</td>
<td>Hardwired + Modbus Profibus (Optional)</td>
<td>Hardwired + Modbus Profibus (Optional)</td>
</tr>
<tr>
<td>Capacity control</td>
<td>Lamtec LCM100 4…20 mA signal</td>
<td>Lamtec LCM100 4…20 mA signal</td>
<td>Built in LMV51 4…20 mA signal</td>
<td>Built in LMV52 4…20 mA signal</td>
</tr>
</tbody>
</table>
Cost savings using O₂ control

Example calculation
- Boiler capacity 5 MW
- Average use time 4000 h/year
- Average capacity 60 %
- Price of light fuel oil 0.55 €/l
- Price of natural gas 0.30 €/m³h
- Price of electricity 0.10 €/kWh

1. Effect of O₂ control on the combustion efficiency
   In a traditional burner, the O₂ level of flue gases is usually adjusted to about 4 %. When using WD200, a 2 % O₂ level can be reached. Two percent reduction in O₂ level means 1 % rise in efficiency.

   The resulting annual savings are:
   - with light fuel oil 6550 €
   - with natural gas 3600 €

2. Effect of VSD in fan motor on electricity consumption
   Burner without VSD:
   - electricity consumption 31600 kWh/year
   - cost 3160 €
   Burner equipped with VSD:
   - electricity consumption 9600 kWh/year
   - cost 960 €
   Savings/year 3160 € - 960 € = 2200 €

3. When using O₂ control and VSD in fan motor the annual cost savings are:
   - with light fuel oil 8750 €
   - with natural gas 5800 €
Oilon Selection Tool

Oilon Selection Tool simplifies choosing the right product and optional accessories from our extensive range of products.

You can make quick selections and advanced system calculations with the user friendly software, available in several languages. Oilon Selection Tool allows you to access an extensive range of product information, calculation results, and enables you to form technical specifications and pre-filled quotations.

Oilon Selection Tool is continuously updated as new products, features, functionalities and improvements will be added. Automatic software updates ensure that you always have access to the latest features and product information.

Oilon Selection Tool can be downloaded from www.oilon.com and can be installed locally to your Windows, Mac or Linux computer.
WISE DRIVE Energy and Cost Saving

Electronic fuel / air ratio control system

Mechanical Ratio Control System

Electronic Ratio Control System
Main functions in Electronic WiseDrive control system

- Burner Control and Security Functions
- Electronic Fuel/Air Ratio Control
- Boiler Cold-Start Protection
- Boiler Temperature Limitation
- Communication with External Systems
- PID Controller for Capacity Control
- O₂ Control, with O₂ Module
- Fan Motor Variable Speed Drive Control
- Reading the Fuel Flow Meter
- Combustion efficiency calculator
Oilon Wise Drive

Mechanical cam

Digital combustion management with servomotors
WiseDrive 100

- Indication and Operating Unit
- Combustion Manager
- Oil Flow Control
- Gas Flow Control
- Air Flow Control
- Combustion Head Optimizer

- CAN-Bus connection
WiseDrive 200
WD 33-34

Boiler pressure / temperature
Flame scanner
Air
Kaasu
Oil

VISIOCONTROL
LAMTEC SYSTEM BUS (LSB)
Control system

PROFIBUS, Modbus, Ethernet
Fieldbus interface

User interface UI300

O₂ -measurement
Optional LT2 LS2
Optional LT2 LS2-K
LS2 (O₂)

KS1 (CO₂)

CO detection
Optional LT2 KS1
Optional LT2 KS1-K

Boiler pressure / temperature
Power control module
Flame scanner

Boiler

Air

Variable speed module
VSM100

Dual-fuel module

DFM300

Optional LT2 LS2
Optional LT2 K
LT2 LS2 (O₂)
Optional LT2 K (CO₂)

WD 33-34
Burner main components

- Cover
- Combustion head
- Gasket
- Gas nozzle
- Nozzle valve
- Gas valve
- Servomotor
- Control unit
- Flame detector
- Oil pump and Pressure regulator
- Fan
- Air damper
Higher efficiency with O2 control and variable speed drive

Example:

- O2 level from 4 % to 2 % with WiseDrive, which equals roughly 1 % higher efficiency
- 10 ton/h steam boiler without O₂ control and variable speed drive
  - Average power 6 ton/hour, 18 hours/day
  - Efficiency 87.5 % with 4 % O₂ level
  - Fuel: natural gas
  - Gas consumption ~8071 m³n/day, 2421300 m³n/year
  - Fan motor electric consumption 89100 kWh/year
- 10 ton/h steam boiler with O₂ control and variable speed drive
  - O₂ level in flue gas is set from 4 % to 2 %, which equals 1 % higher efficiency
  - Efficiency 88.5 %
  - Gas consumption ~7635 m³n/day, 2394000 m³n/year
  - Fan motor electric consumption with VSD 41700 kWh/year
Higher efficiency with O2 control and variable speed drive

- **Yearly savings** with O₂ control and VSD
  - Natural gas price ~0.2 €/m³\textit{n}
  - 2421300 m³\textit{n}/year – 2394000 m³\textit{n}/year = \textbf{27300 m³\textit{n}/year}
  - 27300 m³\textit{n}/year x 0.2 €/m³\textit{n} = \textbf{5460 €/year}
  - Electric price ~0.1 € /kWh
  - 89100 kWh/year – 41700 kWh/year = \textbf{47400 kWh/year}
  - 47400 kWh/year * 0.15 € /kWh = \textbf{4740 € /year}
  - Total savings 5460 € /year + 4740 € /year = \textbf{10200 € /year}
Energy and Cost Saving

Efficiency Increase by Preheated Combustion Air

Heat exchanger for heating the combustion air

Duoblock burner for preheated combustion air

100°C Combustion Air Preheating equals ~ 4% HIGHER EFFICIENCY
Liquids and gases, which earlier have been considered as wastes, have been and will be utilised as combustible fuels.

Many processes have side streams, which can be utilised.

- Bio gases in breweries
- Coke Oven Gas (COG) in steel factories
- Blast Furnace Gas (BFG) in steel factories
- Town gas
- Odorous gases in paper mills
- Lubrication oils
- Hydraulic oils
- Gases from oil refinery
- Gases from chemical industry
- Gases from mines

Efficiency of the plant will increase with less harmful emissions.
Thank you for your attention!

Happy to answer your QUESTIONS