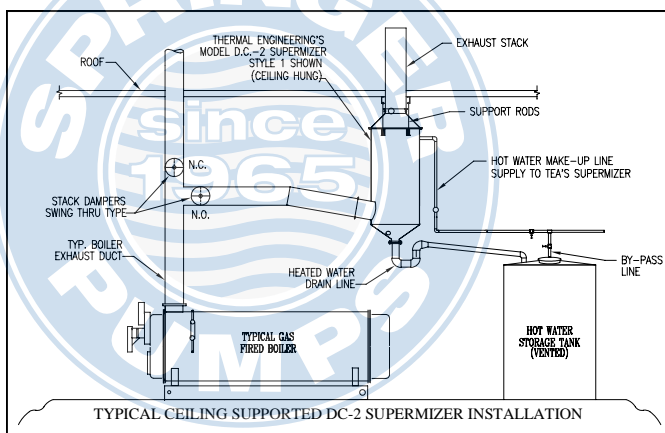


SUPERMIZER

DIRECT CONTACT STACK ECONOMIZER

*The biggest heat loss in a steam boiler
is what goes up the stack.*

Recovering this heat loss is what Thermal Engineering's Supermizer Direct Contact Stack Economizer does. When large volumes of hot boiler exhaust gases are discharged to the atmosphere, substantial quantities of valuable heat are needlessly lost. This heat can be easily re-captured and added to the incoming fresh water make-up as pre-heating. The hot exhaust boiler gases are directed by way of a damper on the boiler stack and enters into the lower heat transfer chamber and starts moving upward through the "packed mass" heat exchanger. When plant make-up water is needed, automatic controls start the regulated flow of water into the Supermizer. The incoming water enters the flow distributor where it is evenly spread out over the Packed Mass heat exchanger. It now starts to flow downward through the torturous path of the Packed Mass heat exchanger. The large surface area of the packing causes the water to spread out into a very thin film. The hot gases traveling upward through the packing readily releases its heat to the water film, rapidly raising the water temperature. Just as quickly, the hot gases cool. The efficiency of the heat transfer is dramatic – at full power and maximum water flow rates, the hot exhaust gases are normally cooled to within 10 to 20 degrees of the incoming water temperature before discharge to the exhaust stack. In a well-tuned boiler, this can amount to about a 20% energy recovery of the on-line boiler load.



TEA Stack Economizer gravity feeding a TEA DC-1 Direct Contact Water Heater. A TEA exclusive feature.



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How The SUPERMIZER Works

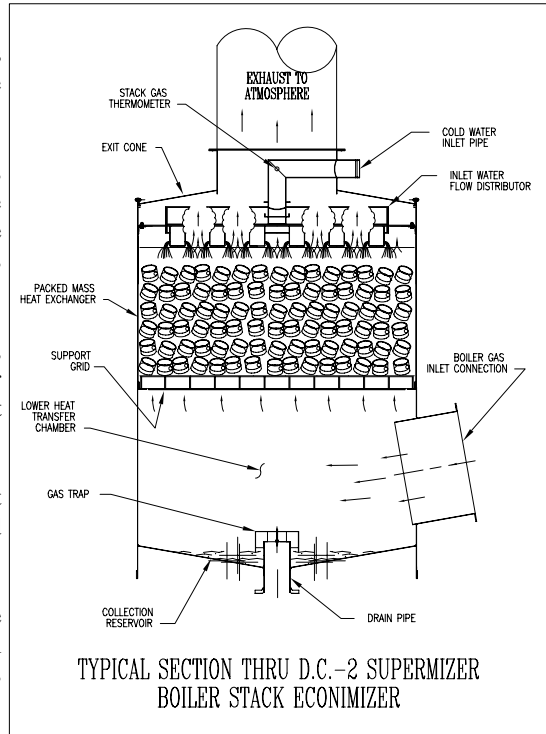
Thermal Engineering's SUPERMIZER Direct Contact Stack Economizer is a high temperature atmospheric type water heater. The unique packed mass heat exchanger has proven itself in hundreds of installations to be safe, efficient and requires a minimum of maintenance.

The heater itself is a vertical stainless steel vessel, which consists of the following:

- The exit cone, which discharges the cooled boiler gases to the exhaust stack and then to the atmosphere after releasing its heat to the water.
- An inlet water flow distributor, which spreads the incoming water evenly over the packed mass heat exchanger.
- The "Packed Mass" heat exchanger, where heat is scrubbed from the boiler exhaust gasses.
- A lower heat transfer zone, where the hot boiler gases make initial contact with the water droplets falling through.
- A bottom heated water collection and transfer reservoir.

other units, which have troublesome spray nozzles, the Supermizer has a flow distributor. This uses the leveling effect of water and dozens of flow orifices to insure equal distribution of water over the heat exchanger regardless of the incoming flow rate or pressure fluctuations.

The heated incoming water flowing downward through the Packed Mass heat exchanger keeps it cool and protects it from the high temperatures of the boiler exhaust gases. The water then falls through the lower heat transfer chamber where it picks up even more heat and then is collected in the reservoir. This heated water is then supplied to the water storage tank either by pump or gravity feed.



THE ENERGY BONUS

The normal combustion process of natural gas combines hydrogen and oxygen chemically to form water, which is instantly vaporized by the heat of combustion. This process absorbs about 12% of the total heat released by the fuel and it is normally lost to the atmosphere with the boiler exhaust gases. The Supermizer ends this loss. As the hot exhaust pass through the Packed Mass heat

exchanger, the gases cool so much that the water vapor in the combustion gases condense out releasing the heat it took to vaporize it initially.

TEA'S Supermizer is a very simple piece of machinery. Unlike

Thermal Engineering's DC-2 SUPERMIZERS can be installed either hanging from the ceiling, mounted on the roof or on the floor. The following describes each option:

Style 1 – Ceiling Hung. Support lugs are provided for customer's supplied rods to hang the unit from. Pre-heated water gravity flows to the water storage tank or Direct Contact Water Heater.

Style 2 – Roof Mounted. Identical shape to Style 1 except support legs are supplied for mounting. Pre-heated water gravity flows to water storage tank. Unit and services must be protected from freezing.

Style 3 – Floor Mounted. Water transfer pump is supplied. Pre-heated water is transferred from the internal reservoir to the hot water storage tank by a transfer pump.



Installation of a DC-2-500 SUPERMIZER servicing a 500 H.P. boiler.



Installation of a DC-2-300 SUPERMIZER servicing a 300 HP. Fulton Hot Oil Boiler. Note simple support frame eliminates structural roof support members



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