The power-package

Manufacturing range

HOT WATER BOILERS

LOOS INTERNATIONAL
The Boiler Company

Editorial

The confidence of important planners, plant contractors and industrial and power supply organizations from all over the world - which we have enjoyed since 1865.

With products, know-how and service from LOOS INTERNATIONAL, every business associate and customer can expect to achieve the safest, most efficient and environmentally sound use of primary energy.

Innovation and responsibility, creativity and commitment to quality are the yardsticks for our product range as well as for our after-sales services. Quick reactions are guaranteed through the full use of today's electronic communication media like Internet, LOOS-Intranet, LOOS-Extranet, CustomerLogin and Teleservice ensures.

Your contact with LOOS INTERNATIONAL will open up a world of vast experience based on almost 100,000 boiler systems supplied to customers in over 140 countries throughout the world. In our group of companies - active throughout the world - you will find specialists for every application.

Contents

UNIMAT

Certificates by all important inspection authorities worldwide.

UNIMAT Heating Boiler

- Type UT-L as flame-tube smoke-tube boiler with 3-pass technology acc. to the Directive relating to appliances burning gaseous fuels up to an output of 750-9,200 kW for hot water generation

UNIMAT Hot Water Boiler

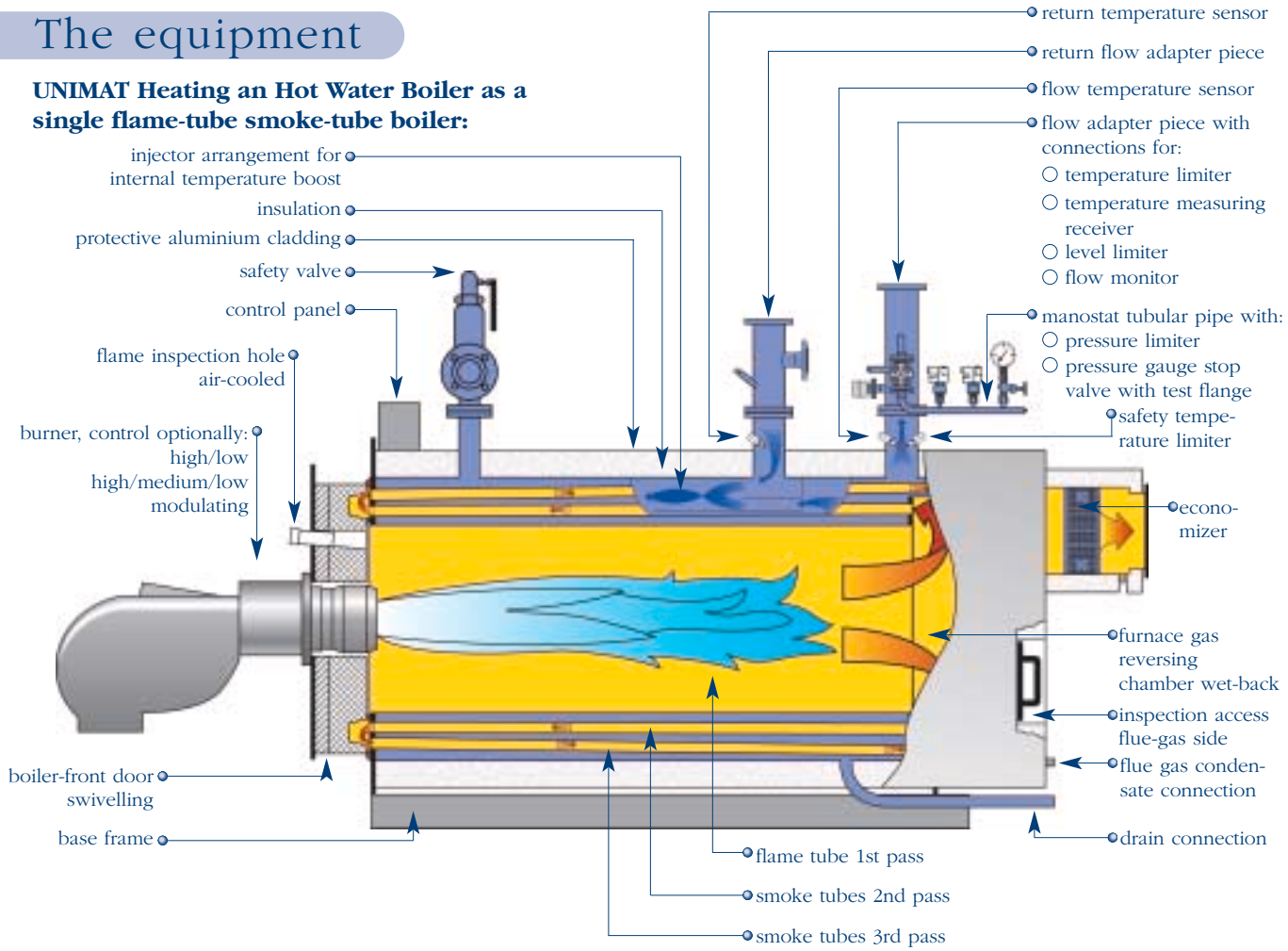
- Type UT-M as flame-tube smoke-tube boiler with 3-pass technology acc. to the Pressure Equipment Directive up to an output of 750-19,200 kW for hot water generation
- Type UT-H as single flame-tube smoke-tube boiler with 3-pass technology up to an output of 820-18,300 kW for hot water generation
- Type UT-HZ as double flame-tube smoke-tube boiler with 3-pass technology up to an output of 13,000-38,000 kW for hot water generation

The concept

With the UNIMAT Heating Boiler Series, LOOS INTERNATIONAL have applied the accumulated know-how of decades of three-pass boiler construction to a new concept. The LOOS design principle of the three-pass flame/smoke tube boiler has been outstandingly successful for the generation of low-pressure hot water and high-temperature hot water and emphasises that LOOS are in complete control of all media steam, warm water and hot water.

The equipment

UNIMAT Heating an Hot Water Boiler as a single flame-tube smoke-tube boiler:



New economy

- Minimum flue gas losses: the use of flue gas heat recovery modules leads to optimal fuel efficiency
- Radiation heat losses are kept to an insignificant minimum by high-quality insulating mats and special insulating materials
- Various special features for reduced fuel consumption
- Superior design and careful matching of all components according to the European Pressure Vessels Directive

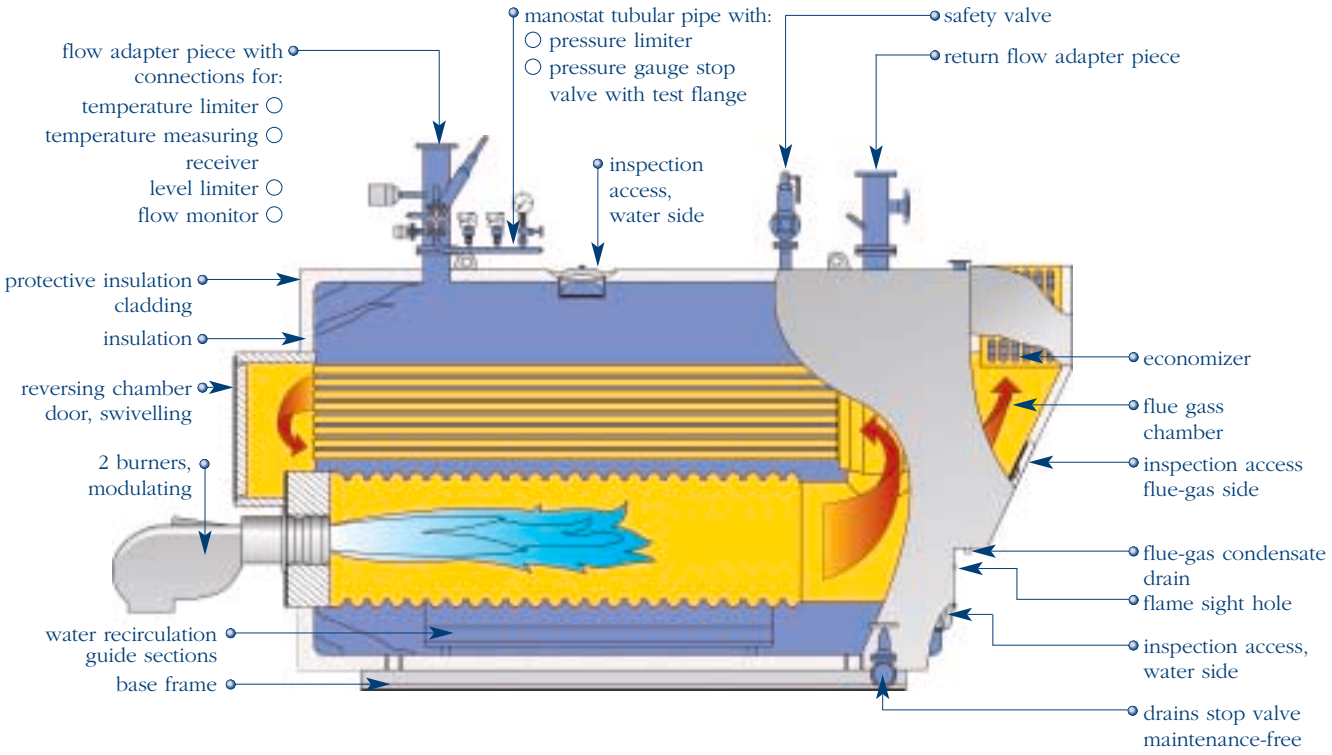
New ecology

The use of sophisticated firing systems and careful tuning of the optimum boiler/burner combination produces a marked improvement over legal emission limits. In addition, the latest research results and techniques for extremely low emission are constantly incorporated. Our firing system specialists are experts in environmentally responsible burner technology and apply cutting-edge emission reduction technology. For LOOS INTERNATIONAL, the use of environmentally compatible materials is obligatory.

User benefit

- Pollutant-reduced combustion
- Low-noise operation
- Environmentally sound operation
- Official acceptance certificates and check measurements (CE tested)
- Easily passes ecological audit
- Lower fuel consumption
- Lower power consumption
- Lower heat losses
- Less wear
- In total, clearly reduced operating costs

UNIMAT Hot Water Boiler as single flame or double flame smoke-tube boiler:



CONTROL AND SAFETY TECHNOLOGY

for all shell boilers

The concept

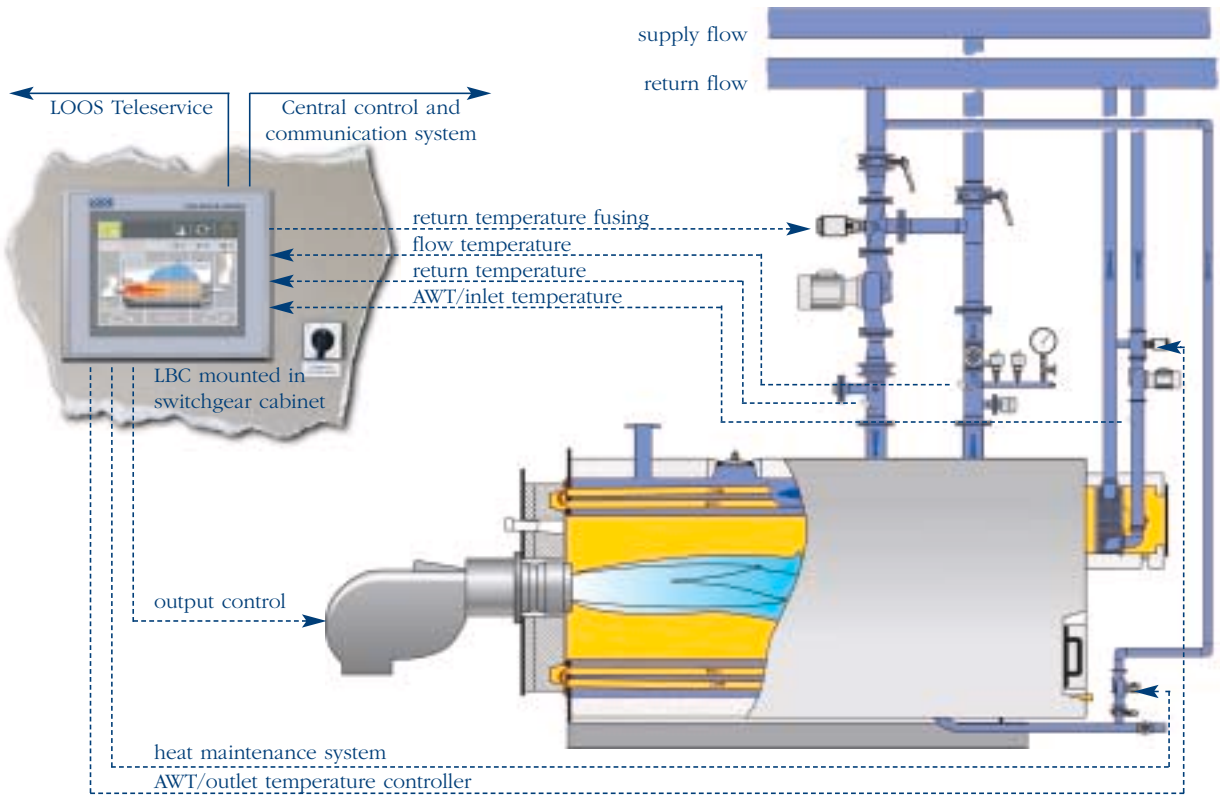
For decades now, LOOS boiler operating and safety technology has been ensuring convenient boiler operation, the highest standards of safety and a high level of availability for all steam and hot water generators. The in-house development and manufacture of regulating and safety systems guarantees solutions that are extremely practical and ensures maximum spare part availability. With conventional controls or as SPC-based boiler management systems – with LOOS boiler operating technology, everything's under control.

The result

LOOS BOILER CONTROL LBC
– the convenient PLC-based boiler control

A convenient boiler control for LOOS hot water boilers was developed on the basis of an SPC automation device which has proved successful in industry. All the regulating and control functions are integrated in an efficient, programmable control. These include the controls for boiler output, heat maintenance, supply and return flow temperature and the controls for the flue gas heat exchanger or flue gas condensers. No matter whether the boiler is operated with a gas, oil or dual burner, stepped or modulating, with mechanical or electric network, LOOS BOILER CONTROL LBC can be used for all systems.

Display and operation are conveniently supported by TFT colour displays with a touch-sensitive interface. These are available in 6" or, as an option, 10" versions. The symbols, graphics and user guidance are designed in accordance with the latest developments in ergonomics and usability. All available control and regulating functions can be accessed intuitively, and actual and setpoint values can be shown in the colour display or changed. The integrated operating signal management system captures and logs operating states before shut-down on faults occurs. Important process data are stored at defined intervals and can be presented on the displays in the form of clear graphs. Analysing data is simply child's play. The connection of higher-level technical management systems via PROFIBUS DP or the provision of routers so that the Loos Teleservice can be used are just two of the many options offered by this system.



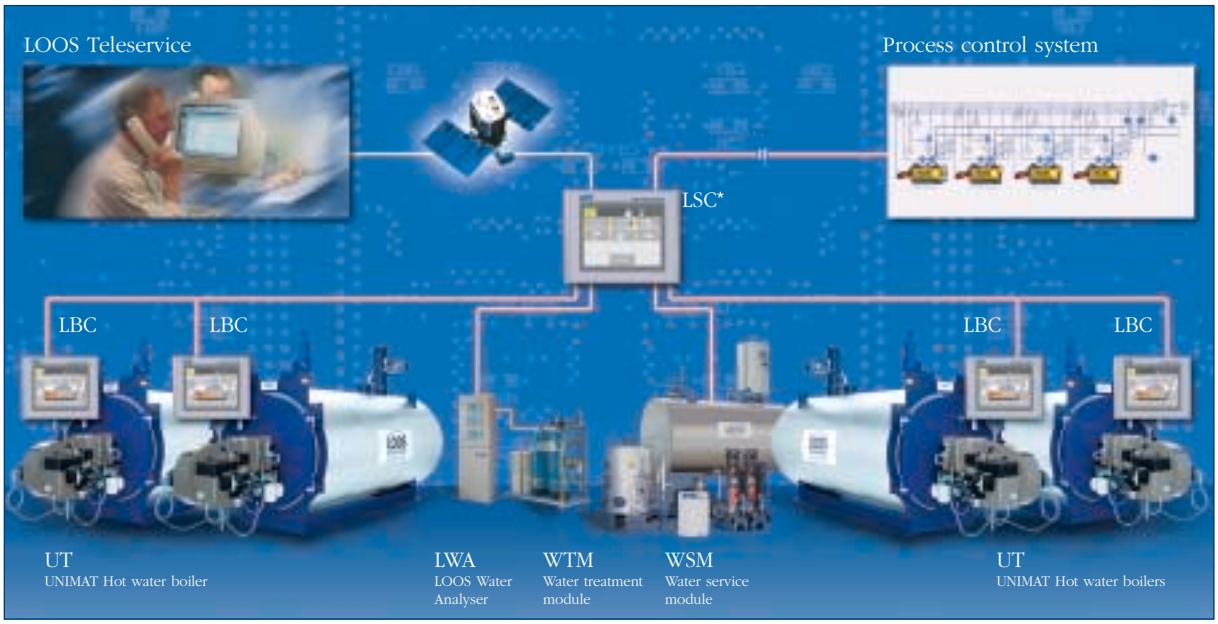
LBC replaces traditional technology

User benefit

- LBC means that all measurement and control functions can be simply optimized, economically and ecologically
- LBC guarantees maximum supply and operating safety. A comprehensive operating and fault alarm memory with integrated pre-warning system allows incorrectly set control parameters to be detected and corrected before any safety disconnection
- LBC - operating data transparency. A large number of operating states, operating data and measurement values are shown in the plain text display.
- Through its simple optimization of the control parameters, LBC minimizes energy consumption, pollutant emissions and wear and tear
- LBC covers all the specific requirements of modern boiler control and is suitable for later addition, modifications and updates
- LBC is prepared for data exchange with higher-level management systems and a teleservice
- LBC guarantees secure, menu-driven operation through presentation of most languages in the plain text display. Integrated protective functions prevent errors in operation.

The concept

All information is gathered in the comprehensive plant management system LOOS SYSTEM CONTROL LSC. Efficient bus systems guarantee intelligent networking of individual boilers and boiler house components. The plant management system is already prepared for connection to higher-level management systems and the cost-effective LOOS Teleservice.



Multiple boiler system, water analyse, water treatement system, deaeration system, fuel supply – LSC has everything under control
*LSC for hot water boilers available from 2008.

HEATING BOILERS

UNIMAT Heating Boilers

UT-L UNIMAT Heating Boilers

The concept

Low-emission and economical heating with the UNIMAT Heating Boiler type UT-L, designed and equipped in accordance with the Directive Relating to Appliances Burning Gaseous Fuels. This flame-tube smoke-tube boiler generates hot water in a range from 750 up to 19,200 kW at low temperature and pressure level.
Suitable sizes for any customer request and heat requirement.

The result

- Up to 95 % standard efficiency without waste gas heat exchanger
- Up to 105 % increase in efficiency with fuel efficiency technology
- Extremely low radiation losses
- Suitable for all burners, including low NO_x
- Low-emission and non-polluting
- Dewpoint is not breached in the boiler at return temperatures below 50°C, even at extremely low load
- No specified minimum burner load for maintaining flue-gas side dryness
- Full exploitation of the burner control range reduces switching frequency and boiler cooling and prolongs boiler- and burner life
- Modest space requirement
- Low carriage weight
- Low foundation load
- Suitable for all heating systems
- Short installation time

The application profile

- Energy-saving heating for residential and office buildings
- Boiler stations for local heat supply to municipal buildings such as hospitals, residential homes, spas and sanatoriums, office- and residential premises
- Stand-by and peak load boilers for combined heat- and power stations
- Trade and industrial heating installations in greenhouses, trade facilities, ...
- For installation in mobile containerised boiler plants
- For all fuel gases and LFO

UNIMAT Heating Boilers in a public facility:
- 2 x 7,700 kW
- 70/50 °C
- Natural gas firing systems

UNIMAT Heating Boilers with integral economizer for space heating in an industrial plant:
- 2 x 2,400 kW
- 70/50°C
- LFO burners

The design

- Three-pass flame-tube system
- Functional cylindrical design for optimum pressure resistance
- Special-purpose injector for effective return temperature boost integrated in the boiler apex
- Fully opening swivel-mounted boiler-front door for easy cleaning and inspection
- UT Series with integral economizer for utilizing the heat of sulphur-free flue gases with and without bypass
- Furnace design agreed with all leading burner manufacturers
- Insulated with mineral wool mats underneath aluminium cladding without heat bridges

- Boiler-front door fully opening - hinged optionally at the right or left, entire boiler cross-section freely accessible
- Easy and simple servicing, cleaning and inspection

Special features

- LOOS BOILER CONTROL LBC - the convenient SPC-based boiler control system
- LOOS SYSTEM CONTROL LSC* plant management system
- ECO flue gas heat exchanger for separate installation for maximising fuel values
- Forward/return flow adapter piece
- Return flow temperature boost or return flow temperature maintenance
- Return flow temperature maintenance with regulator, 3-way valve and boiler circuit pump
- WTM water treatment module
- WSM water service module with partial and full deaeration
- LWA water analysis module

For more detailed information, see the "Boiler House Components" brochure

UNIMAT Heating Boiler	Output	Design pressure	Boiler efficiency	max. permissible flow temperature**	min. permissible return temperature	Fuel
Series	kW	bar g	%	°C	°C	
UT-L	**750 to 19,200**	**up to 16**	**up to 105*** **	**120**	**50**	**LFO, gas**

With each boiler series you receive data sheets as well as detailed technical advice
*Available from 2008
**Supply flow temperature can be limited at lower temperatures depending on local regulations.
***reachable by means of fuel efficiency technology; without fuel efficiency technology, up to 95% can be reached

UNIMAT Hot Water Boilers

UT-M High-pressure hot water
UT-H High-pressure hot water
UT-HZ High-pressure hot water

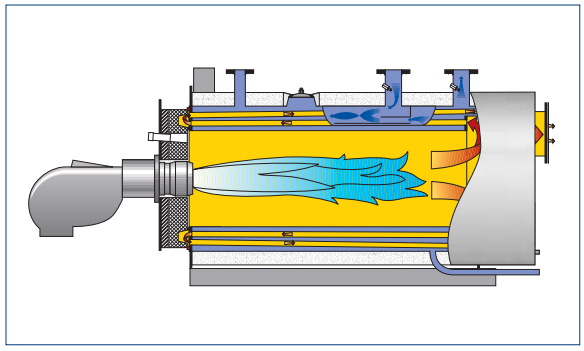
The concept

The UT-M boiler series, as flame-tube smoke-tube boilers, built in accordance with the Pressure Vessels Directive, is used to produce high-pressure hot water cheaply in the mid-temperature range up to 190°C. The pressure up to max. 16 bar and the capacity of 750 to 19,200 kW are also in the middle range.
The type UT-M is a further refinement of the successful UT boiler design and is produced as a real three-pass boiler without any disruptive flow fittings in the smoke tubes.

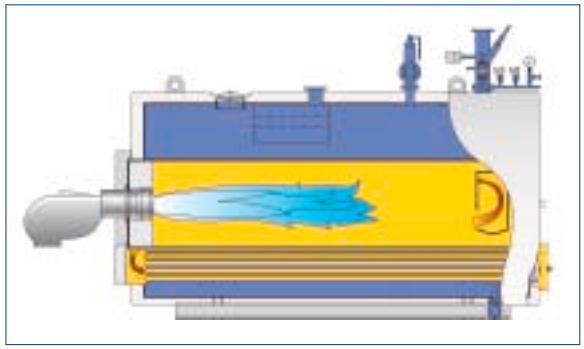
The boilers in the UNIMAT UT-H series, as single flame-tube smoke-tube boilers, and the UT-HZ series, as double flame-tube smoke-tube boilers, are designed for the production of high-pressure hot water to very high pressure and temperature levels.

This is where the LOOS three-pass patent from 1952 comes into play. The dimensions of the flame tube, smoke tube bundle and water area have been thermodynamically optimised for a specific capacity and ensure rapid thermal transmission and an adequate volume of hot water.

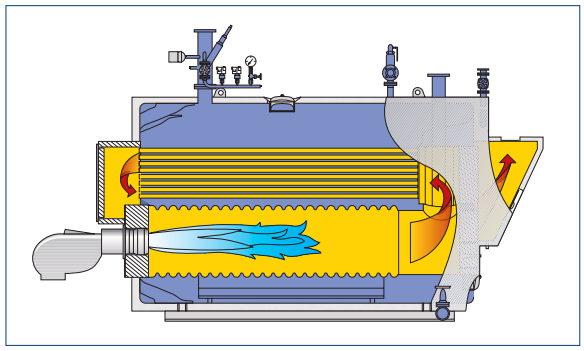
The capacity range goes from 820 to 18,300 kW with the UNIMAT UT-H (one flame tube) and from 13,000 to 38,000 kW for the UNIMAT UT-HZ (two flame tubes). The large capacity range combined with the high pressure range up to 30 bar and a temperature level of up to 240°C will ensure that every customer requirement can be met.



Section through a UT-M



Section through a UT-H



Section through a UT-HZ with rear reversing chamber and additional flow gas collection chamber

The result

- Suitable for all high-pressure hot water systems
- Up to 95% standard utilisation without flue gas heat exchanger with boiler type UT-M
- Up to 105% increase in efficiency with fuel efficiency technology with boiler type UT-M
- Extremely low radiation losses
- Very low space requirement and low operating weights, and so particularly good for container installation and roof heating units.

Assembled and function tested in the workshop ready for connection

- Suitable for all burners, including low-NO_x burners
- Dynamic capacity response for fluctuating heat requirements
- Up to 93% boiler efficiency without flue gas heat exchanger with boiler types UT-H(Z)
- Up to 96% boiler efficiency with flue gas heat exchanger with boiler types UT-H(Z)
- Maximum availability and reliability
- Sturdy and long-lasting
- Stable water circulation and rapid thermal transport
- Optimum water capacity and space requirement
- Environmentally compatible and low-NO_x
- Easy to operate and maintain
- Stable at peak loads and low loads

In addition, with the UT-HZ

- Single burner operation / control has been TÜV approved for decades
- Fuel change during operation using single burner switchover
- Double regulating range with increased efficiency

The application profile

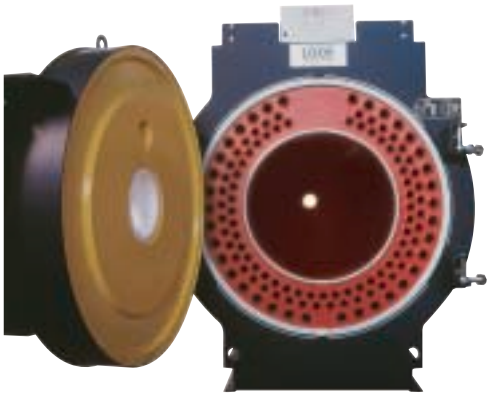
- Space/water and process heating at medium and high temperature level
- For basic load, peak load and back-up heat supply stations
- For local and district heat generation
- For local authority heating stations, e.g. swimming pools, sports complexes, etc.
- For heat supply companies
- For commercial and industrial process heat generation, e.g. for greenhouses, airports, factory halls, etc.
- Supply of heat to multi-occupancy housing and residential complexes

Two type UT-HZ UNIMAT hot water boilers in an airport, supplying hot water and heating

Two type UT-M UNIMAT hot water boilers in a packaging plant to supply heat to the halls

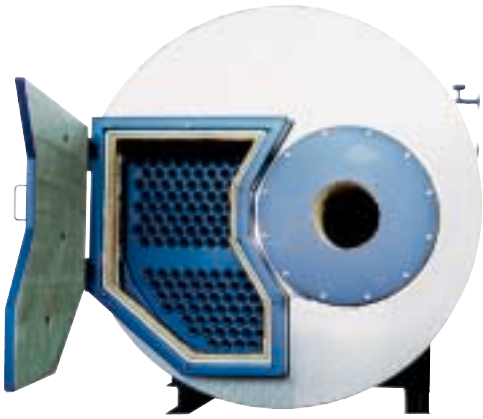
The design

- Three-pass flame tube-smoke tube compact system
- Practical round design for optimum pressure resistance
- Special injector to improve circulation and to increase the inner return flow temperature integrated into the apex of the boiler
- Fully swivelling boiler front door for simple cleaning and inspection
- The model series can be supplied with an integrated flue gas heat exchanger for full utilisation of the calorific value of sulphur-free flue gases with and without bypass
- The burner space geometries are coordinated with all leading burner manufacturers
- Thermally insulated with mineral wool mats under an aluminium protective casing without thermal bridges



In addition with the UT-H boiler type

- Built as a shell boiler in the three-pass single flame tube-smoke tube system
- Burner area, smoke pipes and large water capacity ideally matched to each other
- Available with integrated flue gas heat exchanger
- Water-rinsed rear smoke gas reversing chamber



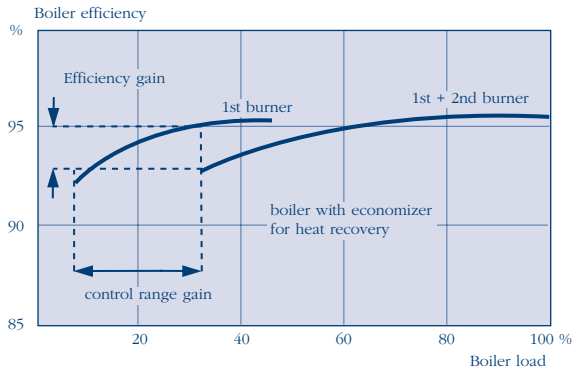
In addition with the UT-HZ boiler type

- Built as a shell boiler in the three-pass two flame tube-smoke tube system
- Separate flue gas routes for burners as far as the flue gas connector piece for single burner operation
- Water circulating guidance profiles on the boiler base
- Suitable for unlimited single flame tube operation because of special design measures

The design

The LOOS three-pass patent from 1952 forms the basis for the UT-H and UT-HZ model series. The suitability of the UT-HZ for unlimited parallel or single operation of the burners is based not only on the stable separation on the flue gas side. The special design measures to neutralise the tension forces in single flame tube operation are crucial for lasting stability. The flame tubes are pushed through in the front and rear base and welded firmly all round. The water-rinsed rear flue gas reversing chamber is separated with a water-circulated stabilising pipe wall and also pushed through in the rear base. The large pressure release areas with webs running all round, together with the reversing chamber ceiling-floor anchors neutralise the tension forces.
The water circulation and heat transported are effectively made more dynamic by guide profiles on the boiler base and accelerated additionally through flow gases between the flame tubes and the adjacent smoke tube areas.
The smoke tube areas can be freely and easily accessed through swivelling reversing chamber doors. The high-quality mineral mat insulation of the entire boiler body ensures minimal radiation losses. The stable base frame reduces the specific floor load.

With the TÜV-approved single flame-tube operation, fully automatic operation with one or both burners is possible without limitations. The regulating range is doubled and every low-load phase is deployed with a burner with an efficiency gain. With dual burners, it is possible to change fuels during operation and to run parallel operation with different fuels.



Special features

- LOOS BOILER CONTROL LBC - the convenient SPC-based boiler control system
- LOOS SYSTEM CONTROL LSC* plant management system
- ECO flue gas heat exchanger for separate installation for maximising fuel values
- Forward/return flow adapter piece
- Return flow temperature boost or return flow temperature maintenance
- Return flow temperature maintenance with regulator, 3-way valve and boiler circuit pump
- WTM water treatment module
- WSM water service module with partial and full deaeration
- LWA water analysis module

For more detailed information, see the "Boiler House Components" brochure

UNIMAT Hot Water Boilers	Boiler sizes acc. to performance stages**	Gauge pressure	Temperature	Fuel
Series	kW	bar g	°C	
UT-M (one flame-tube)	**750 to 19,200**	**up to 16**	**up to 190**	**LFO, HFO, Gas**
UT-H (one flame-tube)	**820 to 18,300**	**up to 30**	**up to 240**	**LFO, HFO, Gas**
UT-HZ (two flame-tubes)	**13,000 to 38,000**	**up to 30**	**up to 240**	**LFO, HFO, Gas**

Technical data sheets and detailed technical advice are provided for every boiler series.
*Available from 2008
**In some countries national restrictions of the max. permissible output apply.

FLUE GAS HEAT RECOVERY

The concept

Fuel efficiency technology for UNIMAT Heating Boilers

Natural-gas fired UNIMAT Heating Boilers produce soot- and sulphur-free, steam-enriched flue gas. The flue gases are cooled below their dewpoint with system return water on secondary heat-transfer surfaces. The evaporation heat is converted into additional heating capacity by steam condensation, thus achieving maximum efficiency. The occurring slightly acid condensate can be treated in neutralising arrangements before discharge into the public sewer. UNIMAT Heating Boilers of Series UT with integral economizer or with the ECOMAT EWT for separate installation offer the planner and plant construction engineer a mature fuel efficiency system with maximum user benefit.

Dry operation for UNIMAT Hot Water Boilers

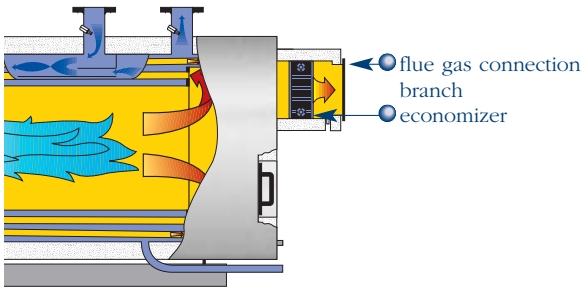
High-pressure hot water boilers for process- or district heating systems are operated with system return temperatures above the flue gas dewpoint. Economizers for 'dry' operation are used to achieve a high level of efficiency. Economizers with (ECO-SA) or without flue gas bypass can be used.

To prevent the temperature from dropping below the dewpoint during start-up or in the case of moisture-sensitive stacks, water- or flue gas-side temperature control is used. Every hot water system, every requirement profile and every performance level receives the optimum, tailor-made solution with the highest possible user benefit.

The result

For the UT-L/UT-M series

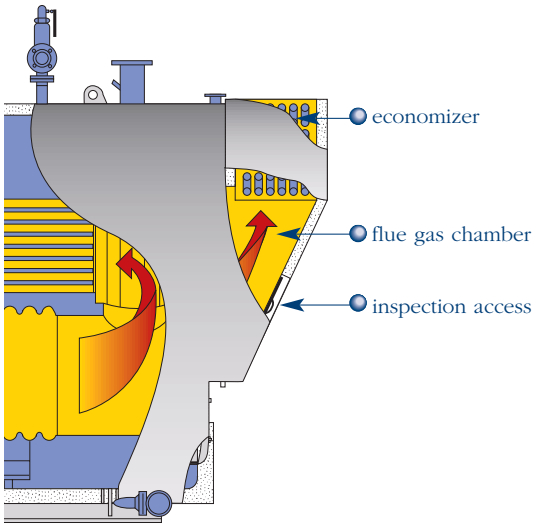
- Waste gas heat exchangers are available for condensation operation
- Flue gas heat exchanger mounted to the boiler
- Corrosion protection with condensation operation: made in high-grade austenitic stainless steel
- Optimum condensate disposal
- Liquid neutralisation for all sizes or granulate neutralisation up to a heat output of 2 MW



mounted economizer for the UT series

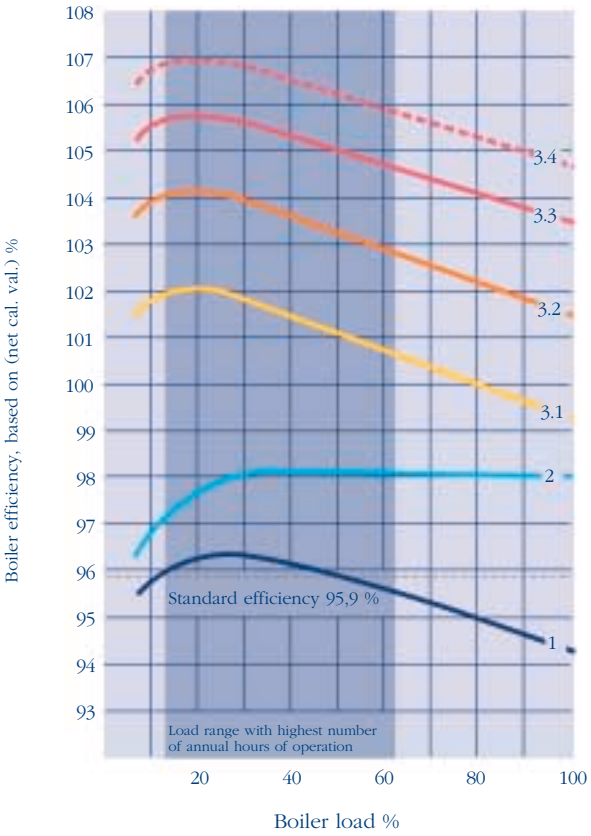
For the UT-H (Z) series

- Flue gas heat exchanger mounted to the boiler
- With helically finned tube for gas and EL fuel oil
- Large inspection openings
- Modest space requirement
- No separate foundation
- Pre-assembled in the works within the permissible transport dimensions, all pipework installed ready for connection, tested and thermally insulated



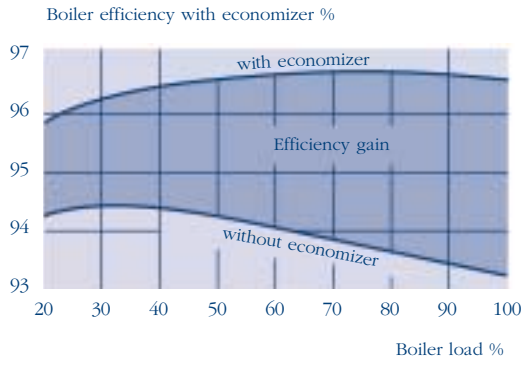
integrated economizer for the UT-H (Z) series

The performance



Efficiency diagram for UNIMAT Heating Boilers
at: boiler flow/return temperature 70/50°C
1 boiler without economizer
2 boiler with economizer
for **„dry operation"**
3 boiler with economizer
for **„fuel efficiency"**
3.1 water inlet temperature 50°C
3.2 water inlet temperature 40°C
3.3 water inlet temperature 30°C
3.4 water inlet temperature 20°C

Large secondary heat-transfer surfaces in combination with flue gas temperature control ensure maximum user benefit without breaching the dewpoint.



Obtainable efficiency gain with economizer for UNIMAT Hot water boilers
Example: efficiency curve for a UT-HZ with 19,950 kW, natural gas H, twin flame-tube operation, 60°C inlet waste gas heat exchanger

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