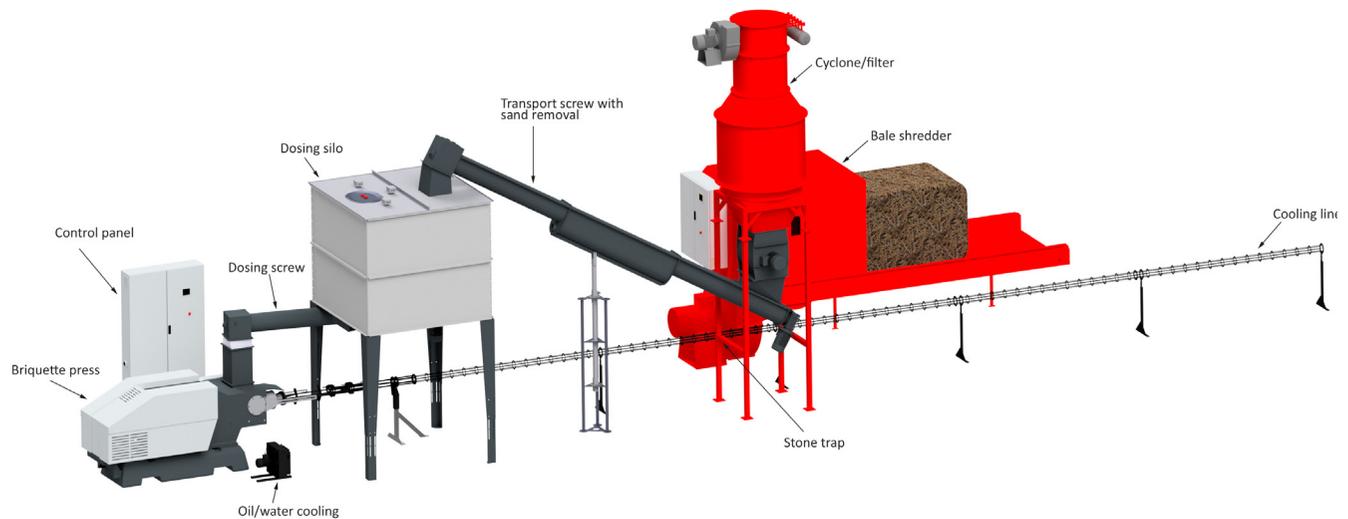




C.F. Nielsen A/S

Complete Straw Process Briquetting Solution 700-800 kg/h

Straw shredding Line including the BP5000 and silo



Large amounts of straw available

Worldwide very large quantities of cellulosic crop residues – like wheat straw, rape seed straw, etc. - are produced annually, however only a small part of these residues are used for energy and other purposes. Collection and briquetting of this surplus straw converts the product into a valuable resource for sustainable bioenergy production. To utilize this potential, C.F. Nielsen is introducing a complete briquetting concept for straw consisting of the following:

- A straw shredding and milling line
- A briquetting line with silo

Advantages and markets

There are many advantages to producing straw briquettes. The bulk density of loose straw is 60-70 kg/m³, straw in bales is 150 kg/m³ and briquetted straw is 4-500 kg/m³. Furthermore, the product is uniform and easy to transport and has a heat value that is approx. 17 MJ/kg, which is close to wood-based briquettes.

Straw briquettes can be used for numerous applications including the following:

- Heat and power - Industrial briquettes to be used in boilers generating heat and power
- Consumers - Consumer briquettes for use in private households
- Gasification – very dense briquettes can be used in gasification plants
- Bedding for animals – After briquetting the straw can absorb 5-7 times more water than before briquetting
- Biogas – using straw briquettes in

biogas can increase the biogas production

- Feed – briquettes can be used for feed for animals – additives can be mixed in

Briquetting equipment

The briquetting line consists of a BP5000 briquetting press with control panel, cooling lines and an 8-12 m³ dosing silo.



The C.F. Nielsen BP5000

The BP5000 is a strong press designed for 3-shift operation. The press is equipped with a Siemens PLC control system for automatic operation. The system has a log function which makes it possible to optimize production and correct failures. The control panel can be accessed remotely. The press is equipped with a 45kW main motor, weighs approx. 5.000 kg and measures L2850xW1350xH1350.

Straw Preparation

In order to produce straw briquettes, the moisture level has to be below 15%, for consumer logs and some other applications the moisture has to be as low as 10%. The right moisture is one of the most important requirements to produce straw briquettes. In order to make the straw ready it must be shredded and milled down to a particle size of 10-15 mm. For higher density briquettes the particle sizes has to be even smaller. In some cases, 1-3% of chalk is added to improve the strength of the briquettes as well of assisting in keeping the boiler clean.



Industrial straw briquettes



Consumer straw briquettes Ø60mm

C.F.Nielsen A/S - Solbjergvej 19 - DK-9574 Baelum - Tel.: +45 98 33 74 00 - sales@cfnielsen.com - www.cfnielsen.com

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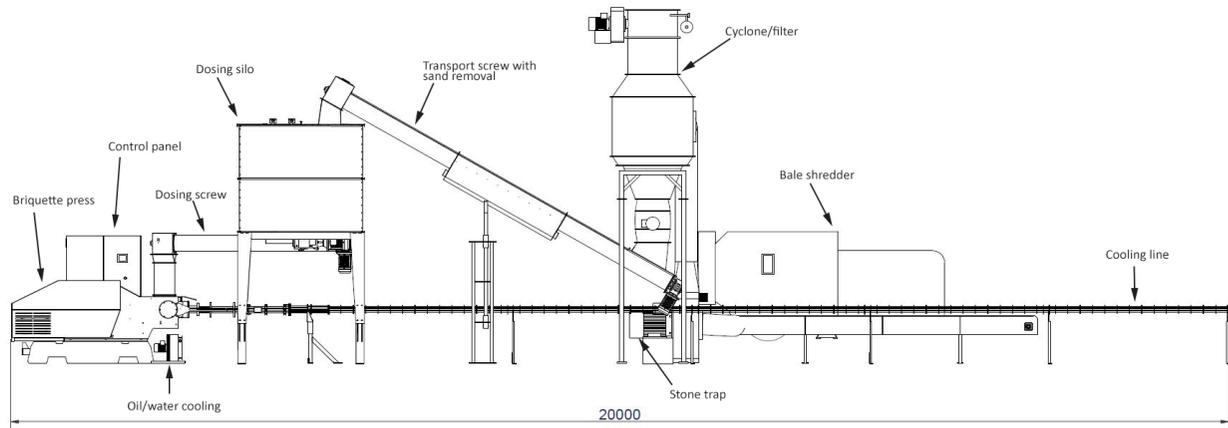
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Straw shredding Line, including the BP5000 and silo



Straw Shredding and Milling Line

Good straw preparation is important for getting the right briquette quality and due to this many elements have to be integrated in the Straw Shredding and Milling Line. The elements and their function are as follows:

- Straw conveyor – The bales are placed on the conveyor and fed into the shredder
- Shredder – The shredder opens the bale and shreds the straw down to approx. 100 mm
- Stone trap – The shredded straw passes through the stone trap and stones are removed. Any stones will be damaging to the hammer mill

- and briquetting press
- Hammer mill – The hammer mill down-sizes the straw to required particle size, typically 5-15 mm.
- Cyclone filter – The straw passes through the cyclone filter where air and dust are separated. The straw passes to the screw conveyor and the dust is also brought back into the process
- Sand removal – Sand is removed through a sieve at the bottom of the screw conveyor leading to the dosing silo.

OBS! Please observe that the shown Straw Briquetting line is for square bales only!!



Straw bales



Bales going into the bale shredder



Milled straw 10-15mm

Capacity briquetting machine	
Production per hour - ton	0,8
Hours per year	5.000
Total tonnage per year	4.000

Power consumption, spare parts, labor			
Equipment type	Kwh	Load	Khw
Straw Shredding Line	46	70,00%	32
Briquetting line	60	70,00%	42
Total	106		74
Power consumption per ton			
			92
Number of workers required per shift			2
Total number of workers for 5.000 hours production per year			7
Spare parts, cost per Ton - EUR			7



ООО «РМП БИОЭНЕРГИЯ»
П. Независимости 17, г. Буск
Львовская обл., Украина, 80500
Тел. +380 98 830 3388
info@rmpbio.ua
www.rmpbio.ua



ООО «РМП»
Ул. Ерсикас 14, Рига
Латвия, LV – 1003
Тел.: +371 67286442
rmp@rmp.lv
www.rmp.lv

C.F.Nielsen A/S - Solbjergvej 19 - DK-9574 Baelum - Tel.: +45 98 33 74 00 - sales@cfnielsen.com - www.cfnielsen.com



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