EFFICIENT BIOMASS PLANTS

NESS
The Process Heat Company

Creating process heat using biogenic solid fuels

TURN-KEY

MAINTENANCE GUARANTE

EFFICIENT

SERVICE

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BIOMASS BROCHURE

EXPERIENCE MORE BENEFITS FROM THE EXTRAORDINARY QUALITY, DESIGN AND CONSTRUCTION BY NESS

Our development and design inspires real-world application

10 MW (34.121 MMBtu / h)

Biomass plant
equiped wtih radiation and convection components as well as other thermal oil technologies exclusively from NESS.

USE OF BIOGENIC SOLID FUELS FOR PROCESS HEAT

Biomass plants use organic solid fuels such as sawdust, wood chips, timber or landscape management by products to produce hot flue gases. Biomass is an excellent alternative to generating heat using conventional fossil fuel products.

Depending on their quality, these solid biomass fuels can create high demands on a plant. The combustion process, the heating components and the legal and emission regulations must be considered.

Organic solid fuels

Biomass plants use organic solid fuels such as sawdust, wood chips, old timber, or material from landscape management.

Many biomass burning plants have been built since the end of the 90s as a measure to end dependence on fossil fuels. Many plants constructed early on have ongoing issues with the two and three-pass heaters.

Recurring ash is a major reason heaters require frequent cleaning - up to six times a year. This cleaning operation requires the plant to be shut down. The ash is also a solid material that in certain conditions (ex: high flow rate) can take on abrasive properties and over time, the tube coil can be damaged.

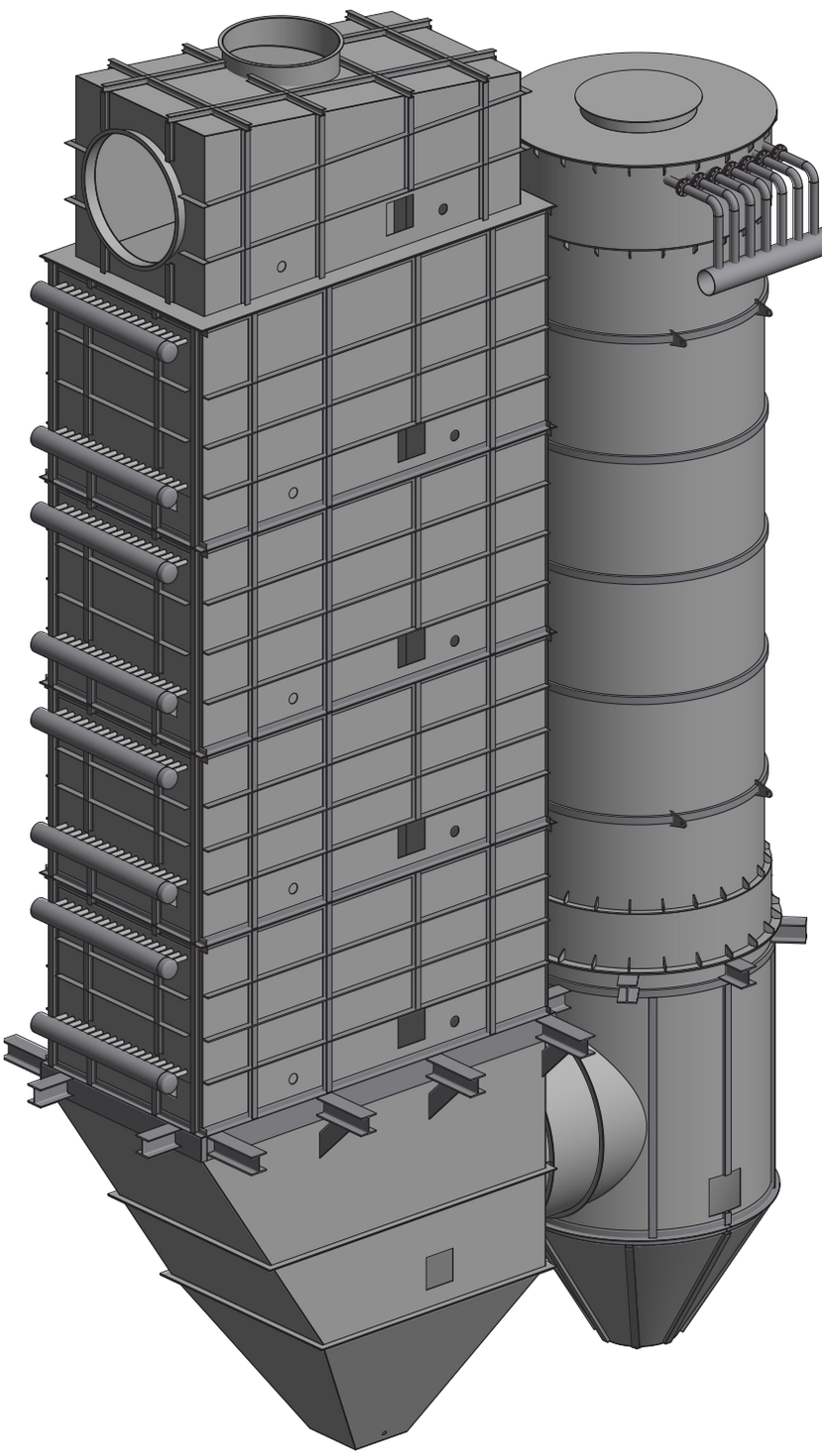
Over a period of time, the abrasion from ash causes a reduction in wall thickness of the tube coil and holes will eventually form. In the worst case, a fire will occur. At the minimum, extensive repairs will be required for proper and safe operation.

TURN-KEY SOLUTIONS

NESS is proud to offer a complete biomass burning plant using trusted partners. We can implement grate-fired, dust-fired or underfeed-fire options. We design our plants for simple cleaning and minimal abrasion. Our special design directly discharges ash and pollution created long-term, efficient and easy-to-maintain operations. We always focus on the thermal oil component of a plant by producing a complete thermal oil management system including expansion and collection vessel, pumping stations, heat exchangers, economizers, air-preheaters, emergency coolers, switch cabinets and more.

18.5 MW (63.124 MMBTU / H) ORC BIOMASS PLANT | GREECE

7 MW (23.884 MMBTU / H) WOOD DUST 3-PASS HEATER | RUSSIA



From planning to the finished plant

Our systems are built according to your needs. We take care of the installation, IO inspection and commissioning in coordination with our partners.

We, along with our trusted partners, provide biomass plants for a wide range of industries worldwide.
NESS contributes the highest quality components.

NESS COMPONENTS FOR BIOMASS PLANTS

TWO-STAGE HEATER: EFFICIENT ASH SEPARATION FOR THE LONG HAUL

Efficient separation of ash and particles is possible due to the separation of the heater in radiation. Longer periods between maintenance intervals are possible because much of the arising debris can be directly separated, thus requiring less cleaning.

NESS offers benefits of a balanced temperature profile and high performance refractory materials as a result of the quality heaters NESS is known for. The convection section is built for a long lifetime as **special protective shells** are installed to protect the heat exchangers from wear. Cleaning abilities are also enhanced in the radiation sections.

NESS Protective Shells for Hot Gas-Heat Exchange Pipes

Protective Shells for Hot Gas-Heat Exchange Pipes cover the pipes on particularly vulnerable places and protect them from excessive erosion.

NESS THREE-PASS HEATER – ALSO FOR BIOMASS

Three-pass heaters fired with biomass are certainly an option. NESS has optimized this three-pass design specifically for this purpose further minimizing abrasion and pollution. A three-pass heater makes sense for smaller plants with a performance range up to 4MW (13.648 MMBtu / h). This solution from an investment perspective is 10-15% cheaper than a separated radiation and convection configuration.

With a three-pass system, several areas must be considered. With the higher quality of biomass, less ash is produced and thus less cleaning and maintenance is required. This pays off for smaller plants. However, when using materials from landscape management or A3 timber category, it is nearly impossible to operate a plant efficiently with a three-pass system and thus we recommend our two-stage system.

NESS RADIATION SECTIONS (WEAS)

Efficient and long-term with special sealing materials

Compared to three-pass heaters, NESS radiation sections consist of only one tube coil. This is because the highest rates of flow occurs on the return section of the three-pass heaters and this is where the highest wear happens. This is often overlooked in older plants so NESS offers a solution integrated in to the convection section to provide the ultimate economic solution.

Like all NESS heaters, the NESS radiation sections (WEAS) are optimized for good heat transfer with low wear.

NESS CONVECTION SECTIONS (WEAK)

Optimized construction for long-term reliability

NESS convection sections in the second and third pass of a traditional three-pass heater are optimized for minimal wear and easy maintenance. The compromise between good heat transfer and low abrasion has been eliminated by the unique meander-shaped heater batteries that only allow flue gases to pass in one direction. This two-part concept is a reliable advantage for larger plants using grades of biomass with unpredictable quality.

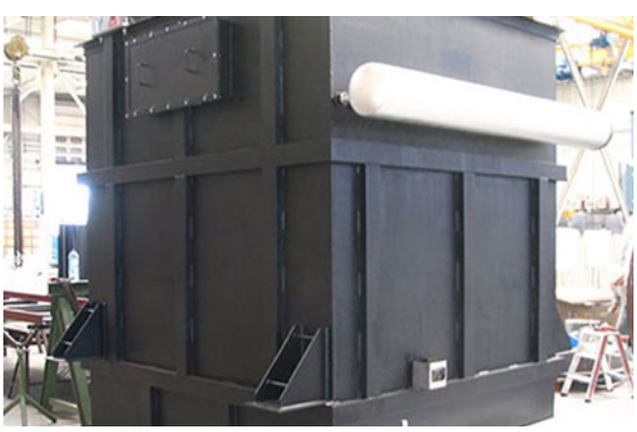
The NESS convection sections require little maintenance and can be cleaned easily.

NESS ECONOMIZER FOR ORC PLANTS

Electrical power generation by biomass

Designed specifically for ORC (Organic Rankine Cycle) plants, NESS offers the two-stage economizer with high-temperature (HT)-ECO and low-temperature (LT)-ECO respective sections of the turbine. The result is a highly efficient ORC process in the heating system.

The ORC process is optimized with the NESS economizer.



NESS HIGH-PERFORMANCE EMERGENCY COOLER

Plant safety in the event of a failure

The NESS high-performance emergency cooler is equipped with a large cooling surface that provides assured safety should there be a failure in the main plant. The cooler is equipped with an automatic fill level controller and is protected from corrosion. The cooler is integrated into the primary circuit of the thermal oil system and at low load, can be used as an optional process cooler.
NESS high-performance emergency cooler significantly increases the safety of your plant.

Product overview

OUR PRODUCTS

We offer highquality and sustainable systems and customized concepts to improve a variety of **processes in different industries**

NESS OPERATES WORLDWIDE

ALL NECESSARY CERTIFICATIONS

RELIABLE IN USE

INTELLIGENT SOLUTIONS

THERMAL OIL SYSTEMS

For heating at a high temperature level

The decision for a thermal oil plant is almost obvious for some processes, as thermal oil has many compelling properties. For example, the operation of the plant is possible up to a temperature of about 350 ° C / 662 ° F almost without any pressure and is extremely efficient.

ELECTRIC HEATERS

Electrical heaters as an alternative to fired heaters

The electric thermal oil heater (EWE) is a true alternative to fired heaters and, in addition to continuous operation, it is also suitable for bridging peak loads and during retrofits to the system.

HEAT RECOVERY

More efficient use of existing resources

A sustainable option for your plant is heat recovery through a combustion air preheater (Luvo). Thanks to the Luvo, the energy of the hot flue gases at the outlet of the heater can be used to save energy costs and resources.

MORE PRODUCT INFORMATION ON WWW.NESS.DE

HEATING AND COOLING SYSTEMS

Heating-cooling circuits for machines and devices

In particular, these processes are dependent on the precise control of temperature gradients, such as in printed circuit board production or composites production for the aerospace industry.

FIRED HEATERS

Fired heaters for gaseous and liquid fuels

By using a 3-pass system in our heaters, the thermal oil is heated up constantly, in order to avoid temperature peaks. An optimal coil design increases efficiency and plant safety.

STEAM SYSTEMS / HOT WATER SYSTEMS

With fired or indirectly heated heat generators

This type of heating system is characterized mainly by the economical heat transfer medium. Hot water works well if lower temperatures up to 180 ° C / 356° F are required. Steam is often used as a heating medium with direct product contact.

SECONDARY CIRCUITS

Independent control of your process temperature

With secondary circuits, the heating parameters (temperature and volume flow) can be optimally adapted to the requirements of the process. The temperature can be regulated very precisely and is therefore ideal for demanding processes.

SPECIAL INSTALLATIONS

Special installations from experts for experts

Customer requirements and wishes are often the reason to develop new concepts that are customized to specific applications. Some solutions are therefore completely reviewed by us and “refreshed” as needed.

NESSESSITIES

More safety, availability, durability and efficiency for your thermal oil system

NESSessities products increase permanent increase of safety, availability, durability and efficiency in thermal oil systems. Each of the NESSessities has been developed in close cooperation with our customers and is therefore practice-oriented.

WE LOOKING FORWARD TO HEARING FROM YOU

MORE BROCHURES
AND FACTSHEETS
AT WWW.NESS.DE

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