Turbomat 150 - 550 kW

WOOD CHIP AND PELLET BOILERS

BETTER HEATING

INNOVATIVE AND
COMFORTABLE

fröling

ENVIRONMENTALLY RESPONSIBLE HEATING, ECONOMICAL ATTRACTIVE

CO_2 NEUTRAL

Wood chips are a local and environmentally-friendly fuel which is not subject to the crises and fluctuations of the market. Furthermore, wood chip production provides jobs for local residents. That is why wood chip is the perfect fuel, not just from an economic perspective but also from an environmental point of view. The quality class is determined by the type of wood used.

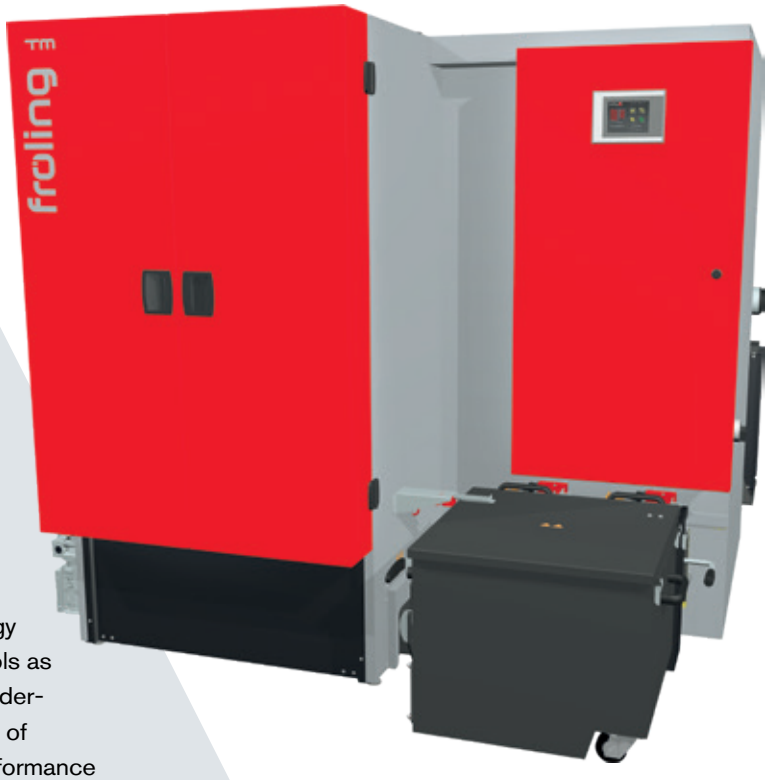
Wood pellets are made of natural wood. The large volumes of wood shavings and sawdust generated by the wood-processing industry are compacted and pelleted without being treated beforehand. Pellets have a high energy output and are easy to deliver and store. These are just some of the advantages that make pellets the perfect fuel for fully automatic heating systems. Pellets are delivered by tanker and unloaded directly into your store.

Shavings are a waste material and a by-product of the wood-processing industry, and are therefore logically the ideal fuel for this industry. The characteristics of this exceptional dry heating material require particularly robust combustion technology.

For almost sixty years Froling has specialised in the efficient use of wood as a source of energy. Today the name Froling stands for modern biomass heating technology. Froling firewood, wood chip and pellet boilers are successfully in operation all over Europe. All of our products are manufactured in our factories in Austria and Germany. Froling's extensive service network ensures that we can handle all enquiries quickly.

GUARANTEED QUALITY AND RELIABILITY FROM AUSTRIA

- International pioneer in technology and design
- Sophisticated fully automatic operation
- Excellent environmental compatibility
- Environmentally responsible energy efficiency
- Renewable and CO_2-neutral fuel
- More comfort for you



Invest in the future

Froling's Turbomat is a unique heating system with a fully automatic wood burner which will operate with a wide variety of wooden material. As a leading manufacturer of biomass heating systems, the Turbomat embodies all of Froling's expertise in pioneering innovation. We were looking for a boiler that would be perfectly suited for burning other biomass fuels as well as wood chips.

The Turbomat not only boasts innovative combustion technology but also offers impressive control options. With Lambda controls as standard, combustion chamber temperature monitoring and under-pressure control, perfect combustion is guaranteed for a range of materials. The comfort provided sets new standards in this performance category.

All Turbomat functions are fully automatic, from fuel feed and combustion right through to cleaning and ash removal. The high-tech Turbomat is designed to be extremely robust, durable and easy to service.

STURDY TECHNOLOGY WITH SMART DETAILS
TM 150/200/250

Vertical 3-pass heat exchanger and Efficiency Optimisation System WOS)

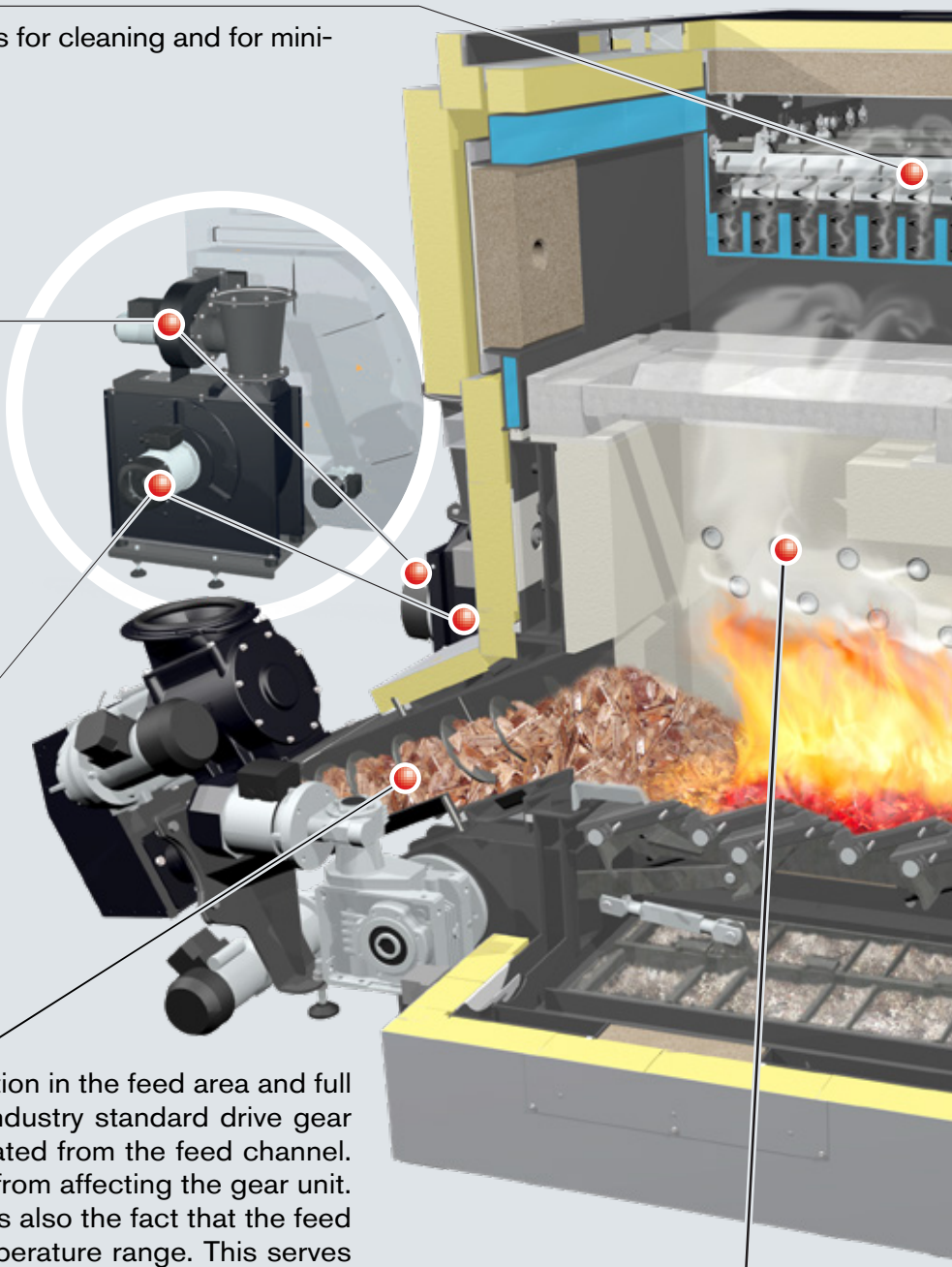
with automatically operated turbulators for cleaning and for minimal dust emissions (<50 mg/Nm³)

Flue gas recirculation FGR

optimises burning (output, emissions etc.) with particularly demanding fuels, e.g. pellets, shavings, miscanthus etc...

Speed-regulated and function-monitored induced draught fan

together with the under-pressure controller ensure that the system continuously adapts to changes in fuel and the chimney conditions



Trapezoidal stoker duct

guarantees minimal energy consumption in the feed area and full flexibility for varying fuel sizes. The industry standard drive gear unit is durable and mechanically isolated from the feed channel. This prevents the screw movements from affecting the gear unit. A bonus feature of the TM 200/250 is also the fact that the feed area is water-cooled in the high temperature range. This serves the very practical purpose of pre-drying the heating material where the fuel has a high moisture content.

4-layer high temperature combustion chamber

(firebrick / insulation 1 / air jacket / insulation 2) made of premium, heat-resistant fireclay components for optimal combustion, even with inferior fuel (e.g. high moisture level etc.) or alternative fuel

Multilayer thermal insulation

guarantees minimum radiant heat

Large, solid combustion chamber doors

ensure ease of access for maintenance

Moving grate

for constantly homogeneous combustion process with ongoing removal of combustion residue

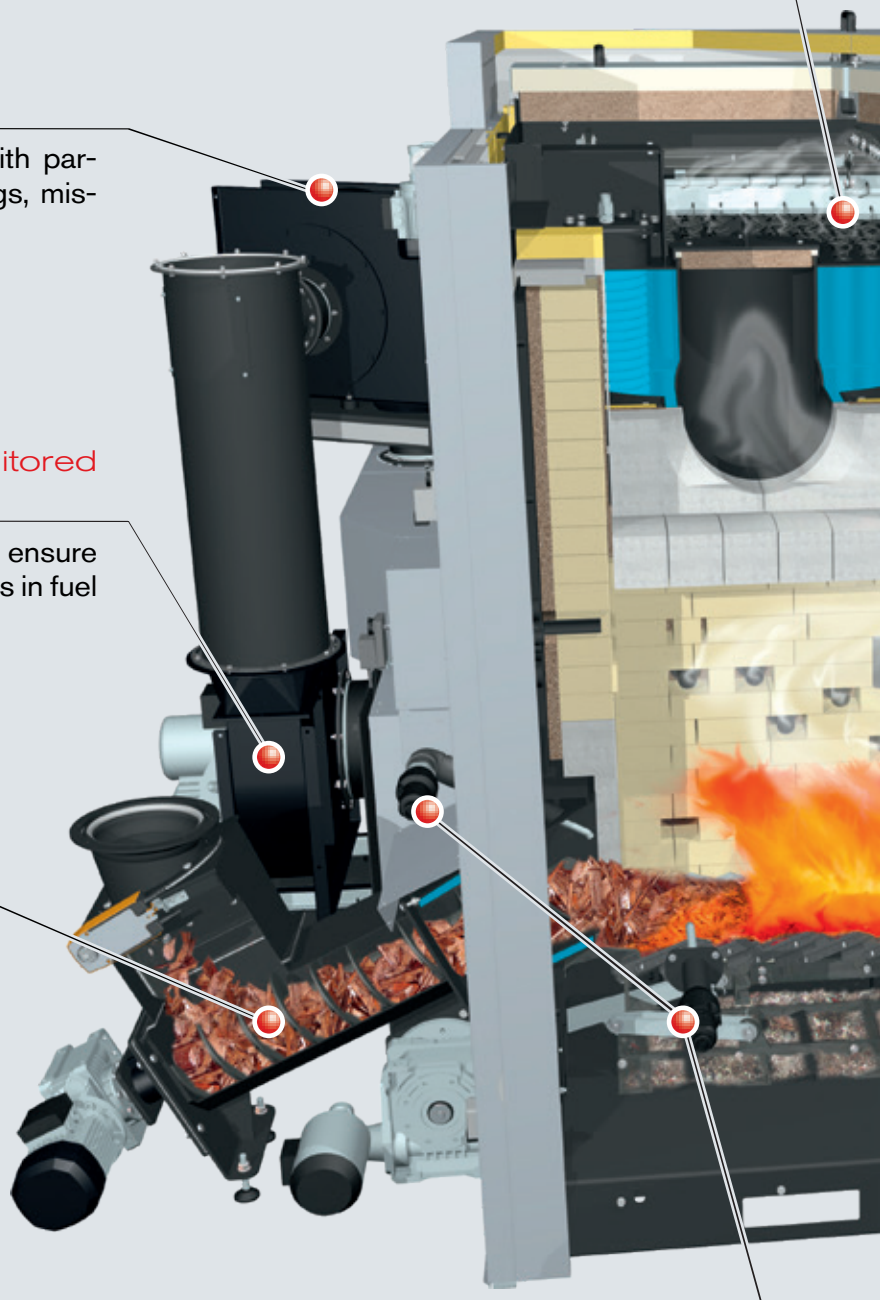
Automatic ash removal

for transport into adjacent ash containers

A DESIGN WITH UNIQUE BENEFITS
TM 320/400/500

Vertical, patented 4-pass heat exchanger

with integrated suction cyclone unit dust separation unit and Efficiency Optimisation System (WOS) with automatic cleaning function. Operating pressure up to 6 bar.



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Second ignition fan

for heating material that is hard to light (e.g. damp)

Case cooling of combustion chamber

minimises radiant heat

High-temperature post combustion zone

with hot fireclay lining prolongs combustion. This increases efficiency even further, particularly with inferior fuels.

4-layer high temperature combustion chamber

(firebrick / insulation 1 / air jacket / insulation 2) made of premium, heat-resistant fireclay components for optimal combustion, even with inferior fuel (e.g. high moisture level etc.) or alternative fuel

Large, solid combustion chamber doors

ensure ease of access for maintenance

Moving grate

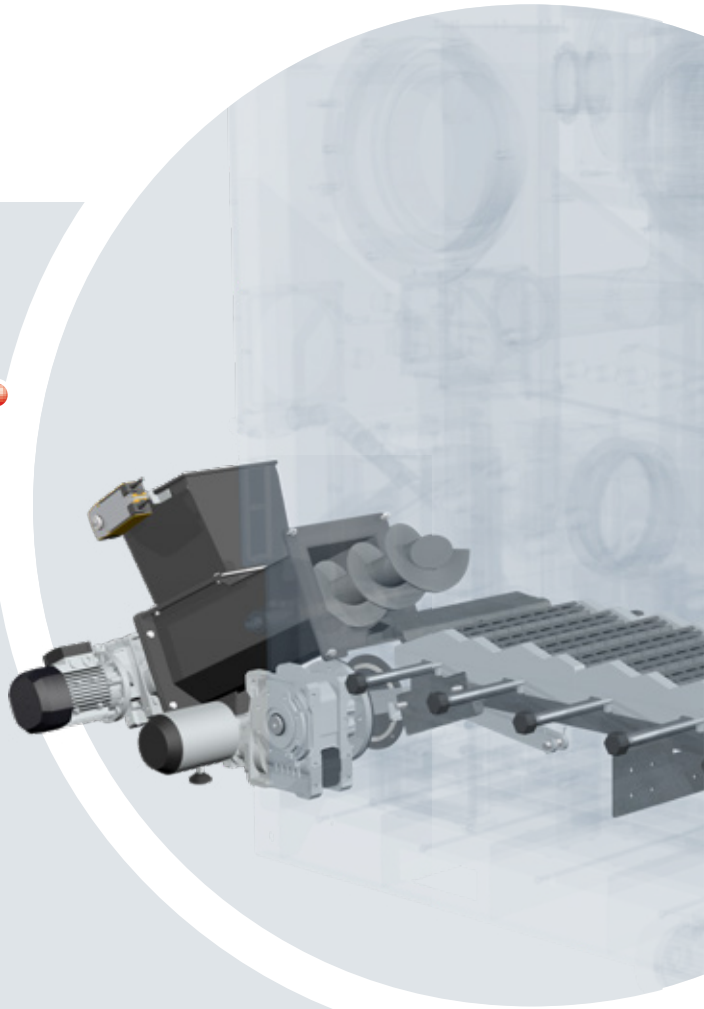
for constantly homogeneous combustion process with ongoing removal of combustion residue. The innovative primary air zone separation system produces exceptional combustion results with low CO emissions!

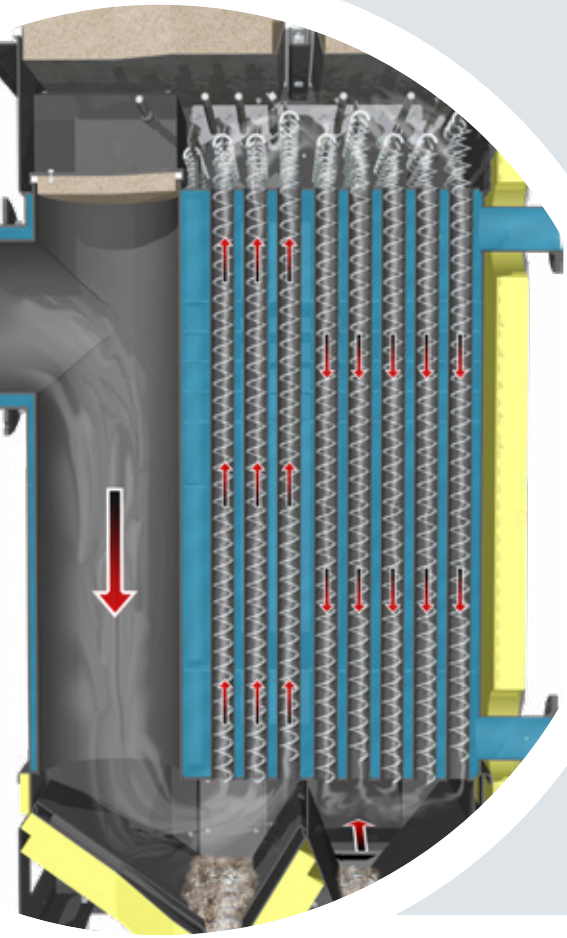
WELL-PLANNED IN EVERY DETAIL

High temperature combustion chamber with moving grate

The high-temperature combustion chamber is 4-shelled, guaranteeing clean combustion. The jacket cooling, together with the water-cooled stoker duct minimise radiant heat losses and guarantee high efficiency. Thanks to the moving conveyor grate, boiler operation is trouble- and maintenance-free, even when using lowgrade fuels which tend to form cinder. Separation of the primary air zone guarantees full, efficient burnout. This keeps emission levels very low The ashes that fall under the grate are automatically transported to the ash container by a rake.

Advantages:
- No cinder build-up
- Optimum burnout
- Very low emissions
- Automatic ash removal

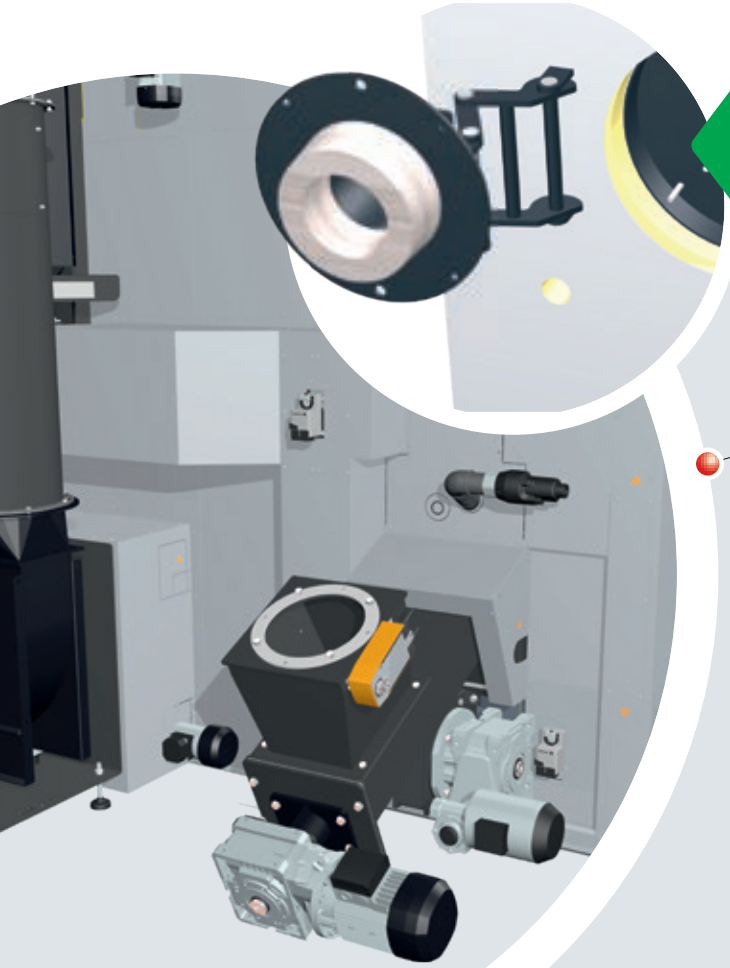




Upright heat exchanger

The upright design means that the heat-exchanger practically cleans itself. The heating surfaces can also be cleaned automatically, which means high efficiency. The built-in safety battery prevents over-heating. The patented multicyclone dust separator integrated in the heat exchanger of the Turbomat 320 and 500 ensures compliance with the lowest dust emission limit values. Ash is removed by sturdy screws, which feed it into containers. These are outside the unit, so they are easy to remove and empty.

Advantages:
- Optimal heat transfer
- Automatic cleaning of heating surfaces
- High efficiency
- Very low dust emissions

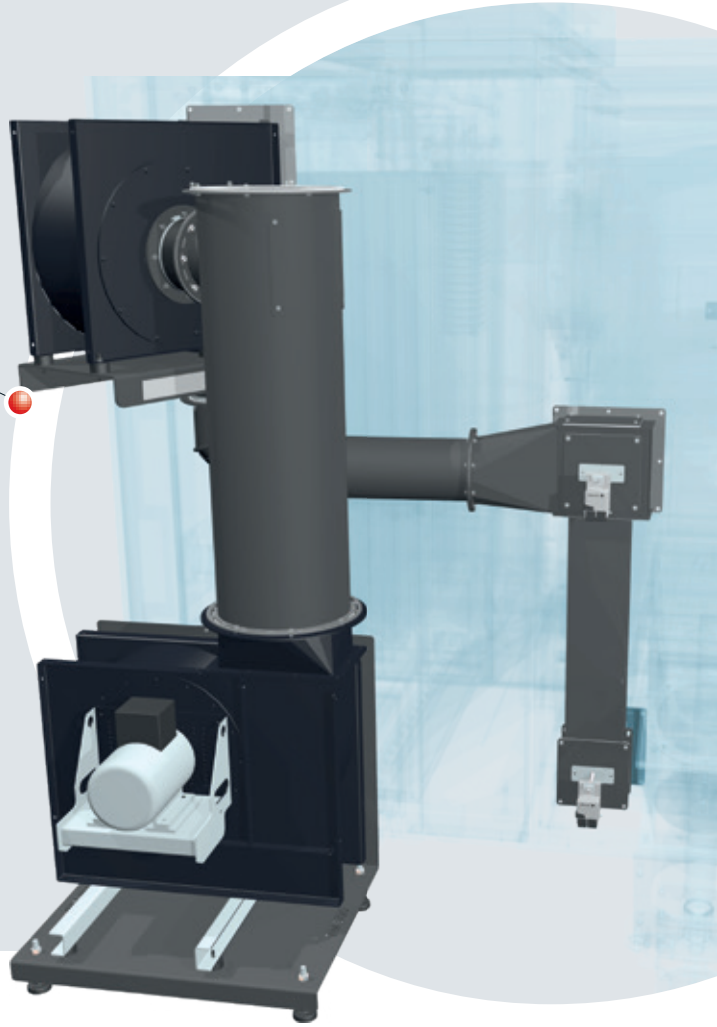


Connection of an oil or gas burner possible in order to include emergency operation in the event of an emergency.

Service-friendly, sturdy design

The high-tech Turbomat is extremely easy to service. All components, from the fire bricks to the grate elements, are easy and inexpensive to replace if necessary. The built-in burn back flap or rotary valve, combined with the underpressure monitoring system, ensures safe operation. In the case of an emergency you can continue operation by connecting up an oil burner or a gas burner.

Advantages:
- Maintenance work kept to a minimum
- Components easy to service
- Cost savings
- Extremely high operating safety

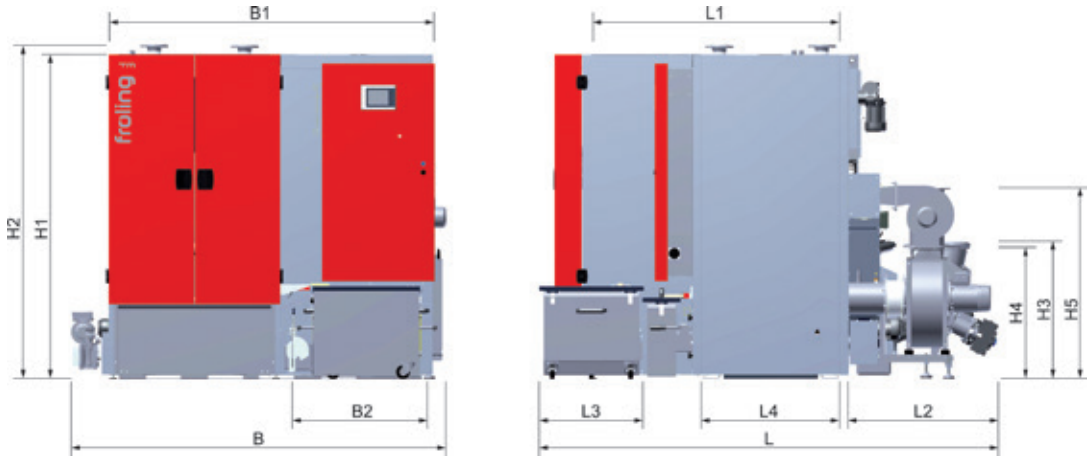


Flue gas recirculation

Some of the flue gas is fed back into the combustion by a speed-regulated FGR blower fan. The residual oxygen in the flue gas is fed back to the combustion zone by automatic progressive rotary slide valves serving as the primary and secondary flue gas return. This reduces the NOx emissions. It also helps to protect the fireclay when high-quality dry fuels are used whilst optimising combustion and output for both damp and dry fuels.

Advantages:
- Combustion optimisation
- Preserves the flame-swept parts

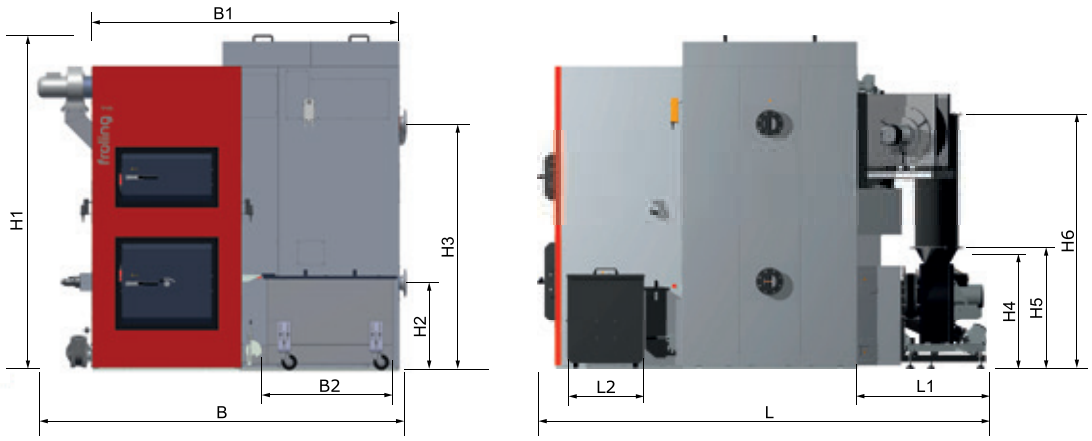
DIMENSIONS & TECHNICAL SPECIFICATIONS
TM 150/200/250



Dimensions - Turbomat [mm]	150	200	250
H1 Height, boiler incl. insulation		1880	
H2 Height of flow connection / return connection		1935	
H3 Height, stoker incl. burn back protection system	790	850	
H4 Height of flue gas pipe connection without FGR]	770	1320	
H5 Height of flue gas pipe connection incl. FGR	1350	1320	
B Total width incl. fittings	2170	2180	
B1 Width, boiler incl. insulation	1870	1930	
B2 Width, ash trolley		870	
L Total length incl. fittings	2630	2860	
L1 Length, combustion chamber excl. insulation	1720	1880	
L2 Length of stoker unit]	940	970	
L3 Length of ash trolley		600	
L4 Length, heat exchanger excluding insulation	790	950	

Technical specifications - Turbomat		TM 150	TM 200	TM 250
Nominal heat output	[kW]	150	199	250
Total weight incl. fittings	[kg]	200	250	250
Flue gas pipe diameter	[mm]	3300	3820	3820
Water capacity	[l]	440	570	
Maximum permitted operating temperature	[°C]		90	
Minimum return temperature	[°C]		65	
Max. permitted working over-pressure	[bar]		4	
Flue gas temperature at nominal load	[°C]		150 / 110	

TECHNICAL SPECIFICATIONS
TM 320/400/500/550



Dimensions - Turbomat [mm]	320	400/500/550
H1 Boiler height including insulation	2560	2660
H2 Height of return connection	640	710
H3 Height of flow connection	1850	2000
H4 Height of stoker including burn back protection system	815	930
H5 Height, flue gas pipe connection without FGR	960	985
H6 Height, flue gas pipe connection with FGR	2005	2075
B Total width including fittings	2780	2990
B1 Width, boiler including insulation	2195	2495
B2 Width, combustion chamber ash container	730	1165
L Total length including fittings	3340	3595
L1 Length, stoker unit	940	1050
L2 Length, combustion chamber ash container	600	630

Technical specifications - Turbomat		320	400	500[1]	550
Nominal heat output	[kW]	320	399	499	550
Flue pipe diameter	[mm]	300	350		
FGR pipe diameter	[mm]	150	200		
Total dry weight including attachments	[kg]	6330	8470		
Heat exchanger water capacity	[l]	780	1040		
Maximum permitted operating temperature	[°C]	90			
Minimum boiler return temperature	[°C]	65			
Maximum permitted working over-pressure	[bar]	6			
Flue gas temperature (NL / PL)	[°C]	140 / 110			

[1] TM 500 with 501 kW nominal output only available in UK

The ecodesign requirements according to VO (EU) 2015/1189, Annex II, point 1. are met.

ROTARY AGITATOR DISCHARGE SYSTEMS
WITH COMBINED DRIVE

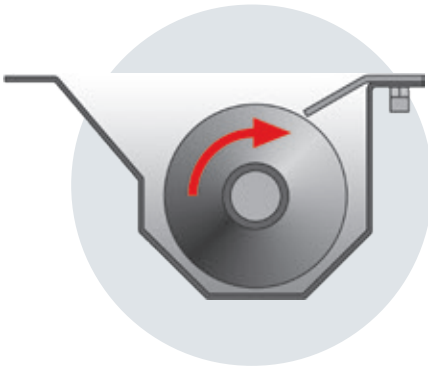
The simple and effective design of Froling's rotary agitator discharge systems ensures smooth operation. Any problematic materials (e.g. foreign bodies) are automatically detected and removed by a reverse turn of the screws (turn control). The feed screw with progressive screw raise ensures low energy consumption.

FBR spring blade agitator

Maintenance-free system with a max. working diameter of 5 metres. Designed for wood chips P16S/P31S to M35, previously G30/G50 to W35 for example.

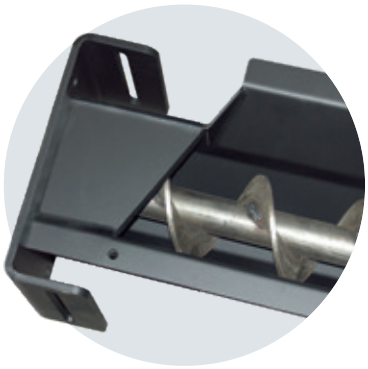
GAR articulated arm rotary agitator

Low maintenance system with sturdy design and maximum working diameter of 5 to 6 metres. Designed for wood chips P16S/P31S to M35, previously G30/G50 to W35 for example.



Special trapezoidal duct

The special trapezoidal shape of the trough ensures that fuel is transported smoothly. The system is easy to operate so it saves energy even when feeding in the maximum amount of pellets.



Shear edge

The robust shear plate with cutting edge breaks up larger pieces of fuel guaranteeing continuous fuel feed.

Rotary agitator arms with tearing hooks

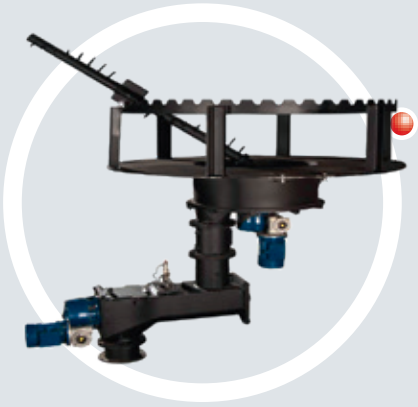
The powerful rotary agitator arms move towards the agitator head during filling and then swing back out when fuel is removed. Together with the sturdy tearing hooks that loosen the fuel, they ensure that the fuel store is emptied.

ROTARY AGITATOR DISCHARGE SYSTEMS
WITH SEPARATE DRIVE

Froling's rotary agitator discharge systems with separate drive offer even greater flexibility. In the FBR-G and GAR-G, the rotary agitator is powered independently of the discharge screw. This allows flexible installation and variable adjustment of the feed output. The discharge screws can be positioned on both the left and right of the rotary agitator.

There is also the option of using extra long discharge screws. This system means that the fuel can even be optimally fed from the back of the fuel store.

Please contact our sales engineers for details.

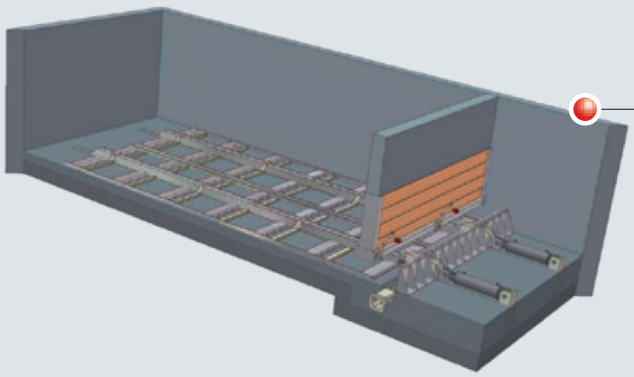


Inclined screw discharge unit

Mainly used as a silo discharge screw in the wood-processing industry. Ensures even and reliable fuel feed from high silos.

Horizontal screw discharge unit

Solid construction to withstand extremely high feed loads when feeding from high silos. This is used for shavings and for large-diameter bunkers in particular.



Pusher discharge unit

Optional design for rectangular storage rooms. Suitable for all commonlyused biomass fuels. The pusher discharge unit is extremely sturdy and has proven to be especially suitable for discharging fuels from large wood chip stores.

SYSTEMATIC CONVENIENCE

Froling SPS 4000 controller

The new SPS 4000, made of industry-standard high-quality components, is now available as an option. The clear, user-friendly control system offers a wide range of different settings and display options for individual, efficient and stable operation.

The Froling SPS 4000 offers numerous functional possibilities such as 5 sensor storage tank management, heating circuit and network temperature control, external power specifications, cascade function, integration, monitoring and controlling of additional peripheral components. Froling visualisation software offers transparency thanks to its trend, status and alarm recording features.

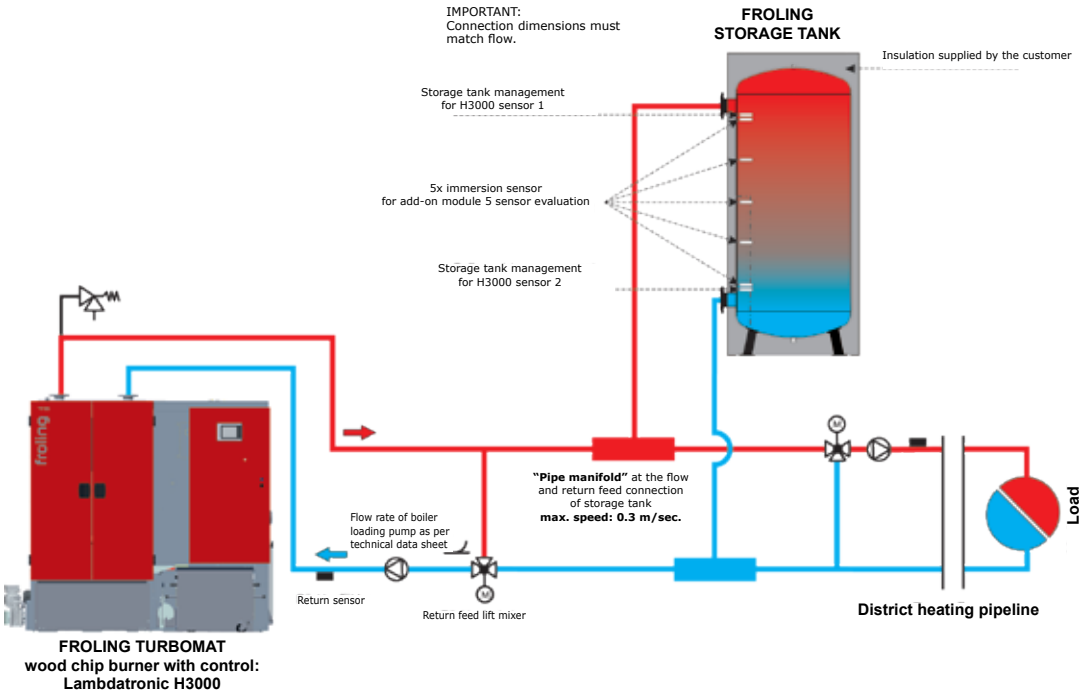
Advantages:
- Powerful SPS controller with 5.7" colour touch display
- Safe and simple remote access via Froling visualisation software
- Numerous functional possibilities

Froling Visualisation Software

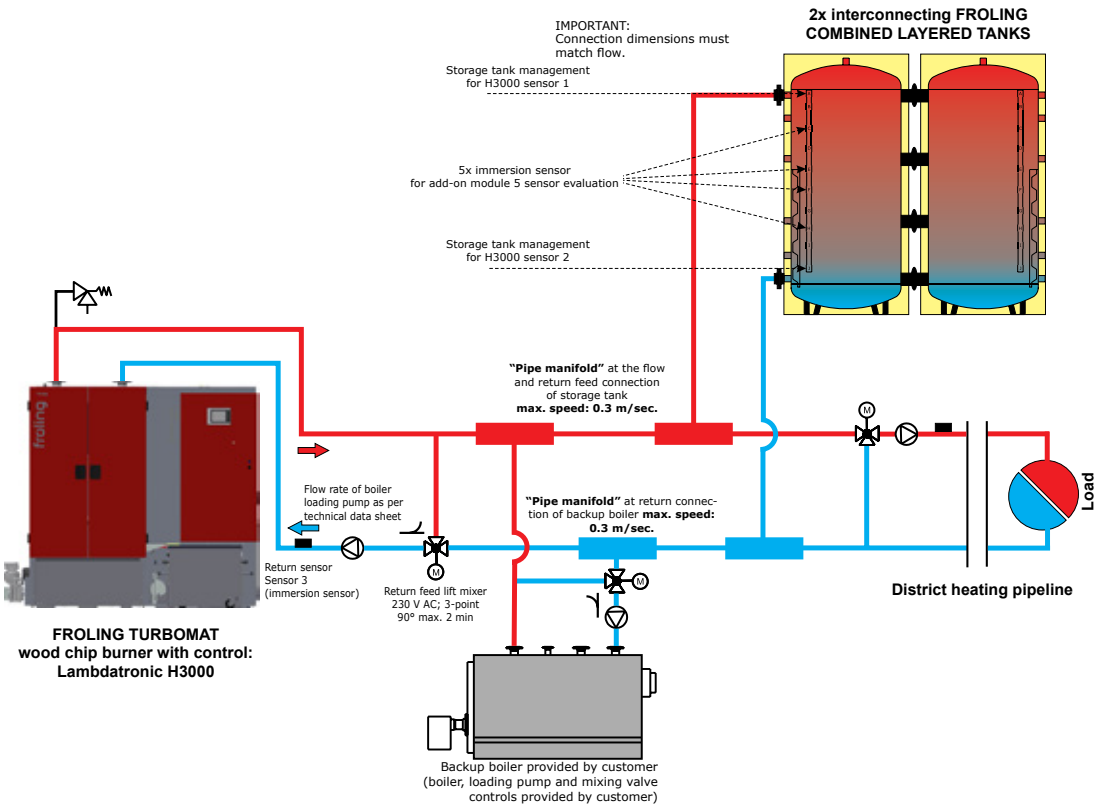
The boiler display software enables convenient remote control of the system from a computer. All operating values and parameters can be displayed and modified. The Windows interface and clear menu structure make it easy to use. In combination with a modem, it is possible to connect to the visualisation software via the telephone network. This means that the heating system can be monitored from any location.

Advantages:
- Monitor and operate from your PC
- Record boiler data
- Remote control via modem

Turbomat with layered tank



Turbomat with backup boiler and two layered tanks (interconnecting)



BUNKER FILLING SYSTEM

BFSV / BFSU / BFSV-H bunker filling system

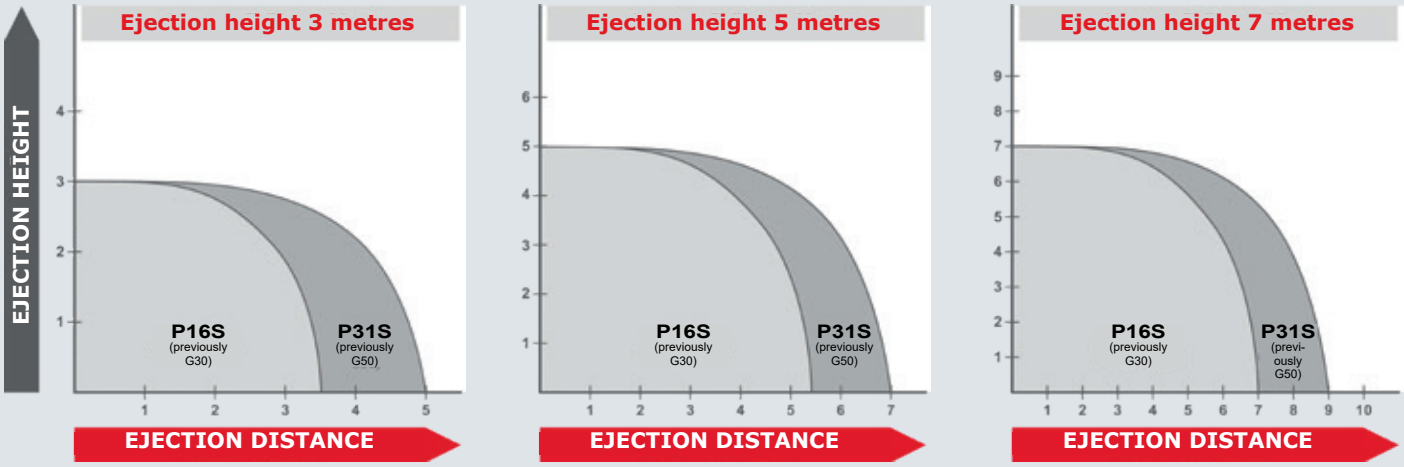
Froling bunker filling systems, both vertical (with vertical feed screw BFSV) and horizontal (with horizontal feed screw BFSU) set new standards for feed output (up to 30 m³/h), operating safety and bunker filling.

A screw transports the wood chips from the tipping gutter into the vertical feed system, which transports the fuel to the desired height for the centrifugal disc. In this way, the Froling bunker filling systems fill the store space without producing much dust and ensure the best possible distribution of the fuel in the bunker.

Advantages:
- Easy to assemble
- High feed output (up to 30 m³/h)
- Great ejection distance (up to 9 m)
- Optimum fuel distribution
- Suitable for P16S - P31S wood chips (previously G30 / G50)

High feed output and maximum ejection distance

The separate drive for the high speed centrifugal disc enables a particularly good ejection distance. However, the ejection distance depends on the grain size and the weight of the fuel and the position of the centrifugal disc. The coarser and heavier the wood chips and the higher the position of the ejection head, the greater the trajectory. Depending on the fuel characteristics and local conditions, ejection distances of up to 9 metres can be achieved.

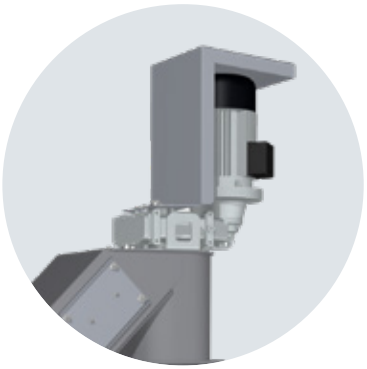


Fill level recognition

Two sensors recognize when the store space is full and automatically stop the fuel feed.

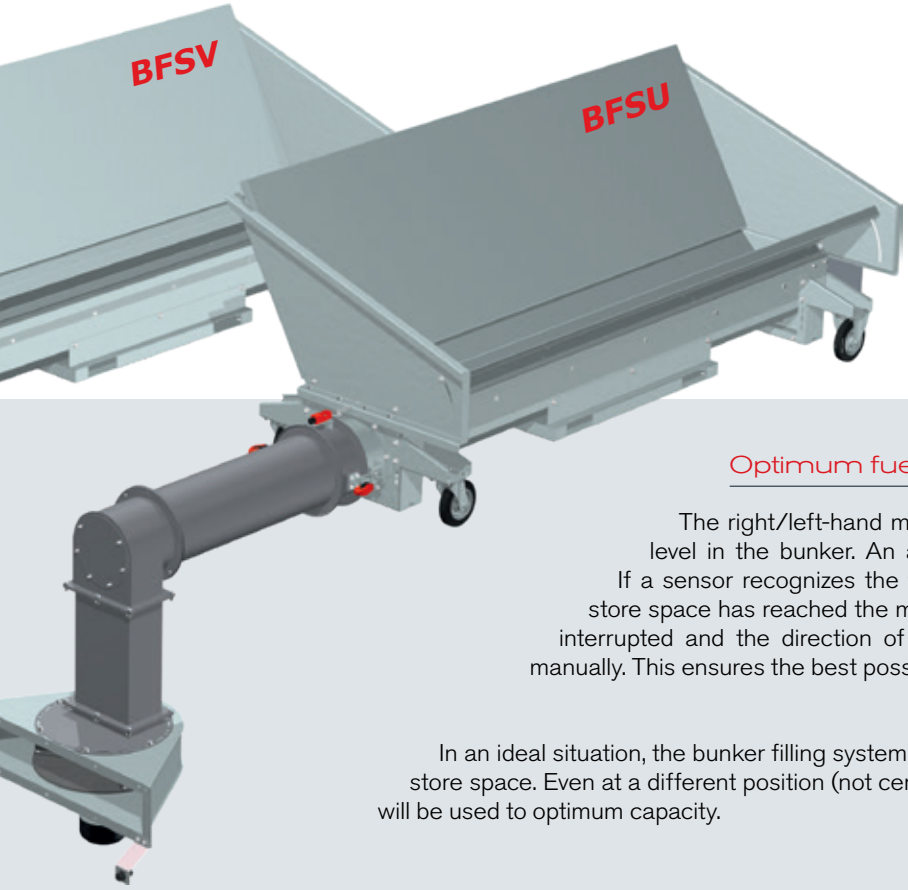
Feed screw

The coreless feed screw (Ø 225 mm) guarantees long service life and smooth operation, even with coarse wood chips.



Energy saving drives

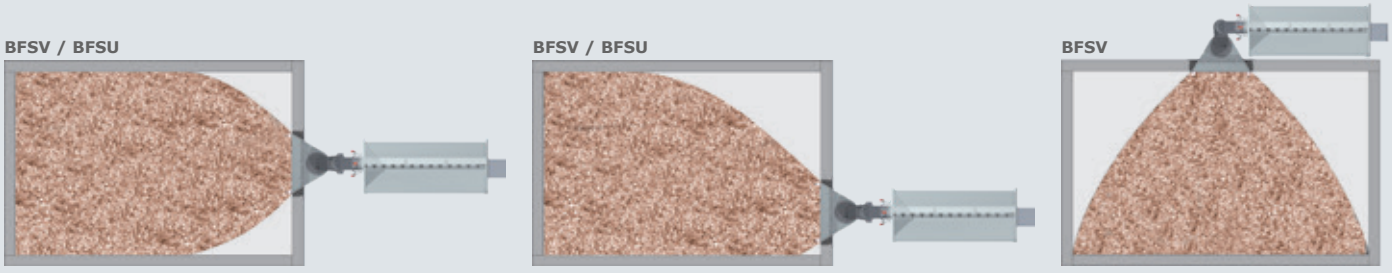
All of the drives have an a efficiency rate of over 90% and ensure low energy operation. All of the drives in the store space feature explosion protection.



Optimum fuel distribution

The right/left-hand motion of the centrifugal disc ensures a good filling level in the bunker. An additional plus is the semi-automatic turn control. If a sensor recognizes the fill level indication that the fuel in this area of the store space has reached the maximum fill level, the fuel transport is automatically interrupted and the direction of rotation of the centrifugal disc can be changed manually. This ensures the best possible fuel distribution in the bunker.

In an ideal situation, the bunker filling system is positioned in the centre at the narrow end of the store space. Even at a different position (not centred, at the wide end, etc.), the store space volume will be used to optimum capacity.



FROLING ENERGY BOX

Heating containers make it possible to locate the boiler and fuel storage room wherever you wish. This saves space and enables installation of biomass heating, especially when renovating an existing building.

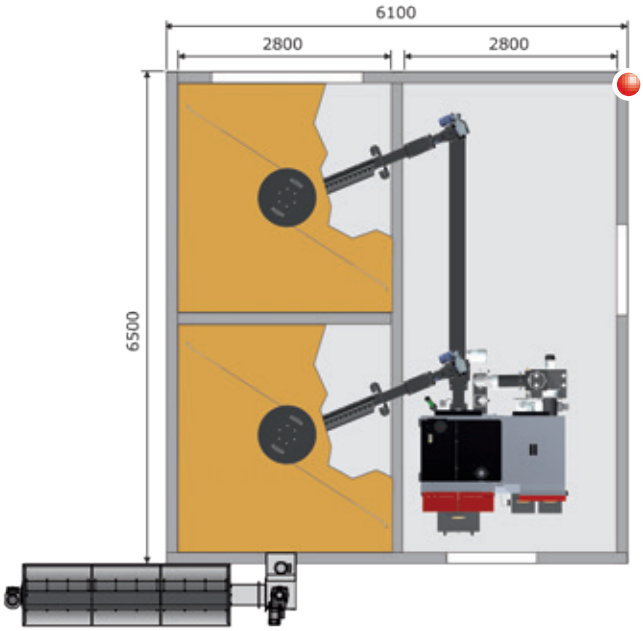
The Froling energy box is available in two versions (Modular and Individual) and is the ideal container solution for heating with wood chips, pellets and shavings. While the Modular version (made from reinforced concrete) is a standardised design offering excellent value for money, the Individual version (made from either reinforced concrete or steel) offers solutions for almost any requirement.

More information in our „Energy Box“ brochure!

INDIVIDUAL ENERGY BOX

The Individual energy box is tailored specifically to your requirements, and the possibilities are virtually endless. Thanks to these wide-ranging options and personalised planning, the Individual energy box is ideal for the Froling TX, Turbomat and Lambdamat.

Planning by FROLING engineers ensures that the solution is just as complete as the Modular version. Heating system, feed system, fuel store or - depending on the model - storage tank and bunker filling system all come from the one supplier and are perfectly coordinated. For the finished container, you can choose between either reinforced concrete or steel.

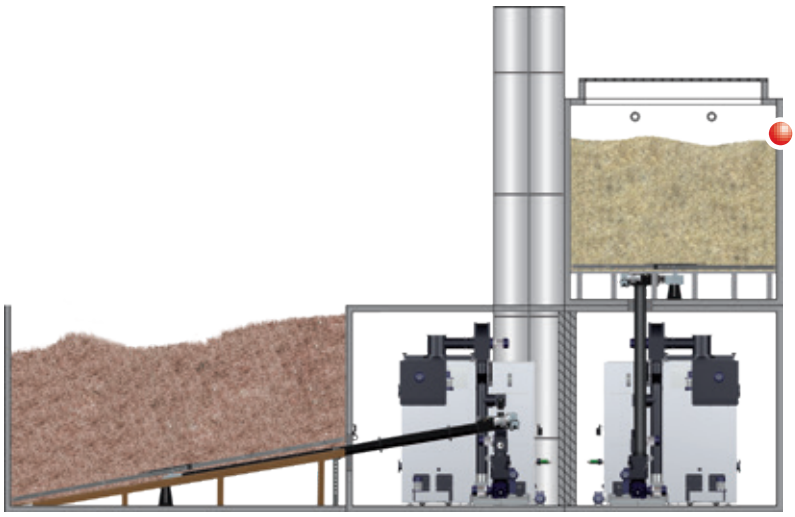


Output up to 500 kW

Individual energy box with two Turbomats and two FBR spring blade agitators and feed screw. The second Turbomat wood chip system can be added any time, in which case the interim feed screw is no longer required. The store space is filled directly via the large store space door using the vertical feed screw.

Store width can be expanded

Second boiler can be added any time



Output up to 1000 kW

Froling Individual energy box with Turbomat 320 kW and Turbomat 500 kW. FBR spring blade agitator and articulated arm discharge unit for wood chip and pellet fuels. The pellets are blown into the store space via filling pipe; wood chips are fed into the large store door.

IN OPERATION ACROSS EUROPE

ENGLAND - Ampleforth College

Boiler: Turbomat 320 kW
Discharge: articulated arm feed unit / diameter 4 metres
Fuel: wood chips

SWEDEN - Tre Sagar

Boiler: Turbomat 220 kW
Discharge: articulated arm feed unit / diameter 5.7 metres
Fuel: wood chips

GERMANY - Schloss Gaußig

Boiler: Turbomat 220 kW
Discharge: hydraulic pusher feed unit with transverse conveyor unit
Fuel: wood chips

SPAIN - Cantabria

Boiler: 2 x Turbomat 150 kW - double boiler system
Discharge: articulated arm feed unit / diameter 5 metres
Fuel: wood chips

Your Froling partner

Fröling Heizkessel- und Behälterbau Ges.m.b.H.
A-4710 Grieskirchen, Industriestr. 12

AT: Tel +43 (0) 7248 606-0
Fax +43 (0) 7248 606-600

DE: Tel +49 (0) 89 927 926-0
Fax +49 (0) 89 927 926-219

E-mail: info@froeling.com
Web: www.froeling.com

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