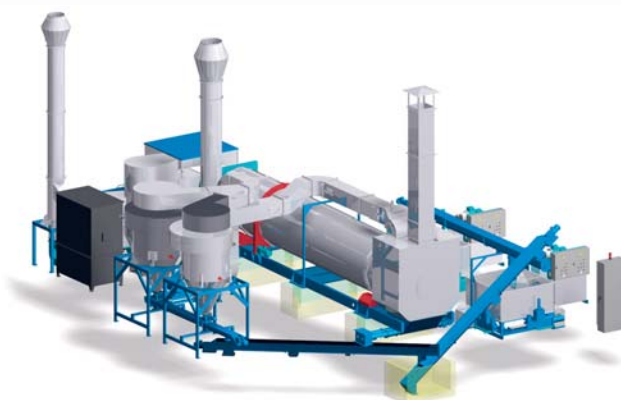


briklis

**Briquetting lines BRISUR
Sawdust drum driers BUS**

BRISUR BRIQUETTING LINES

The easiest way how to produce wooden briquettes is to use the dry wood waste from joinery. Sawdust and wood chips from timber or forest production; shredded wood from municipal sorted waste are other suitable materials for briquetting. These materials must be dried to the moisture 8 -15 % in modular BRISUR line. The BRISUR line composition is very flexible. The line can be adjusted according to the place and the type of materials that are being processed. The essential parts of the BRISUR line are a drying drum with boiler and air handling system. Other parts are added according to the specific requirements of the customer.



The feeding screw system is installed in the raw material storage place, mostly under a shed. The feeding screw brings the material from the pile of sawdust to the conveyer which supplies the sawdust screen in front of the drier hopper. The screw rotation centre is above the conveyer hopper. The screw movement in a semi-circle is controlled by sensors for detection of material level in the hoppers of the conveyer and drier. The operators refill the outlined area with material. When the storage area is empty, there is a possibility to return the screw into its original position or to manually revert the direction of its movement.

The vibration screen with circular holes is used for separation of the large pieces of bark or wood from the sawdust. The inclined screen in the steel frame is suspended on springs. The vibration motor moves the screen in such a way that the material is distributed in a thin layer on the screen. Large pieces that are unsuitable for drying go down into the container prepared for screened waste. The fine material falls through the screen directly into the drier hopper or onto another conveyer.

Belt conveyors are used for transporting the non-screened material. After the sawdust sorter the material is mostly transported by the screw conveyors. The advantage of the screw conveyors is a dust-free operation.

BUS sawdust drum drier is a set of equipment forming one functional complex – drier drum, drier hopper and discharger, boiler, cyclone separator, fan, interconnection pipeline and electrical switchboard with a drier control system.

■ **The drier drum** is a steel welded single-shell insulated cylinder. It is connected to the drier hopper and the hot flue gas inlet from the front side and from the back side it is closed with a material discharger fitted with discharging endless screws. The dimensions of the drum, diameter and length vary according to the different outputs. An advantage of the single-shell structure is great saving of electrical energy because the material is transported by the drier only by rotation of the inclined drum. The drier works continually. The dispensing of sawdust into the drier as well as the putting of fuel into the boiler is regulated by a control system. Dry sawdust is brought from the drier by means of a screw conveyor which performs the function of a turnstile for the dry material feeder of the briquetting press. The drier operates in a very economic energy consumption mode given by the design because the heat source is formed by the actual material being dried. The drier is heated directly with flue gases from the boiler designed for wood waste combustion.



■ **The boiler** combusts wood on a firm grating. The high efficiency and high quality of combustion is ensured by the dual-chamber structure of the boiler with a vaulted combustion chamber. The boiler brickwork is made of fireclay bricks. An optimum fuel is formed by chips smaller than 20 mm with the moisture up to 30 %. The boiler hopper can be replenished automatically with a screw conveyor from the drier hopper. Flue gas from the boiler is cooled by means of cold air to a temperature of 300 to 500 °C and is drawn into the drier by the vapour exhaust fan.

■ **The exhaust fan** is installed on the end of the air handling system. It transports vapour from the drier to the chimney. In the entire drier, including the boiler, there is a slight under pressure which prevents flue gas from escaping from technology areas to the operation area. The drying air transports (from the drier) fine wood dust which is separated in a two-level cyclone separator. The emissions of solid pollutants satisfy the conditions of the air protection standard requirements.

■ **The regulation** of moisture of the dried material is indirect; the output moisture of the material is not measured. It is regulated by dispensing the raw material into the drier so that the temperature of the vapour leaving the drier is would be on a constant value preset by the drier operators.

■ **The drier operators** perform supervision over the correct operation of individual devices, the setting of the required temperatures of the input and output temperature regulators, replenishment of materials to the raw material storage area, monitoring of the material level in the drier hoppers, boiler as well as the briquetting press. Some of the activities can be automated, e.g continual moisture measurement, but still it is necessary to ensure a permanent supervision. Another duty of the operators is to ensure good maintenance consisting in the cleaning of transport routes from the objects trapped, lubrication of the prescribed spots, cleaning of the boiler from ash and sand originating from the wood combusted.



Technical data of the flue gas drum drier BUS 200 to 1000

| DRIER | BUS 200 | BUS 400 | BUS 600 | BUS 800 | BUS 1000 |
|--|-----------------|-----------------|------------------|------------------|------------------|
| Total raw material consumption with a humidity of 45 % | 355 kg/hr | 715 kg/hr | 1,085 kg/hr | 1,480 kg/hr | 1,850 kg/hr |
| Fuel consumption | 35 kg/hr | 75 kg/hr | 125 kg/hr | 200 kg/hr | 250 kg/hr |
| Evaporated water quantity | 120 kg/hr | 240 kg/hr | 360 kg/hr | 480 kg/hr | 600 kg/hr |
| Quantity of output material with a 12 % moisture | 200 kg/hr | 400 kg/hr | 600 kg/hr | 800 kg/hr | 1,000 kg/hr |
| Electrical power input | 21 kW | 30 kW | 50 kW | 57 kW | 64 kW |
| Weight of the drum | 2,100 kg | 2,600 kg | 9,000 kg | 10,000 kg | 10,000 kg |
| BUS drier size | 7 x 1.7 x 2,3 m | 8 x 1.7 x 2.3 m | 10 x 2.1 x 2.6 m | 13 x 2.1 x 2.6 m | 13 x 2.1 x 2.6 m |
| Transport size | 24 x 2.4 m | 24 x 2.4 m | 36 x 2.4 m | 36 x 2.4 m | 36 x 2.4 m |

The number of BrikStar 200, 400 and BrikStar MAGNUM briquetting presses will be adjusted according to the required output of the line. The material is transported to the press hopper continually by a screw conveyor from the sawdust drier.

Briquettes come out from the briquetting press through a pipeline to the selected packing point, e.g. directly to PE bags in the rotary stand. The closing of the bags is done manually after the evaporation of residual moisture, it is not automated.

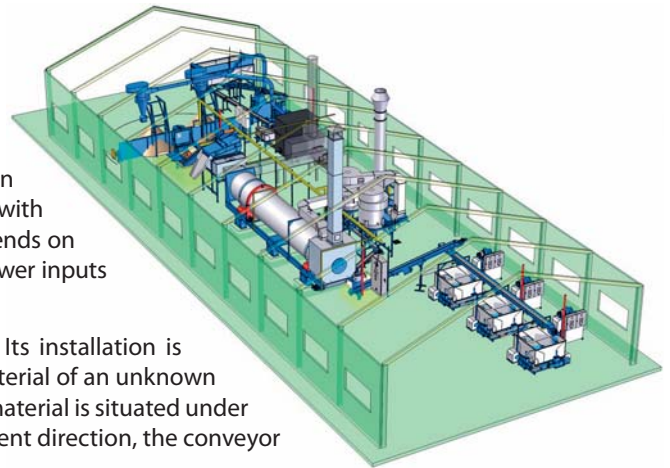
It is possible to combust briquettes in all types of stoves, boilers and incinerators for solid fuel combustion. Their high heating value of 15 - 18 MJ/kg can be used better in gasification boilers. It is possible to insert the line of the BrikStar briquetting presses with various types of die; a cylindrical shaped die with a diameter of 55 mm, rectangular die 55 x 55 x about 60 mm and the new BrikStar MAGNUM press with a die for rectangular briquettes with dimensions of 135 x 65 x about 90 mm.



Optional accessories

Crushers can be used for preparation of raw materials whose dimensions exceed the permitted size of 15 mm. Briquettes cannot be produced only of the sole crushed material without addition of sawdust. The sawdust share should be at least 50 %. Knife cutter is used for long pieces of wood, hammer crusher for straw or crusher with one slow-run rotor for lump waste. The crusher should always be equipped with a screen with a hole with a diameter smaller than 15 mm. The crusher power input depends on both the hourly output and on the material characteristics. The crusher power inputs oscillate from 15 kW to 50 kW.

The metal separator is a less usual part of the technological line. Its installation is recommended especially during the processing of the purchased raw material of an unknown origin. An induction indicator recording the presence of metal in the raw material is situated under the conveyor belt of the reversing belt conveyor. By changing the movement direction, the conveyor separates the contaminated material falling into the container prepared.



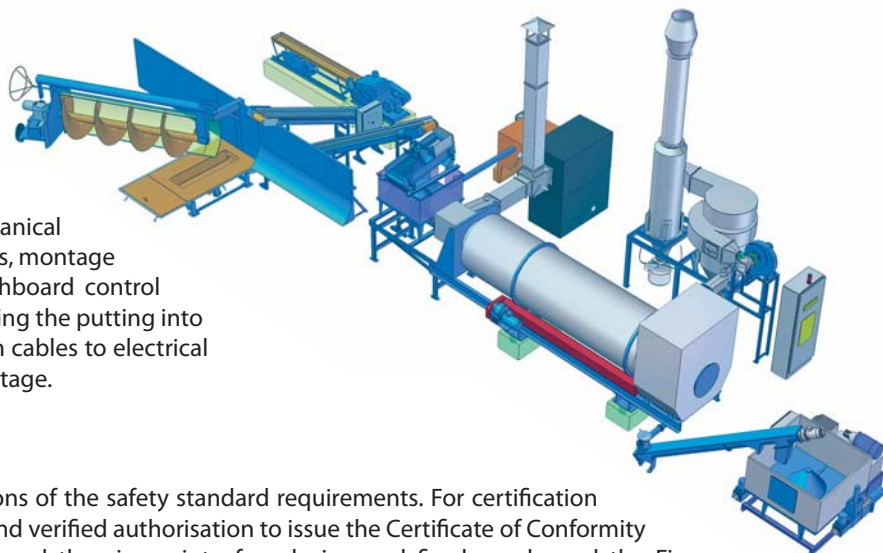
Technical data of the BRISUR 200 to 1000

| | BRISUR 200 | BRISUR 400 | BRISUR 600 | BRISUR 800 | BRISUR 1000 |
|--|------------|------------|------------|------------|-------------|
| Line output | 200 kg/hr | 400 kg/hr | 600 kg/hr | 800 kg/hr | 1,000 kg/hr |
| Electrical power input (without a crusher, with a press) | 37 kW | 62 kW | 113 kW | 120 kW | 159 kW |
| Protection | 80 A | 140 A | 220 A | 250 A | 300 A |
| Transport dimensions | 24 x 2.4 m | 24 x 2.4 m | 36 x 2.4 m | 36 x 2.4 m | 48 x 2.4 m |
| Built-up area | 14 x 8 m | 14 x 10 m | 14 x 14 m | 14 x 15 m | 16 x 17 m |
| Staff members required | 2 | 2 | 3 | 3 | 3 |

BRIKLIS Services

■ **Technological design** - It includes the layout distribution of technologies in the production facility, description and specification of individual devices and requirements for building treatments.

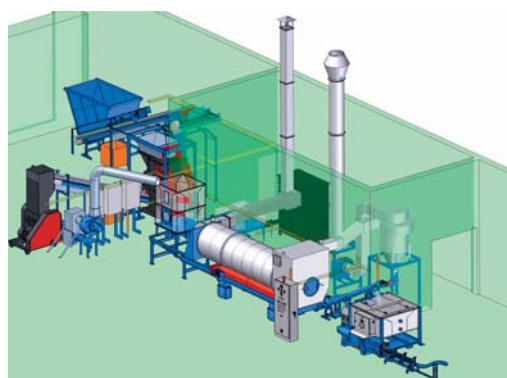
■ **Complete assembly** - It consists in the mechanical montage and interconnection of individual devices, montage of electrical distribution systems from the switchboard control panel, debugging of the entire technology, including the putting into trial run and training of operators. The connection cables to electrical switchboards are not a part of the delivery or montage.



Operation safety

■ The entire technological line satisfies the conditions of the safety standard requirements. For certification needs, the company has drawn up a Risk Report and verified authorisation to issue the Certificate of Conformity (CE). The Radvanice research institute has measured the viewpoint of explosion and fire hazards, and the Fire Protection State Administration has issued an approving opinion relating to the operation of this technology.

■ In order to ensure safe operation, it is necessary to follow exactly the instructions for the technological line operation with an emphasis on the work discipline of operators. It is forbidden to use the drier for drying materials with a different level of humidity. The high temperature of the drying air necessary for intensive drying of humid material can cause ignition of a part of the material which enters the drier in an almost dry condition. The drum of the drier and separators can be equipped with a pipeline with spraying jets serving for fire water inlet.



Advantages of BRISUR technology

- creating added value by evaluation the waste production
- simple installation, modular system
- the possibility of dismantling and moving the line to the material
- nonstop semiautomatic operation
- safety elements for pressing material of unknown origin
- the possibility to produce various shapes of briquettes
- certified equipment
- complex supply, quality processing, reliable service

Our long-term experience and the wide choice of outputs and additional equipment are a guarantee of the most suitable design of the equipment according to your requirements and wishes. Briquetting technologies bring great advantages not only for the environment but also for you. We provide material testing in our test-room in the factory in Malšice. We can visit you and suggest the best installation suitable for you free of charge.



**WE DO NOT ONLY PRODUCE MACHINES,
WE OFFER A SOLUTION AS WELL.**

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