froling

T4e

Wood chip boiler

T4e

THE NEW GENERATION

- Extremely sturdy design
- Even lower emission values
- Integrated particle separator (electrostatic precipitator) optionally available

Heating with wood chips

For more than 50 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 can be found 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.

The fuels:

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. Leftover branches and treetops and sawmill waste are shredded into wood chips. The quality class is determined by the type of wood used.

The new Froling T4e

User-friendly, compact, economical and safe: The new T4e from Froling meets all your needs. This boiler can efficiently burn both wood chips and pellets due to its intelligent fully-automatic system.

With the silicon carbide combustion chamber, the T4e ensures a **high level of efficiency** (up to 93.7%) with **very low emissions**. Well-planned use of energy-saving drives ensures **extremely low energy consumption**.

Thanks to its modular construction and **compact** dimensions, the Froling T4e is particularly easy to position and install. The entire boiler is fully assembled, electrically wired and tested in the delivery configuration.

Particular attention was paid to energy efficiency, durability and stability during the development of the T4e. The T4e consumes very little electricity during operation, keeping the operating costs down. This priority was clearly confirmed when the boiler was awarded the EnergieGenie award.

ENERGIE GENIE
ENERGIESPARMESSE 2018

The **"EnergieGenie Innovation Prize"** of the Federal Ministry of Agriculture, Forestry, Environment and Water Management and the State of Upper Austria awards new products according to the criteria of innovation, energy saving and degree of innovation.

NEW

7” touch display with
LED status illumination

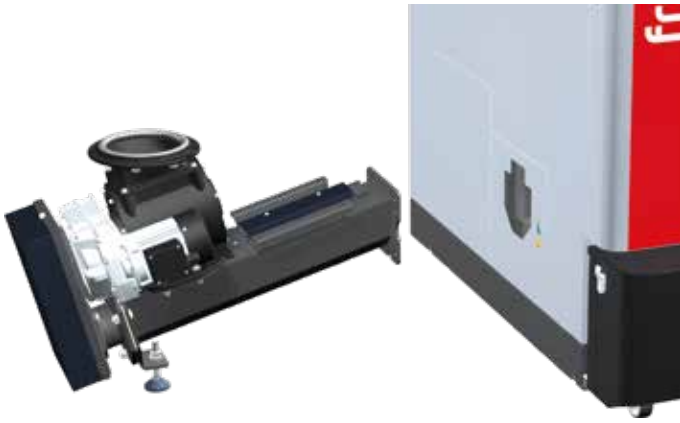
1. Lambda probe for optimum fuel adjustment
2. Built-in return temperature control with pump, mixing valve and ball valve for quick and easy installation
3. Speed-controlled, highly efficient EC induced draught fan for lowest power consumption
4. Fully automatic cleaning of all heat exchanger pipes (starting from the first pass) by means of turbulators (mechanical drive in the "cold" area)
5. Volume-optimised Ø200 mm two-chamber rotary valve for excess wood chips
6. Optional integrated particle separator (electrostatic precipitator)
7. Stoker with large diameter Ø100 mm screw
8. Sturdy foot step for easy maintenance and assembly
9. Silent, energy-efficient ceramic igniter with function monitoring
10. Optimized silicon carbide combustion chamber for lowest emissions and a long service life
11. 110° tipping grate with 900N drive for best possible grate cleaning
12. Underpressure-controlled combustion with sensorless bed of embers monitor
13. Fully automatic ash removal with energy-saving combi drive (common drive for heat exchanger and ash screw combustion chamber) in large-sized mobile ash containers.

    FGR (flue gas recirculation) prepared in the boiler, motor and connecting pipe for activation available as an option

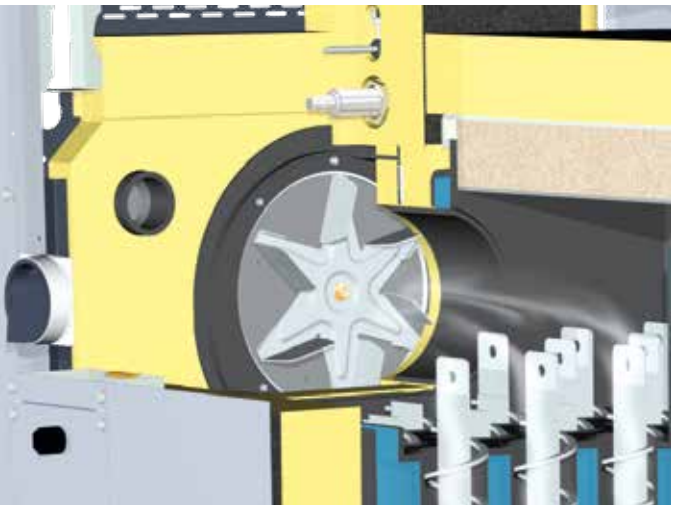
Easy to assemble on site

- Quick assembly
- Pre-wired
- Stoker unit can be ordered on the left or right as desired
- Return temperature control already integrated (ex works)

The T4e is supplied assembled and wired, you just need to fit the stoker unit and connect the chosen discharge system to the rotary valve. This saves time and money. Thanks to the well-planned layout of the units and its compact design, the T4e can also be used in very confined spaces.



You can order a right or left-hand stoker unit.



Speed-regulated EC induced draught fan

- Maximum ease of use
- Constant optimisation of combustion
- Up to 40% less power consumption

The speed-regulated EC induced draught fan ensures the exact air quantity for combustion. As the induced draught fan is speed-regulated, it stabilises combustion throughout and adjusts the output to requirements. Working together with the lambda control, it ensures optimum combustion conditions. The EC induced draught fan has a significantly higher efficiency than conventional induced draught fans with AC motors. This results in significant power savings, especially in partial load conditions.

Precise primary and secondary air control

Combustion in the T4e is controlled by underpressure. Combined with the EC induced draught fan, this guarantees extremely high operating safety. The innovative control of air distribution in the combustion zone is a new feature. Primary and secondary air are optimally adjusted to the conditions in the combustion chamber with only one actuator. This, combined with the lambda controller which comes as standard, ensures that emissions are kept to a minimum.

Fast, energy-saving ignition

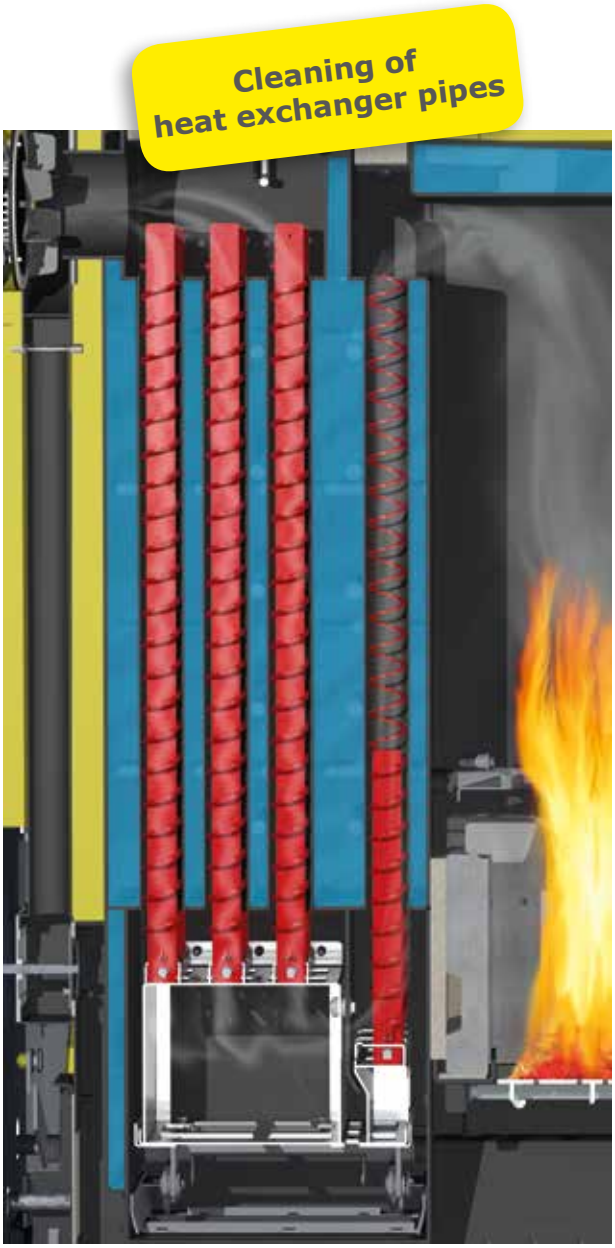
- Silent ceramic igniter for reliable ignition
- Automatic ignition using residual embers
- No separate blower fan required

The silent ceramic igniter ensures safe and energy-saving ignition of the fuel. Thanks to the hot combustion zone, after short periods in idle mode the fuel is automatically reignited by the residual embers. It is only necessary to start the igniter after longer combustion pauses.

Heat exchanger with automatic cleaning (WOS) of all passes and lower drive

- More efficient
- Fuel savings
- Drive mechanism in cold zone (low thermal load)

The WOS (Efficiency Optimisation System) consists of special turbulators, which are placed in the heat exchanger pipes **(NEW! already from the 1st pass)** and allow automatic cleaning of the heating surfaces. Clean heating surfaces ensure greater efficiency and thus fuel savings.



Integrated return temperature control

- Minimal radiant heat loss
- Maximum efficiency
- No external return temperature control required
- Space saving in the boiler room

The integrated room temperature control avoids unnecessary radiant heat loss; this special feature guarantees maximum efficiency. An external return temperature control is therefore no longer necessary and saves installation time. The components are intelligently built-in and the main parts (e.g. pump) are visible from the outside and easily accessible.

Flue gas recirculation (FGR) (optional)

- Precise adjustment via air actuators
- Ideal combustion conditions
- Intelligent regulation of the air quantity

The flue gas recirculation system (FGR) mixes part of the flue gas with the combustion air and returns it to the combustion zone.

The FGR optimises combustion and performance, and also reduces NOx emissions. The lower combustion temperatures offer added protection for flame-swept parts.

NEW: Integrated particle separator (electrostatic precipitator) can be added at any time

Optional integrated particle separator (electrostatic precipitator)

- Can be retrofitted on site
- No additional space required
- Combined cleaning with heat exchanger optimisation system (WOS)

The optionally available particle separator (electrostatic precipitator) can be added at any time without additional space requirement and thereby considerably reduces the fine dust emissions of the boiler. Cleaning is carried out fully automatically in the joint ash box at the front of the boiler.

High-temperature silicon carbide combustion chamber and perfect combustion control

- Highest temperature resistance for a long service life
- Optimal emission values
- Adapts automatically to varying fuel qualities

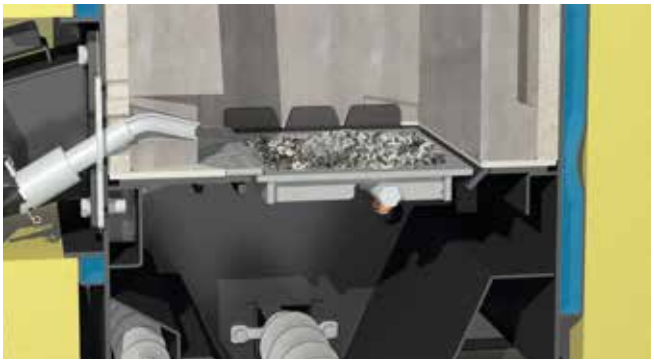
The firebricks are made entirely of high-quality fireproof material (silicon carbide). The hot combustion zone ensures optimal combustion and very low emissions.

Patented firebrick!

The patented shaping of the firebrick stones gives the air supply in the combustion chamber particularly good airtightness without the need to use expensive wearing seals. The new shape of the stones also considerably simplifies the maintenance of the combustion chamber as they can be removed easily.

Special tipping grate technology

- Reduction in costs through energy-saving operation

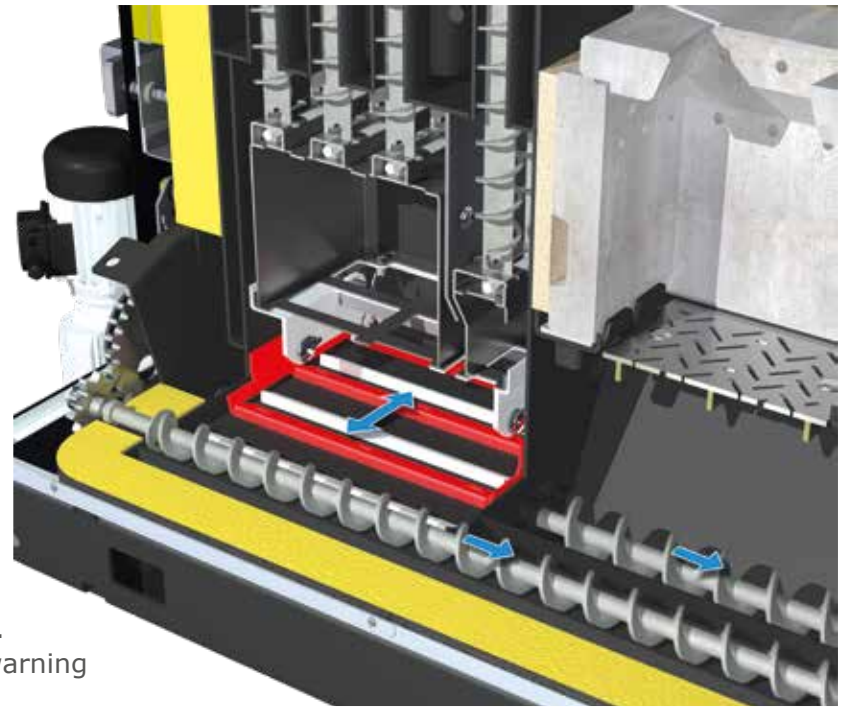


Two-part combustion grate consisting of a fixed insertion zone and automatic tipping grate guarantee energy-saving operation and lowest emissions.

Due to the 110° inclination, the ash is completely emptied from the tipping grate and discharged into the large-volume mobile ash container by means of the ash screw.

Ash discharge system with separate ash screws and ash rakes

- Optimal emptying
- No risk of air leakage thanks to two-chamber ash container



Ash is automatically emptied from the combustion chamber and the heat exchanger into the ash container using two separate ash screws, which are powered by a communal geared motor. This ensures a clear separation and absolute tightness between the combustion chamber and the heat exchanger and eliminates the risk of air leaks.

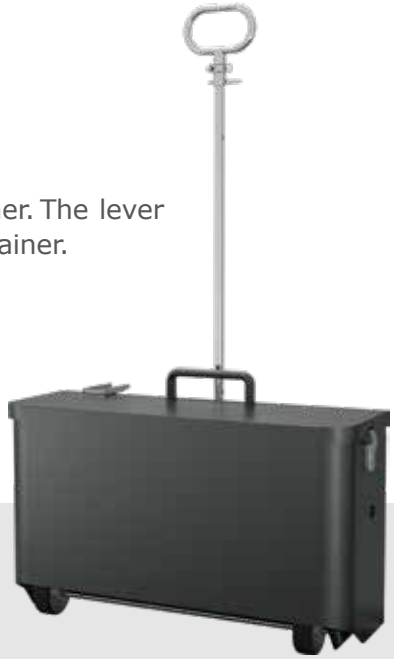
The ash screws are speed controlled. The boiler automatically generates a warning message when the ash box is too full.

At the same time, the joint geared motor drives the ash rake (tested for many years in Froling large-scale boiler systems) in the lower reversing chamber, which transports the heat exchanger ash reliably to the side ash screw.

Extra convenience with the external ash box

With automatic ash removal, the ash is fed into an external ash container. The lever locking mechanism makes it quick and easy to remove the ash container.

Side carrying handles for quick handling



Easy removal by means of transport rollers

The side carrying handles also allow the ash box to be transported comfortably by pallet forks (e.g. a front loader, forklift truck, etc.)

Practical hydraulic device for transporting with the tractor and easy emptying (tipping)

Optional: Ash discharge system with bin

For added convenience, ash can optionally be emptied into a standard 240 l dustbin. The ash is automatically conveyed into the dustbin where it can be easily emptied. This ensures long emptying intervals and maximum convenience.

1 Robust agitator head.

2 Maintenance-free agitator gearbox.

3 Powerful spring piles for even fuel transport (for wood chips up to P31S / G50)

4 Trough channel and feed screw with progressive screw blade.

5 Ball joint for continuously adjustable inclination.

6 Twin-chamber rotary valve for top burn back protection.

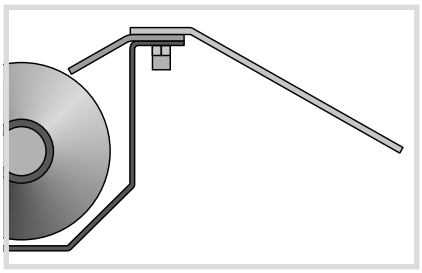
7 Sturdy stoker screw for reliable fuel feed with automatic turn control.

8 Energy-saving, powerful spur gears.

9 Temperature monitoring device in the fuel store (only required in Austria).

10 Easy access to the shear edge through an accessible opening.

11 Monitored gravity shaft cover.



No sloping sides required

None of Froling's discharge systems requires sloping sides. Without sloping sides, the raising plate fitted to the trough ensures simple operation.

Modular screw system

The plug-in screw system with standard extension pieces between 100 and 2,000 mm (graduations every 100/200 mm) allows easy assembly and flexible positioning of the system in the boiler room.

Optional fibre shredder

If the material is particularly fibrous, the optional fibre shredder can shred long parts, thus ensuring reliable transportation of the material.

Energy-saving drive motor (only 0.25 kW)

Highly efficient spur gears

The **powerful, energy-saving spur gears** with a drive power of 0.25 kW ensure that even larger wood chip pieces can be shredded and transported. This design strikes the perfect balance between power and service life.

Flexible ball joint

The ball joint is a flexible connecting piece between the discharge screw and the stoker unit. Offering continuous adjustment of the inclinations (up to 15°) and angles, the ball joint allows flexible planning.

High volume rotary valve (Ø 200 mm)

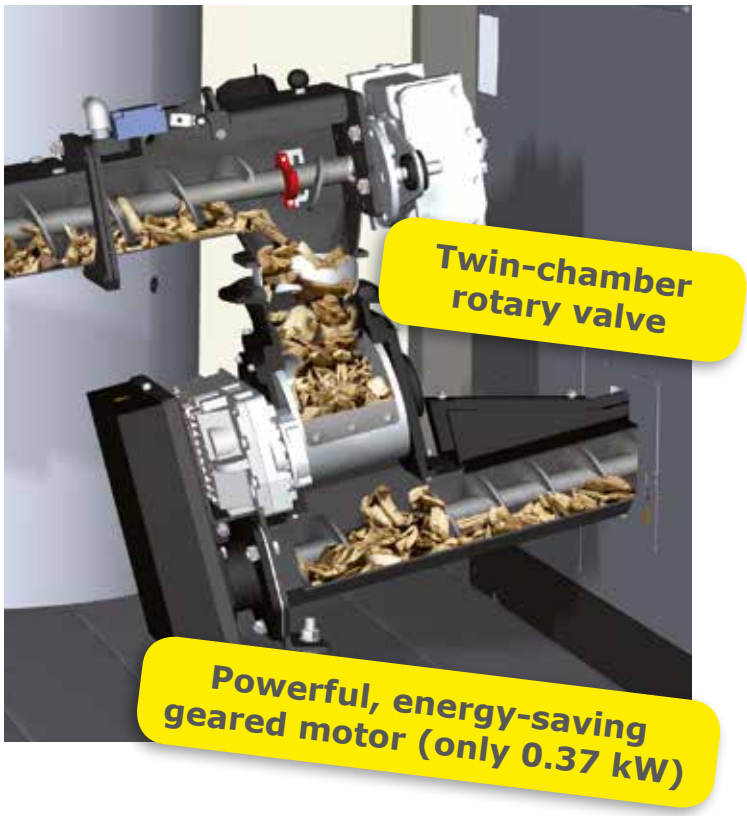
The rotary valve with two large chambers offers maximum burn back protection and continuous material transport.

Sturdy stoker unit

- Flexible set-up
- Maximum burn-back protection
- Low energy consumption
- Great space saving due to the low design height of the stoker unit

The extremely compact stoker unit of the Froling T4e in combination with the rotary valve guarantees maximum burn back protection and reliable fuel feed to the combustion zone. The stoker unit is driven together with the rotary valve by an energy-saving geared motor (spur gears), thus guaranteeing maximum energy efficiency.

The Froling stoker screw with Ø 100 mm is the optimum solution for safe fuel transport from wood chips to P31S (previously G50).



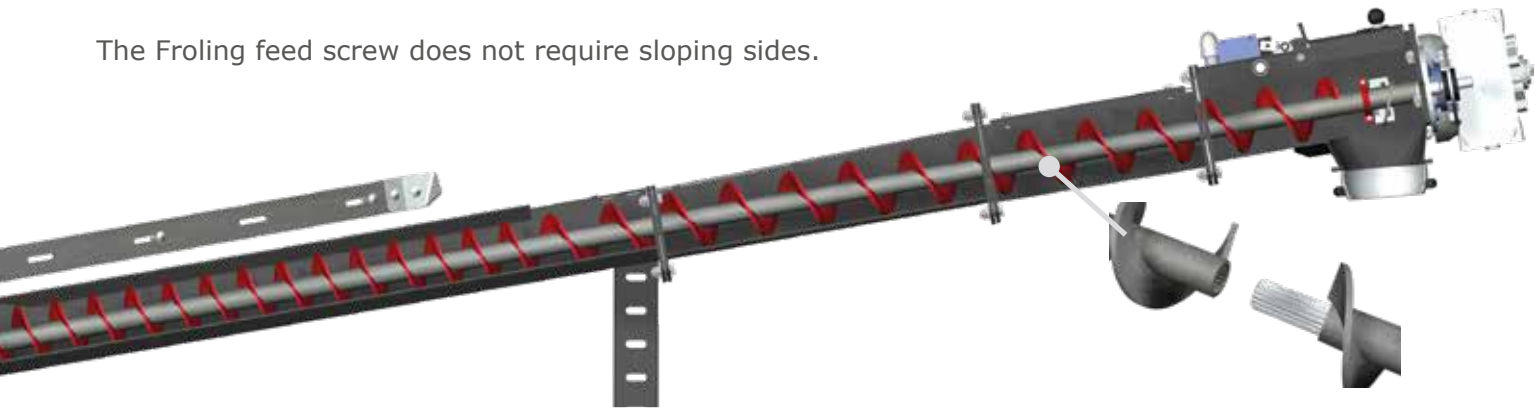
Progressive dosing screw with modular plug-in system

- Flexible set-up
- Reliable material transport
- Low energy

The progressive feed screw guarantees reliable fuel transport. Thanks to the progressive screw raise, the material does not get compacted and can always be moved on easily. This ensures less force and energy consumption.

The modular design of the feed screw with standard extension pieces between 100 and 2,000 mm (graduations every 100/200 mm) allows easy assembly and
flexible positioning of the system in the boiler room.

The Froling feed screw does not require sloping sides.

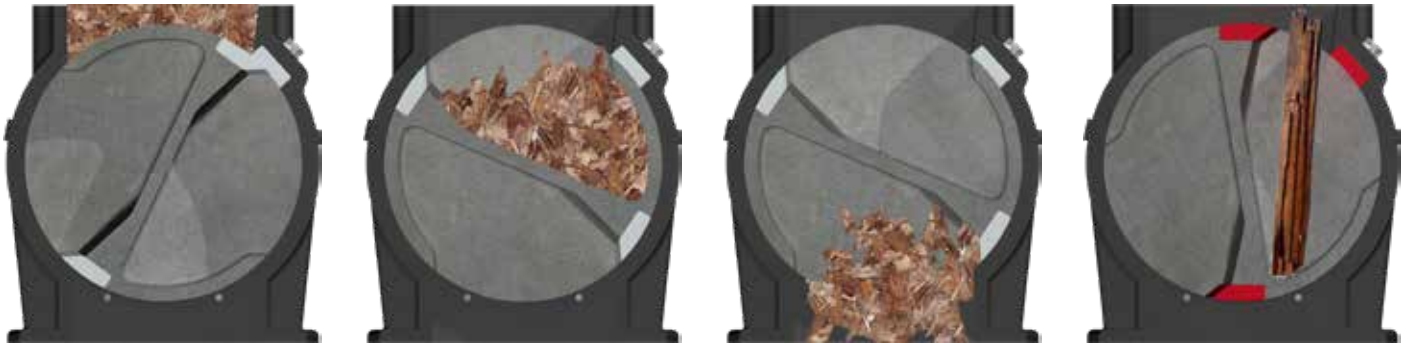


High volume twin-chamber rotary valve

- Continuous flow of material
- Maximum burn-back protection
- Suitable for P31S (previously G50) wood chips
- 200 mm rotor diameter

The twin-chamber rotary valve offers maximum operating safety. The rotary valve forms a reliable separation between the discharge system and the feed unit, providing optimal burn back protection. The advanced system design with two spacious chambers ensures that the fuel is transported continuously to the combustion zone. This optimal fuel metering ensures the best possible combustion values.

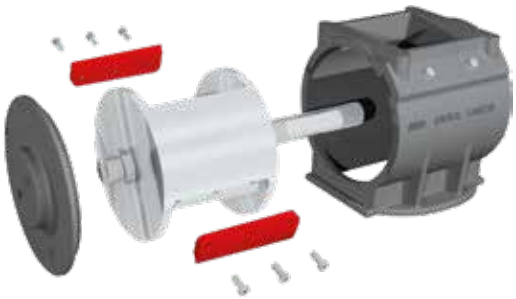
The rotary valve is extremely quiet and uses only minimal power.



The two large chambers (200 mm rotor diameter) are especially suitable for transporting wood chips up to P31S (previously G50). High resistance is recognised automatically. The rotary valve and screw move backwards (several times depending on the parameters set) until transport can be re-started.

Replaceable blades

The high-quality cutting edges of the blades can also easily cut through coarser pieces of wood chip. The blades both in the rotor and the housing can be simply removed and sharpened if necessary.

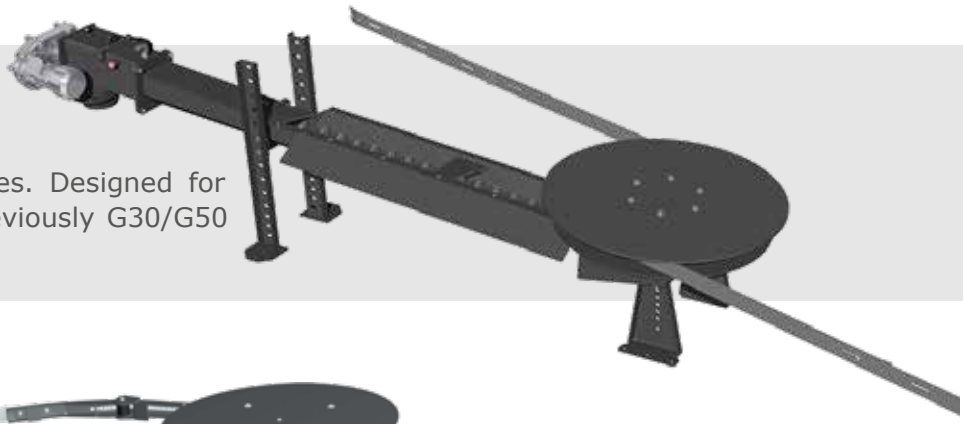


Rotary agitator discharge systems with combined drive

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.

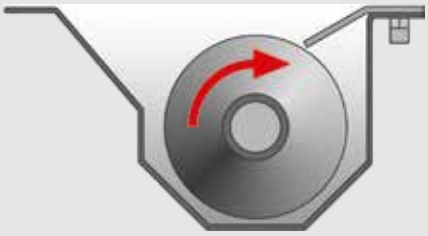
Spring blade agitator (FBR)

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



Articulated arm agitator GAR

Low maintenance feed system with robust design and a maximum diameter 5-6 metres.



Screw channel

The special trapezoidal shape of the trough ensures that fuel transport runs 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

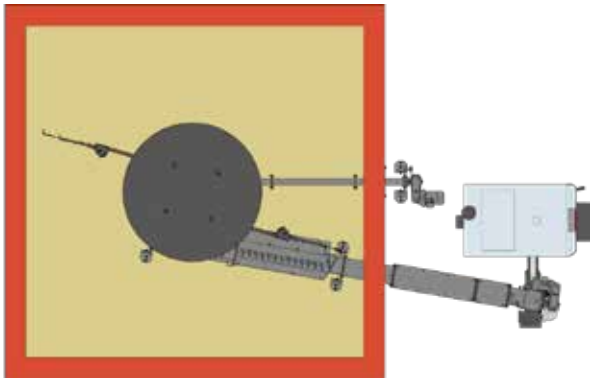
The powerful rotary agitator arms move towards the agitator head during filling and then swing back out when fuel is removed. Together with the sturdy tearing hooks that loosen the fuel, they ensure that the fuel store is emptied.

Rotary agitator discharge systems with separate drive

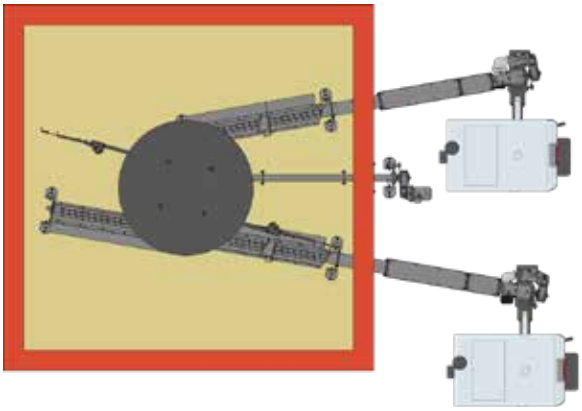
Froling's rotary agitator discharge systems with separate drive offer even greater flexibility. In the FBR-G and GAR-G the rotary agitator is powered independently of the discharge screw. This allows flexible installation and variable adjustment of the feed output. The discharge screws can be positioned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

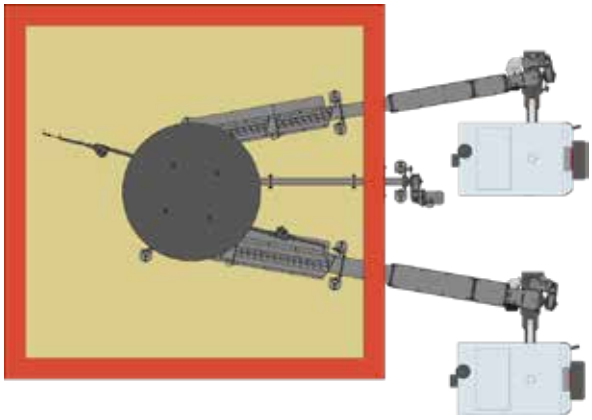
Sample installation options



One discharge screw on the left



Two discharge screws, one standard, one extra-long



Dual boiler system with two discharge screws

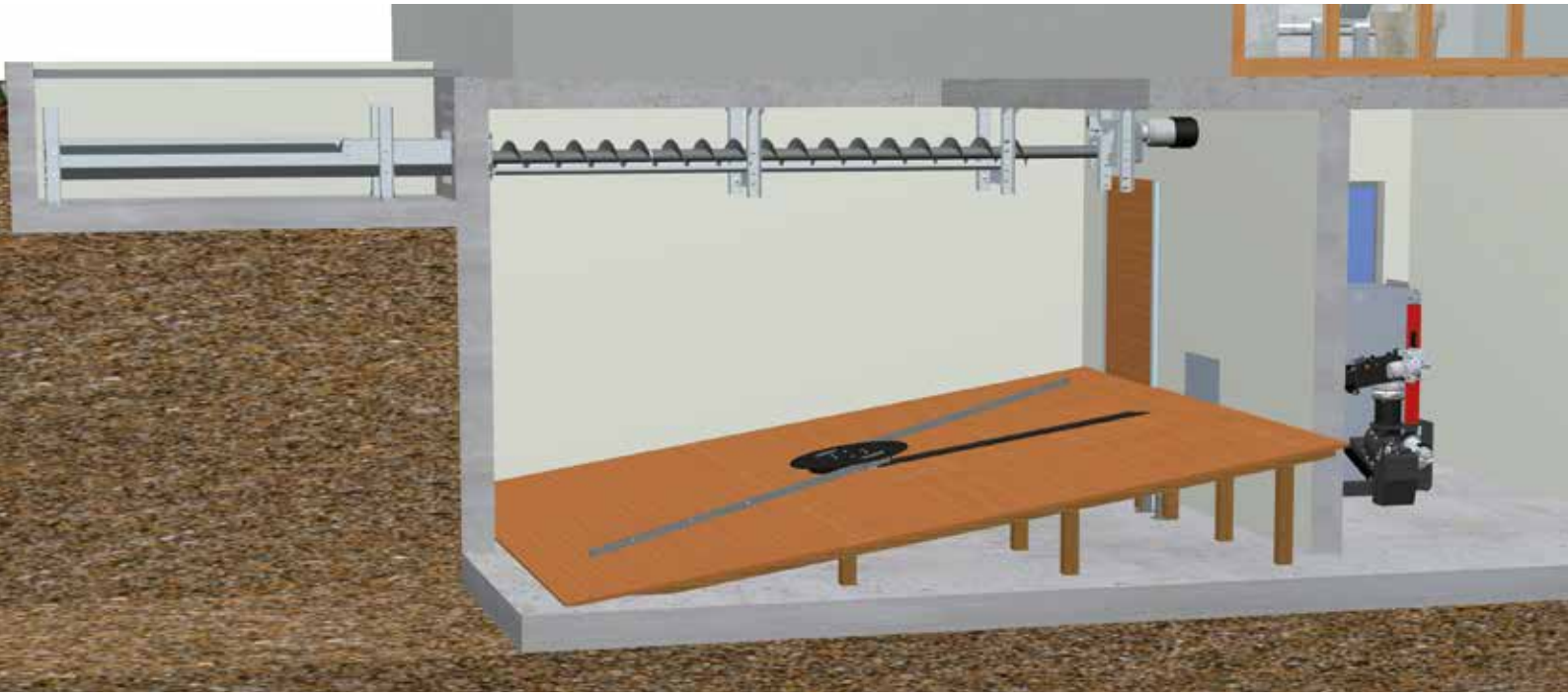
Vertical feed screw

Froling's vertical feed screw sets new standards for feed output (up to 40 m³/h depending on the wood chips used), operating safety and effective distribution. The wood chips are pushed from the tipping gutter into the vertical feed system with a screw, which transports the fuel to the desired height for the distribution device. In this way, the vertical feed screw enables dust-free filling of the store, guaranteeing even distribution of the fuel.

Also available with horizontal distributor screw

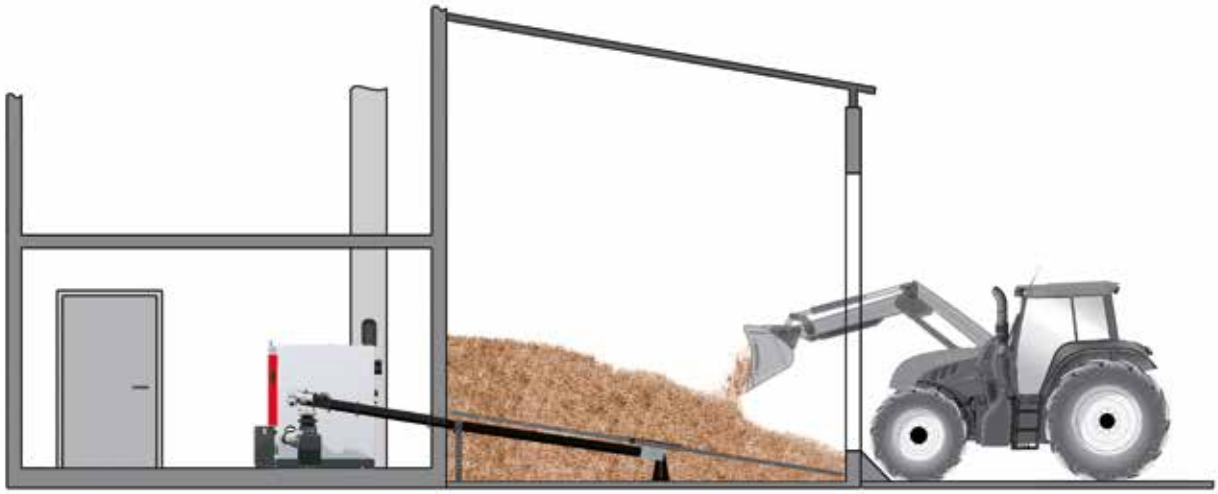
Bunker filling screw

The fuel is transported using the bunker filling screw into the store space via the tipping chute which is located outside the store. The bunker filling screw stops automatically when the bunker is full. The sloping sides shown in the fuel store are not required for the discharge to work properly.

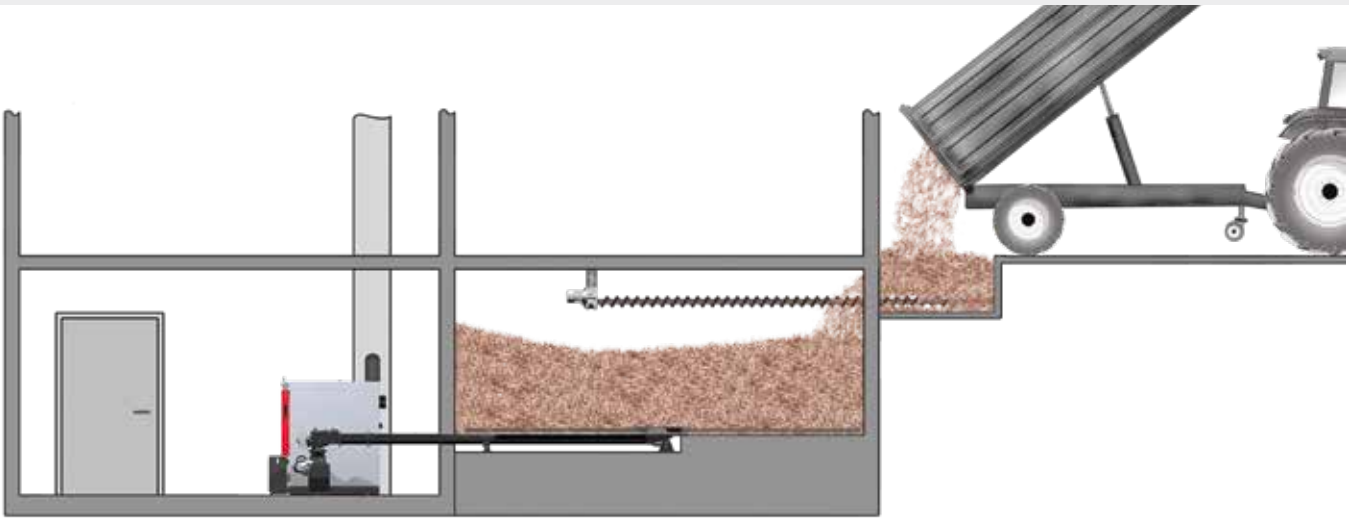


For more information see our "Store filling systems" brochure.

Positioning at ground level



Positioning with bunker filling screw



Positioning with vertical screw

Lambdatronic H 3200 control system

With the Lambdatronic H 3200 boiler controller and the new 7” touch display, Froling is taking a step into the future. Intelligent control management makes it possible to connect up to 18 heating circuits, up to 4 storage tanks and up to 8 hot water storage tanks. The control unit ensures that the operating statuses are clearly shown. The menu structure is ideally organised to allow easy operation. All essential functions can be selected by simply pressing icons on the large colour display.

Advantages:

- Exact combustion control with lambda probe lambda control
- Connection for up to 18 heating circuits, 8 water heaters and up to 4 storage tank management systems
- Integration of solar panel system possible
- LED frame for status display with illuminated presence detection
- Simple, intuitive operation
- Various smart home options (e.g. Loxone)
- Remote control from living room (room console RBG 3200 and RGB 3200 Touch) or via Internet (froeling-connect.com)

Simple and intuitive operation

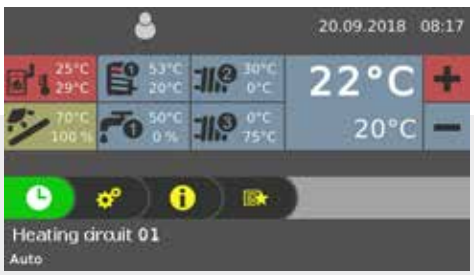


Fig. 1 General overview of heating circuit (start screen)

Fig. 2 View of the chimney sweeper function

Fig. 3 Overview of the new holiday mode

NEW:

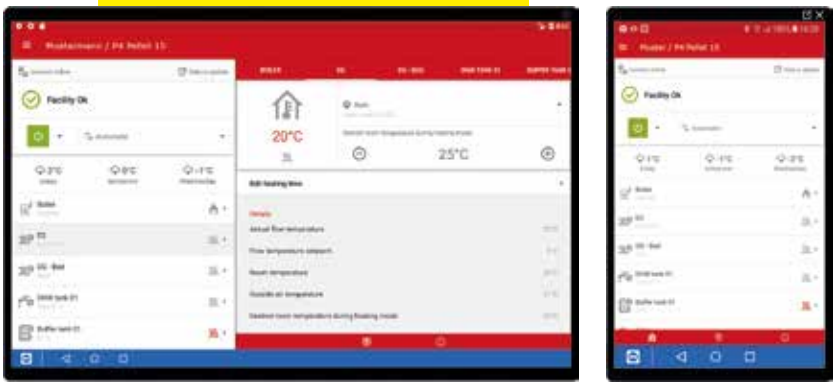
EVERYTHING AT A GLANCE WITH THE **NEW FROLING APP**

- ✓ Simple and intuitive operation of the boiler
- ✓ Status information can be called up and changed within seconds
- ✓ Individual naming of the heating circuits
- ✓ Status changes are transmitted directly to the user (e.g. via e-mail or push notifications)
- ✓ No additional hardware required (e.g. Internet gateway)

With the new Froling App, you can check and control your Froling boiler online from anywhere at any time. You can read and modify the main status information and settings easily and conveniently online. You can also specify which status messages you want to be informed about via SMS or e-mail (e.g. when the ash box is to be emptied or in the event of a fault message).

Froling boiler (software core module from version V50.04 B05.16) with boiler touch display (from version V60.01 B01.34), a (broadband) internet connection and a tablet/smartphone with IOS or Android operating system. Once the boiler has been connected to the internet and activated, the system can be accessed 24/7 from anywhere using a web-enabled device (mobile, tablet, PC, etc.). The app is available in the Android Play Store and IOS App Store.

With optimized tablet view!



SMART HOME

FLEXIBLE SOLUTION

Enjoy smart, convenient and piece-of-mind living with the Smart Home connection options from Froling.

Loxone: Combine your Froling heating system with the Loxone Miniserver and the new Froling Extension and implement individual boiler control on the basis of the single room control of the Loxone Smart Home.

Advantages: Easy operation and viewing of the heating circuit via the Loxone Miniserver, immediate notification of status changes and individual operating modes for each situation (presence, holiday, economy mode, etc.)

Mod bus: Via the Froling mod bus interface, the system can be integrated into a building management system.

Accessories for even greater ease of use

FRA room temperature sensor

By using the just 8x8 cm FRA room temperature sensor, the main modes of the corresponding heating circuit can be easily selected and adjusted. The FRA can be connected both with and without affecting the store. The adjusting wheel allows you to change the room temperature by up to ± 3°C.

RBG 3200 room console

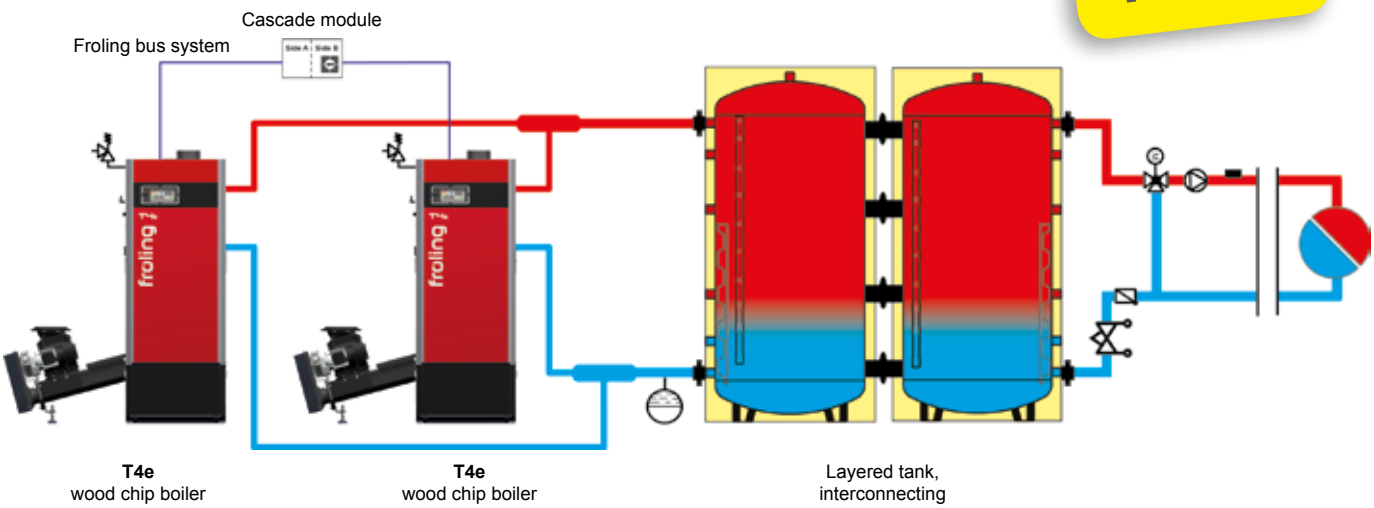
For even more convenience there's the **RBG 3200 room console** and the new **RBG 3200 Touch**. You can control the heating system easily from your living room. Important system data is clearly displayed and settings can be changed at the push of a button.

RBG 3200 Touch room console

The RBG 3200 Touch has an impressive touchpad interface. The menu structure means it is intuitive and easy to use. The 17x10 cm console with colour screen shows the most important functions at a glance and automatically adjusts the background lighting to the conditions. The room consoles are connected to the boiler controller using a bus cable.

Froling cascade controller

NEW:



T4e with layered tank, interconnecting

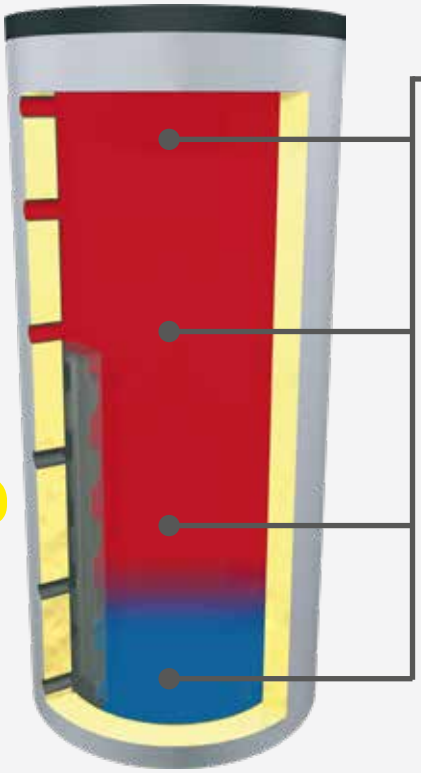
Heating requirements vary considerably, especially in large buildings such as hotels or public buildings. Froling offers the necessary flexibility with a cascade. This smart solution allows you to combine up to four T4e wood chip boilers. You can also see the benefits of a cascade during summer months. If the heat requirement is low, one boiler is often sufficient for hot water preparation. This provides a particularly efficient and economical heating solution. A further advantage is the increased reliability of operation, as the heat is provided by several boilers.

Multi-sensor storage tank management

Minimal start-stop cycles

High system efficiency

Optimised for cascade systems

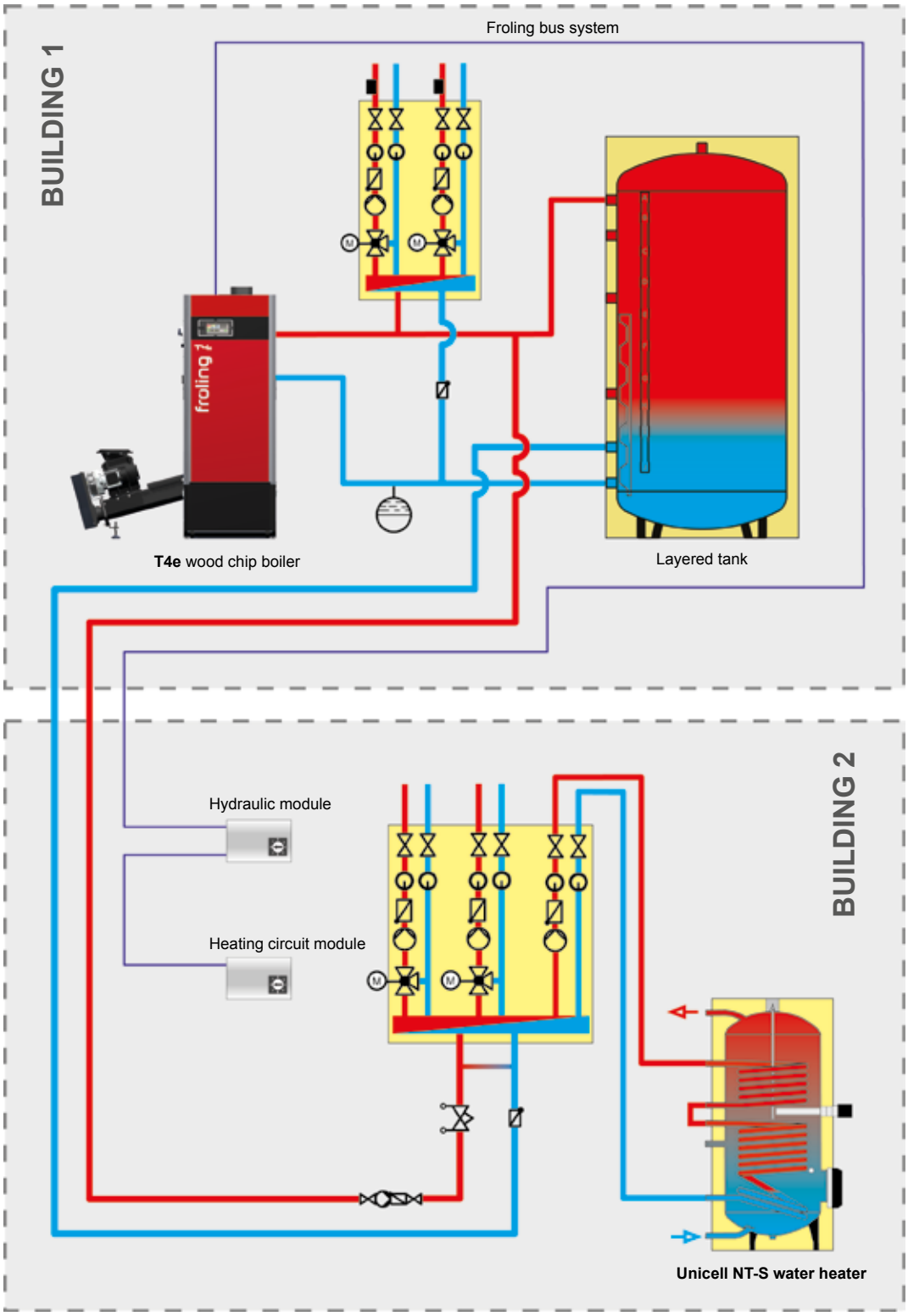


Precise storage tank level with four sensors

In addition to conventional storage tank management with two sensors, Froling also offers the option of multi-sensor storage tank management.
For this function four sensors are distributed along the entire height of the storage tank. The controller then uses these to determine the storage tank fill level.
The controller can thus quickly identify load changes and adjust the boiler output early on. Fewer start-stop cycles result in a long boiler life and maximise the system efficiency.

The **Froling bus system** makes it possible to install extension modules at any location. The local controls can be installed wherever they are needed: at the boiler, at the heat distributor, at the tank, in the living room or in the house next door. Additionally, electric cables are kept to a minimum.

T4e with multiple house system



Calculating the fuel requirement

The fuel requirement depends on the fuel quality. The following rule of thumb can be used to make a rough estimate:

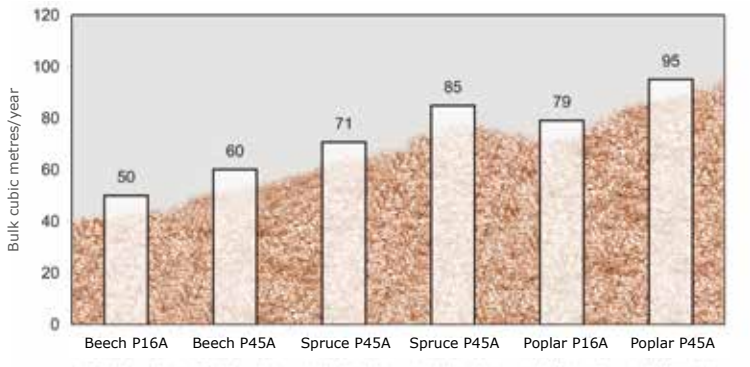
Wood chips:

Hard wood P16A/M30 (previously G30/W30): **2.0 bulk cubic metres per kW heating load**
Soft wood P16A/M30 (previously G30/W30): **2.5 bulk cubic metres per kW heating load**

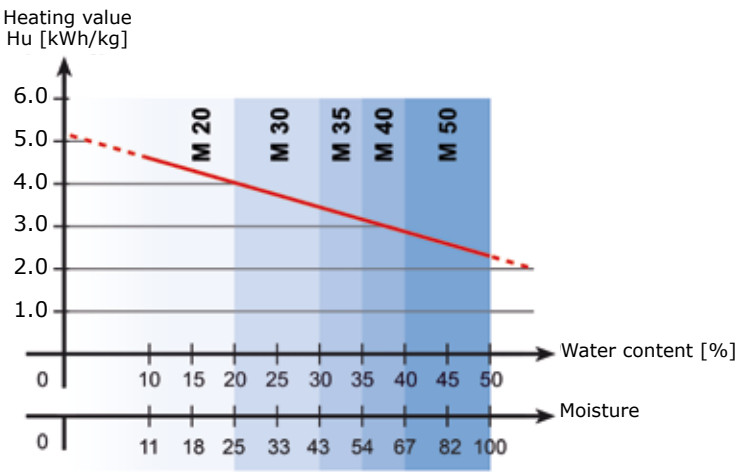
Pellets: **1 m³ per kW heating load**

Annual wood chip requirement in bulk cubic metres Source: Bayerische Forstverwaltung

E.g. annual consumption approx. 57,500 kWh
(T4 30 kW, 1,600 full load hours, 91 % efficiency, M30 wood chips previously W30)



Heating value depending on water content and moisture



Wood chip fuel specification

P16S woodchips (previously G30)

Size	3.15 – 16 mm (minimum 60%)
Max. Length	10 - 30 mm (20% up to 85 mm)
Max. Cross-section	2 cm²

P31S woodchips (previously G50)

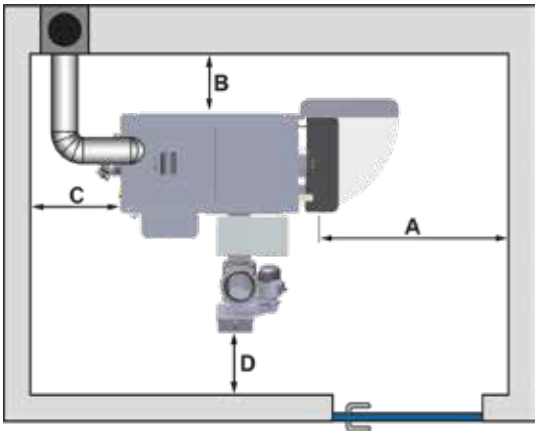
Size	3.15 – 31.5 mm (minimum 60%)
Max. Length	150 mm
Max. Cross-section	4 cm²

Water content	max. 35%
Bulk weight	approx. 210 - 250 kg/bulk cubic metre
Energy content	3.5 kWh/kg

Pellets fuel data

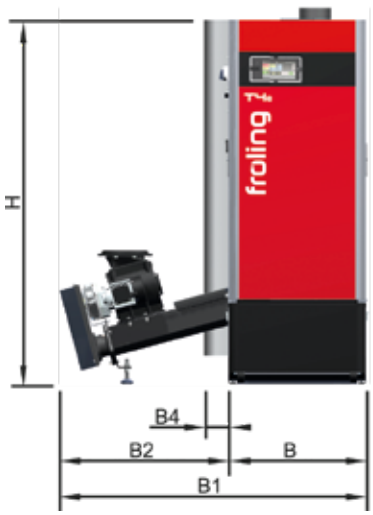
Length	5 - 30 mm (20% up to 45 mm)
Diameter	6 mm
Water content	max. 10%
Bulk weight	approx. 650 kg/m³
Ash content	max. 0.5%
Dust content	max. 2.3%
Energy content	4.9 kWh/kg

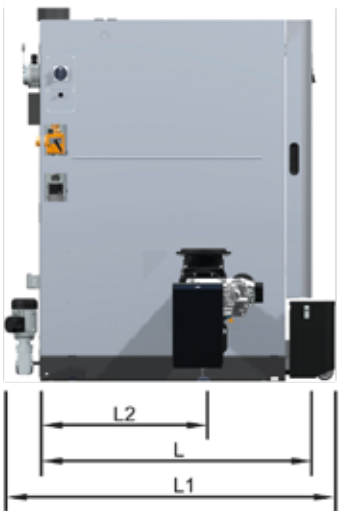
Recommended minimum distances

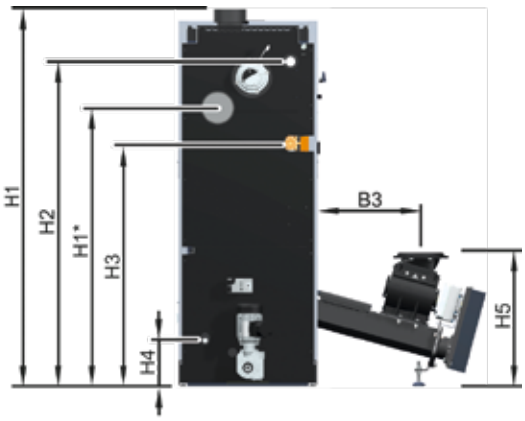


Minimum distances [mm]	45 / 50 / 60
A Minimum distance from insulated door to wall	700
B Minimum distance from side of boiler to wall	150
C Minimum distance back of boiler to wall	500
D Minimum distance between stoker and wall	300

Technical specifications - T4e		45	50	60
Nominal output	[kW]	45	49.9	60
Output range	[kW]	13.5 - 45	15 - 49.9	18 - 60
Electrical connection	[V/Hz/A]	400V / 50Hz / fused C16A		
Boiler weight (incl. stoker without water capacity)	[kg]	850		
Total boiler capacity (water)	[l]	155		
Maximum boiler temperature setting	[°C]	90		
Permitted operating pressure	[bar]	3		







Dimensions - T4e		45 / 50 / 60
L Boiler length	[mm]	1270
L1 Total length	[mm]	1550
L2 Length, back of boiler to stoker connection	[mm]	770
B Boiler width	[mm]	640
B1 Total width with stoker unit	[mm]	1410
B2 Width of stoker unit	[mm]	770
W3 Distance from boiler side to stoker connection	[mm]	470
B4 Width, electrostatic precipitator (optional)	[mm]	165
H Boiler height	[mm]	1690
H1 Total height incl. flue gas pipe nozzle	[mm]	1745
H1* Optional flue gas pipe connection	[mm]	1160
H2 Height, flow connection	[mm]	1505
H3 Height, return connection with integrated return feed boost	[mm]	1155
H4 Height, drainage connection	[mm]	210
H5 Height, rotary valve connection	[mm]	615
Flue pipe diameter	[mm]	149

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