

Example of a burner installation

## New power plant for the paper industry



Within a year, a combined steam/electric/power plant with an amount of 100 t/h steam and with a capacity of 7,2 MW was built on the premises of the company Stora Enso. Two of the three new steam boilers are in constant use and they are each capable of generating 50 tons steam per hour, which is required for paper drying. In the future, the paper manufacturer himself can supply power for the energy-intensive factory operation.

3 x double flame tube boilers of Omnical were installed with 6 x gas burners **marathon®** M 10003.5 ARZ V90 **oxygen**, each with a combustion capacity of 19,5 MW. One of these **marathon®** burners was equipped to operate with natural gas H/biogas. The oxygen control oxygen of **dreizler®** guarantees an efficient fuel utilization and clean combustion.

Reliable and high availability of the 6 x **marathon®** gas burners M 10003.5 ARZ **oxygen** of **dreizler®** ensure a clean and low emission steam generation.

“ For the repeated close and excellent cooperation we thank the Caliqua AG, who served as the general contractor for the turnkey construction of the boiler and the steam turbine.



### Technical data

Total capacity of the installation 100 t/h

### Burner

6 x gas burners **marathon®** M 10003.5 ARZ in version DUObloc

Capacity → each 19,5 MW

All burners in the version LOW-NO<sub>x</sub> with patented internal flue gas recirculation **ARZ** for extra low NO<sub>x</sub> emissions and oxygen control **oxygen**

Control ratio of 1:7

### Boiler

3 x Omnical double flame tube steam boilers

Omnibloc ZDHT-ÜE 48,0-22

Boiler capacity → 3 x 38 MW

Fuel → Natural gas H

→ Co-firing natural gas H/ Biogas

### LOW-NO<sub>x</sub> combustion

→ < 100 mg/Nm<sup>3</sup> NO<sub>x</sub> at 3% O<sub>2</sub>, according to EN 676

### Dates

February / April / May 2015  
GESTRA Symposium

10<sup>th</sup> – 14<sup>th</sup> March 2015  
ISH 2015, Frankfurt

24<sup>th</sup> April 2015  
Company anniversary,  
Spaichingen  
50<sup>th</sup> anniversary of dreizler®

### Imprint

Walter Dreizler GmbH  
Max-Planck-Straße 1-5  
78549 Spaichingen  
V.i.S.d.P. Daniel Dreizler  
Tel.: +49(0)7424-7009-0  
Fax: +49(0)7424-7009-90  
E-Mail: info@dreizler.com

Thoughts on the energy transition

## Boiler / burner as a key technology for heat and energy policy

No other topic is discussed as intensively as the energy transition. In most cases, it is thought, however, only to the power production and electricity distribution. The use of renewable energy sources such as wind and solar energy has great opportunities for Germany, if development, know-how and production capacity for high-tech equipment are used and put into practice.

From the ever-increasing integration of renewable energy also arise significant risks to the availability and supply stability of our electricity infrastructure. Increasing electricity prices and rising O<sub>2</sub> emissions are the results of the current energy transition. One gets the impression that not enough attention is paid in energy transition to private, commercial or industrial heat generation and use.

For operators of commercial and industrial heating and steam generation, (about two-thirds of Germany's primary energy consumption of natural gas and fuel oil) currently there is a lack in decisions regarding the medium- and long-term investments. Concerns about the security of natural gas supply and the general desire to reduce heating oil extra light preferably as an energy source, contribute to the uncertainty of operators.

The result is an over-aged existence of installations with insufficient replacement and renewal rate and ultimately an investment backlog.

Modern boiler and burner systems with fuel natural gas or heating oil extra light represent a particularly efficient, clean and safe means of heat and steam generation. No other technology is so flexible, efficient and clean to implement the energy content of each fuel in heat or steam.

Plant operators of marathon® and CALORAbloc® burner and boiler installations profit from performance data such as

- 50 tons steam/h with 16 bar pressure
- NO<sub>x</sub> < 60 mg in gas operation
- Control ratio 1:10 (available load range 2,5 to 50 tons in single flame tube operation)
- oxygen and – CO control combined with airpreheating and thus an exhaust loss of < 2 %.

The particularly high flexibility of the burner and load variations in the heating or steam requirement can be corrected quickly and without loss of efficiency. The resulting NO<sub>x</sub> and CO emissions are in the range of 50% of the current legal limits.

Considering the energy source natural gas, also the CO<sub>2</sub> emissions are on the lowest possible level in comparison to all other conventional energy sources.

Another strength of the burner and boiler technology is that in conjunction with intelligent burner management systems, the mixing can be effected by one or more fuels simultaneously. Incidental process gases or liquid fuels can be used with other regular fuels together in the dreizler® hollow flame for clean energy generation.

A retrofit of other liquid and gaseous fuels with marathon® burners of dreizler® is possible at any time.



Looking at this in comparison to existing burner installations, it is obviously, that a large potential of heat change is in the renewal and efficiency of existing installations and is not yet specifically started.

We believe that a savings of up to 30 % of the current primary energy consumption over a period of about 10 years can be realized by the renewal of the existing installations with the combination boiler/burner and the efficiency of modern technology. That would be a significant contribution to the successful implementation of heat and energy transition and to the achievement of climate targets. However, operators need investment security for that: A clear political signal to the fuel natural gas and heating oil extra light and the corresponding modern and efficient products.

The plan for accelerated depreciation of investment costs, as it is already done in many of our neighboring countries for investments in low emission and high efficiency, would be a significant incentive and would be accompanied by an economic recovery and increased tax return lines for the state.

The heat and energy transition is a complex infrastructure project for the industrial location Germany. No technology and no ideology alone can claim the silver bullet to solve all the challenges for themselves.

Along with many experts we agree that modern boiler/burner technology is a key position for the successful implementation of the energy revolution in the field of commercial and industrial heating and steam generation.

Dipl.-Ing. Ulrich Dreizler  
Dipl.-Ing. Daniel Dreizler MBE®



Modernization of emissions legislation

## National and European Emissions legislation

The 1. BImSchV, 4. BImSchV and 13. BImSchV are the relevant national emission standards for combustion plants with shell boilers or water-tube boilers.

- 1. BImSchV (from 2010) for combustion plants in the power range of up to 20 MW maximum.
- 13. BImSchV (from 2004) for combustion plants in the power range of > 50 MW. The transition period for compliance with the emission limits specified therein lasted into 2013.
- 4. BImSchV (from 2002) for combustion plants in the power range of 20 – 50 MW. The transition period for compliance with the emission limits specified therein lasted into 2007.



The 4. BImSchV will soon be on the revision. Professional backgrounds speak for an early adaptation of the legal text. This includes using the unit g/m<sup>3</sup> at 3 % O<sub>2</sub> for NO<sub>x</sub> and CO emissions. In other legal texts, the unit mg/m<sup>3</sup> is used at 3% O<sub>2</sub>.

Also, the wording of the measurement uncertainty should be revised. During first measurements, the 4. BImSchV requires the adding of uncertainty to the measured value. This is ultimately a not precisely defined increase of an existing legal limit value. At each facility on site, it depends on the uncertainty of the measurement setup used, which emission measurements must be run on each individual plant to comply with the requirements of the 4.BimSchV. The 1. and 13. BImSchV do not know these rules and are significantly more practical.

At European level, the Industry Emission Directive 2010/75/EU entered into force in 2010. This includes all installations with a capacity of > 50 MW and the IED thus covers the range of the German 13. BImSchV. The emission limits required by the IED can easily be complied with modern gas forced draught burners such as the dreizler® marathon® series even in difficult furnaces.

Currently, the European Commission is working on the Medium Combustion Plant Directive (MCPD), which shall cover all combustion plants in the capacity range of 1 MW up to 50 MW.

The European association ehi (Association of the European Heating Industry), the German association BDH (Bundesindustrieverband Deutschland Haus-, Energie- und Umwelttechnik e.V.) and the companies that are organized in the associations such as dreizler®, are actively working on drafting the MCPD in the framework of the opposition proceedings.

The emission limits for NO<sub>x</sub> and CO presented so far in the MCPD, reflect the European state of the art of LOW NO<sub>x</sub> burners.

Particularly welcome is the introduction of a Best Available Technology value (BAT), that defines NO<sub>x</sub> values < 70 mg/m<sup>3</sup> at 3 % O<sub>2</sub> for gas as the best possible state of the art in future.

For over 20 years, the emission limit value is reliably kept with marathon® burners at suitable combustion chambers. Also NO<sub>x</sub> values < 50 mg/m<sup>3</sup> at 3% O<sub>2</sub> fueled with natural gas H are no problem with burners of dreizler® in a power range up to 20 MW at suitable plants. With our technology MAGMAblue® NO<sub>x</sub> emissions < 30 mg / m<sup>3</sup> at 3% O<sub>2</sub> are already feasible even at firing capacities up to 1.4 MW.

We support the modernization and revision of European and national legislation on emissions.



## Changing gas qualities in the European network



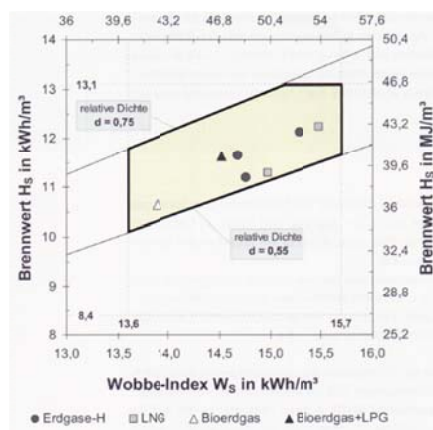
Due to increasing diversification of gas supply and the liberalization of energy markets in the gas supply in Germany and Europe, gas quality variations in the Wobbe index (Wi) arise.

At the urging of the public utility industry, the EU Commission had started a European standardization in CEN in 2010: „H-Gas Harmonization prEN 16726“, which would have allowed a considerable scope for short cyclically fluctuation gas qualities in a fluctuation range of  $Wi \pm 8\%$ . Such fluctuations can lead to massive safety, quality and environmental issues in the existing installations, for new equipment, with the use of natural gas as a raw material and in industrial application.

Neither the existing devices nor the current versions are CE-tested with such a large fluctuation.

After appeals of gas equipment manufacturers and the gas consuming industry a CEN / TC Chairman meeting and a workshop followed in Brussels, where the Commission has explained the potential impact of changing gas qualities.

The European Commission has recognized the difficulties and clarified in a letter to the workshop on 01.07.2014, that the range of the Wobbe index suggested in the draft standard was obviously chosen too large and that, moreover, the gas composition variations per time must be controlled. The safety of gas appliances shall not be reduced in any case.



The Commission is now proposing, where appropriate, to start with a set of rules which only regulates cross-border trade and suggest to define an implementation period for the application of the standard. The Commission relies on finding a compromise of all parties.

Together with the equipment industry, the German utility industry is willing to examine the impact of fluctuating gas qualities exactly and to continue the common standardization work on this basis. For that, special committees have been set up, who deal with the "strategy gas qualities and gas quality fluctuations".

Here dreizler® actively cooperate with other experts in the field of standardization, the gas utility industry, associations and politics, to ensure safety, cleanliness and efficiency of existing plants.

Origin: Gaswärme International 2012-6

Example of an installation

## Variable firing biogas/heating oil EL

At the end of 2013, the Company Hainich Konserven GmbH from Niederdorla in Thüringen invested in their heating system, replacing their existing boiler with a modern steam boiler UL-S 4000 of Bosch Industriekessel GmbH. The system is used to generate steam for canning and heating the production halls.

So far, heating oil was used as fuel. As part of the replanning of the heating system, it was decided to use high quality **marathon®** burner technology of **dreizler®**, to utilize excess biogas from the adjoining biogas plant. The biogas arising in the two CHP is normally 100% implemented into electrical energy. Excess biogas obtained during maintenance or disorders, has been burnt by a flare.

In January 2014 a dual fuel burner of **dreizler®** was reinstalled: **marathon®** MC 5001.1, equipped with oxygen control **oxygen** and variable co-firing.

The normal heating operation of the plant is now made with fuel oil EL. If one or both BHKW switch off, the automatic switching of the burner in mixed mode heating oil EL/biogas is done within 90 sec. In the mixed mode, the power range from 700 kW to 2770 kW is covered. Here, a freely selectable biogas share of 130 and 260 Nm<sup>3</sup>/h is co-incinerated. The proportion of admixture is controlled by a signal level of the biogas storage.

In exceptionally short start-up time, the technical requirements have been implemented on site.

By optimally adapted control behavior of the burner, best use levels are reached. The proven and excellent **marathon®** burner technology of **dreizler®**, in combination with the advanced boiler technology from Bosch Industriekessel GmbH provide an optimal utilization of resources.

” Many thanks to all participants for their cooperation and trust in our burner technology.

### Technical data

#### Burner

Dual fuel burner  
**marathon®** MC 5001.1 **oxygen**  
 in MONObloc version  
 Burner capacity → 2,7 MW  
 with oxygen control **oxygen**

#### Boiler

Bosch Industriekessel GmbH  
 Steam boiler UL-S 4000x16

**marathon®**



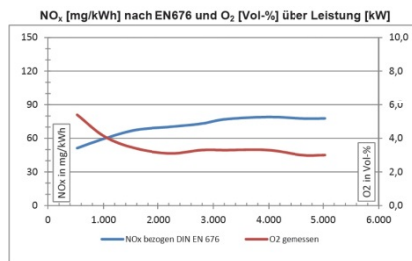
### Example of an installation in Krefeld

## Steam boiler system 7 tons 22 bar with marathon® M 5001.4 ARZ oxygen

In spring of this year, the team of our long-time customer Hagelschuer installed a gas burner **marathon® M 5001.4 ARZ** to a steam boiler UL-S-IE 7000 x 22 of Bosch. With a combustion chamber diameter of 1000 mm (on average) and a combustion chamber length of 4100 mm, a volume load of 1,6 MW/m<sup>3</sup> and a sectional density of 6,4 MW/m<sup>2</sup> are realized at a maximum firing capacity of 5,1 MW.

The burner provides a control ratio of 1:10, NO<sub>x</sub> emissions of < 80 mg/kWh according to EN 676 and the combustion efficiency of the boiler/burner system of > 95,1 %.

The customer benefits from the highly flexible steam generation in the range of 0,7 to 7 tons/h of steam, the high level of efficiency and future-proof and extremely low exhaust emissions.



#### Technical data

##### Burner

Gas burner **marathon® M 5001.4 ARZ** in MONObloc version  
Burner capacity → 5 MW  
With patented internal flue gas recirculation **ARZ** and oxygen control **oxygen**

##### Boiler

Bosch Industriekessel GmbH  
Steam boiler UL-S-IE 7.000x22bar  
Boiler capacity → 7 t/h

#### LOW-NO<sub>x</sub> combustion

→ < 80 mg/kWh NO<sub>x</sub>  
according to EN 676

” We thank the company Hagelschuer and the system operator for the trust and successful cooperation in 2014.



### Example of an installation

## Plant retrofitting of a 18 to steam 44 bar water tube boiler

As part of a retrofit for an industrial customer, E.ON Anlagenservice GmbH decided to use the modern gas burner **marathon® M 10003.5 ARZ** of **dreizler®**. The reconstruction was performed on a Wirth radiant boiler (Year of construction 1962). By using the new burner in the LOW-NO<sub>x</sub> version, NO<sub>x</sub> emissions < 100 mg/m<sup>3</sup> at 3 % O<sub>2</sub> are surely kept.

The peculiarity of this system, is the boiler construction with a direct-fired superheater at the end of the combustion chamber.

Thanks to the competent and purposeful cooperation of E.ON Anlagenservice and **dreizler®**, the conversion to modern control engineering in the field of plant visualization and LOW-NO<sub>x</sub> combustion was successful within the given time frame.



#### Technical data

##### Burner

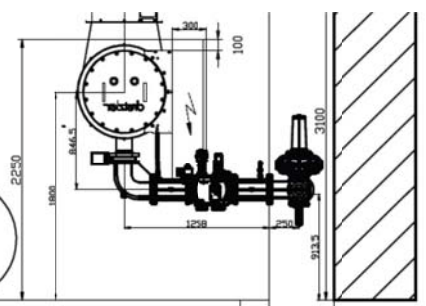
Gas burner **marathon® M 10003.5 ARZ** in DUObloc version  
Capacity → 18,8 MW  
with oxygen control **oxygen**

##### Boiler

Wirth radiant boiler CWP-VI  
Boiler capacity → 18 t/h

#### LOW-NO<sub>x</sub> combustion

→ < 80 mg/kWh NO<sub>x</sub> according to EN



” Thank you for the pleasant and constructive cooperation and trust of the E.ON plant service as well as the plant operator.

Spaichingen

## Welcome to dreizler®



**Bernd Mickisch**  
Project development,  
Spaichingen

We are pleased about the support of Bernd Mickisch, who will support the team of Walter Dreizler GmbH in the construction and project development for special applications from 01.01.2015. For his new task Bernd Mickisch has a lot of experience in the range of coal combustion, asphalt and waste incineration plants and various burner and flame technology.



**Rico Thierse**  
Service, Dresden



New service center in Dresden: At the beginning of 2015 Rico Thierse will complement the team of dreizler® service GmbH. For many years, Rico Thierse has been operating in the service of demanding combustion installations and he is an experienced expert. We are pleased to get his active support in the region of Dresden.



**Hannes Wasmer**  
**Dipl.-Ing.(FH)**  
Sales Baden-Württemberg  
[h.wasmer@dreizler.com](mailto:h.wasmer@dreizler.com)  
☎ +49(0)7424-7009-46



Our team member Hannes Wasmer supported our sales team in the field service and is responsible for the area of Baden-Württemberg since October 2014.

He is a competent contact person and with all matters relating to the burner technology he will always be at your disposal.

Dates

## 50 years dreizler®

We look forward to our anniversary by April 2015. Along with many guests we want to celebrate 50 years of successful company history and a half-century innovative burner technology.



## dreizler® at the ISH 2015

ISH in Frankfurt from 10<sup>th</sup> to 14<sup>th</sup> March 2015: We exhibit and would welcome you. Visit us at our booth in Hall 8, C31. Our team is looking forward to you.





## Dates

## Gestra Symposium 2015

„Prevention of damage in  
Steam and condensate systems“

For more information and registration  
[www.gestra.de/akademie/fachtagung.php](http://www.gestra.de/akademie/fachtagung.php)

## Dates

- |                            |                            |
|----------------------------|----------------------------|
| → 23.02.2015 Lübeck        | → 22.04.2015 Bad Kissingen |
| → 24.02.2015 Osnabrück     | → 23.04.2014 Karlsruhe     |
| → 25.02.2015 Hannover      | → 05.05.2015 Bad Wildungen |
| → 26.02.2015 Gelsenkirchen | → 06.05.2015 Magdeburg     |
| → 21.04.2015 Bad Gögging   | → 07.05.2015 Dresden       |



Thank you for your trust and cooperation.

We wish you a very happy Christmas  
and a prosperous new year

Your dreizler® Team