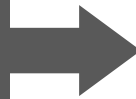




Heat Energy



TSI heat energy systems are based on two approaches. The first, produced in conjunction with Sigma Thermal, is a Reciprocating Grate furnace. These massive machines burn wet fuel, such as the bark from whole logs, producing the heat energy for integrated thermal oil systems, and direct fired dryers. The equipment is designed for continuous production with minimal downtime and maximal operational flexibility. Fly ash carry-over is also reduced by a large secondary combustion chamber that allows entrained particulate to drop out of the gas stream. The firing bed is an air-cooled reciprocating grate with under and over-fire forced draft air. It will also take recycled gasses from the dryer. Ash is automatically dumped into wet-ash conveyors for disposal. The four-zone grates help better control fuel bed depth and coverage to get maximum heat release. The grate is sized to achieve the desired heat output up to a maximum of 100 square meters per grate. A robust refractory lining ensures maximum thermal efficiency and longevity of service.

The second approach is based on fines and multi-fuel burners. These are a family of burners that use either wood fines, gas, or a combination of fuels in a cylindrical combustion chamber. In its basic format, a relatively coarse fraction of wood fines is introduced tangentially via injection ports. In more advanced iterations the fines are ground to a powder like consistency then introduced via cyclonic registers that spin the fuel which then burns in a cyclonic cloud. This burns cleaner and can also have staged combustion making it a low NOx option. The same type of burner can be used with natural gas, or in the case of Torrefaction, syngas.



Dryers



TSI rotary drum dryers are Single Pass Recycle dryers. Ideally suited for wood chips or strands they can also dry other types of biomass such as agricultural residuals. Standard drum designs come in anything from 3-meter diameter up to 7.3-meter with evaporation rates in the range of 50 to 60,000 kgs/hour. The dryer design has several important features that significantly impact performance. The drum itself is made from a reinforced structure where the emphasis is on strength rather than mass. There is also a unique flighting system within the drum which has a major impact on the way the system works. The result is a dryer that is more responsive to process swings, more energy efficient, and produces tighter tolerances product moisture content. The drum also has a bolt together modular design that will reduce installation time significantly when compared to more traditional designs. In addition, built-in air-gap insulation, balanced beam design principles, web reinforcement of the tires, and oversized trunnion wheels are all TSI innovations that have helped make our Single Pass Rotary drum dryers a model of safety, longevity, and efficiency.

The complete system includes ductwork, high efficiency material cyclones, I D (induced draft) fan, infeed and outfeed airlocks, control devices, and structural steel. There are also extensive safety devices including explosion relief panels, spark detection, isolation gates and deluge systems

