HEAT RECOVERY SILENCERS FOR GAS TURBINES
AND RECIPROCATING ENGINES

High Temperature Liquid Phase Heat Transfer and Silencing

**Size Range:** 5 lbs/sec to 45 lbs/sec exhaust flow
Units for larger flow are available on request
Temperature to approximately 1200 °F

**Construction:** The SOH heat recovery unit is a multi-pass counter-cross flow type exchanger. The exchange surface consists of a serpentine arrangement with radial segmented finned tubing. The tube bundle is designed so that the return bends and fabrication welds are shielded from the exhaust gas flow. Removable end covers allow access to all the internal pressure-containing welds. The exterior of the SOH is insulated with 2" of calcium silicate block and covered with a metal jacket.

SOH units are offered for both reciprocating engines and gas turbines. Units designed for larger gas turbines feature an internal bypass diverter similar to the proven design used on model GTW. The SOH with internal diverter reduces turbine exhaust noise by approximately 5 dBA, which in many cases will satisfy the noise criteria. SOH heat recovery units for use on reciprocating engines and smaller gas turbines feature an external bypass inverter tee. This arrangement allows for more flexibility in installation layout, as well as the use of a chamber-type silencer when installed on a reciprocating engine.

Steam at approximately 350 °F to 400 °F is the most versatile and widely used heat transfer medium. At 400 °F saturated steam has a pressure of 232 psig. Above this temperature, steam pressure rises rapidly with temperature increases, making steam increasingly unattractive. In contrast, the use of liquid phase heat transfer fluids becomes more attractive, due to the low pressure systems these fluids require. To meet the need for high temperature heat transfer applications, Maxim Silencers, Inc. has developed the model SOH heat recovery unit.

**Features**
- Maxim reputation for quality
- Maxim experience in engine exhaust heat recovery
- Return bends and pressure containing welds protected from gas flow
- Removable panels for access to return bends and pressure containing welds
- Available integral exhaust bypass diverter and acoustical lined bypass duct
- Counter-cross flow heat exchanger section
- 180° return pipe fittings – no shop fabricated pipe bends
- Heavy wall pipe instead of tubing
- Tube bundle stress relieved as a unit
- Special flanges for high temperature fluids
- Vertical or horizontal exhaust flow for easy installation
- Maxim silencing available

**Accessories:** Silencers can be supplied to meet the most demanding noise criteria, whether the SOH is installed on a reciprocating engine or gas turbine.

Maxim can furnish a properly designed control system complete with expansion tank and pumps.

**Applications:**
- Hospitals
- Schools
- Office buildings
- Shopping centers
- Offshore platforms
- Oil & Gas production facilities
- Industrial plants
- Marine

**Code Compliance:**
All Maxim heat recovery equipment is designed and fabricated in compliance with Section VIII, Division 1, ASME Code.
Exhaust Flow Diagram with Diverter Valve

Exhaust gas enters the unit through the exhaust inlet. The diverter door (shown in the recovery position) directs the exhaust through the finned tube section where heat is transferred to the liquid. The cooled exhaust gasses are discharged through the exhaust outlet connection.

If the door is in the bypass position (as shown with the dotted lines), the exhaust is directed through the bypass duct. The diverter door will modulate between bypass and recovery to maintain the desired liquid outlet temperature.

Liquid Flow Diagram

The heat transfer fluid normally flows counter to the direction of the exhaust gas for the most efficient use of heat transfer surface. Special fluid considerations may, however, necessitate using a parallel flow arrangement.
The heat recovery unit will be a counter-cross flow type exchanger. Primary components of the exchanger section will be an insulated casing or shell, a support structure and a tube bundle. The shell is to incorporate bolted covers to permit access to the return bends and associated weld joints. Each tube will be independently supported by a non-pressure containing structure. Unsupported tube length will not exceed 75 inches.

The tube bundle is to be designed, fabricated and tested in accordance with the ASME Pressure Vessel Code, Section VIII, Division I and stress relieved as a unit prior to the final hydrostatic testing. Tubes are externally finned with radial serrated fins continuously welded to the tube. Fin height will not exceed ¾” nor will fins be spaced closer than 5 per inch. No pressure containing weld or return bend may be located in the gas stream and headers will be external to the shell. Fluid velocity inside the tubes is not to exceed ten feet per second but will be sufficient to limit fluid film temperatures to an acceptable level at the point of highest heat flux. Return bends are 180° fittings having a minimum wall thickness at least equal to that of the fin tubes.

The heat recovery unit will be arranged for vertical/horizontal gas flow. Fluid outlet temperature is to be automatically controlled by a pneumatically actuated gas diverter valve. Diverter actuators must move the valve(s) to the full bypass position on loss of control signal or actuation air pressure. The diverter valve will be of the integral/external type. The gas side pressure drop in the (diverter valve and) heat recovery unit is not to exceed the engine manufacturer’s recommendation and requirements of the installation.