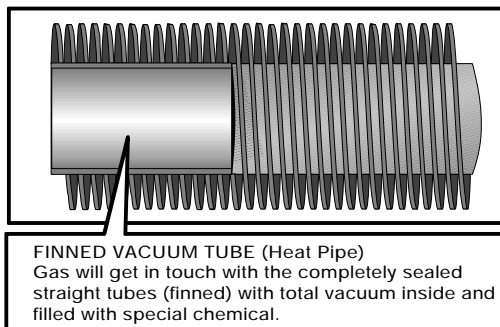


THERMAL VACUUM TUBE BOILER (Heat Pipe) WASTE HEAT RECOVERY BOILER

Kamada
OLE

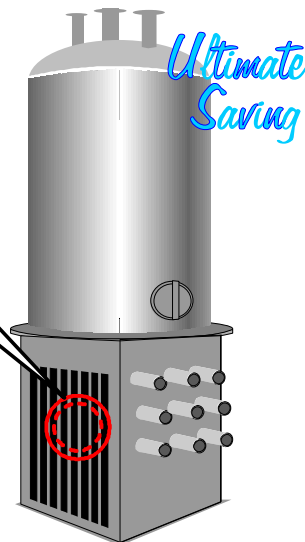
*Generate steam out of waste flue gas
from Steam Boiler and/or Diesel Generator*

Liquid evaporates much lower temperature under vacuum condition than under atmospheric pressure. This is the basic principle of vacuum tube heat exchanger used for low temperature waste gas of about 300 oC to extract highest possible energy out of exhaust gas of Steam Boiler and/or Diesel Generator.

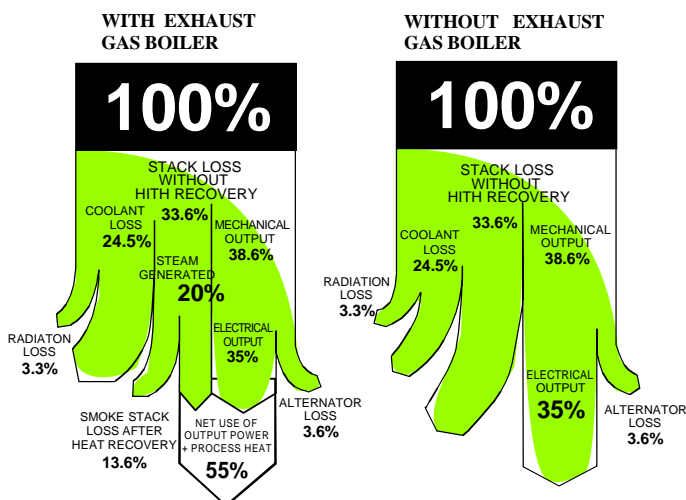


Principle of Heat Pipe Heat Transfer:

- *Low evaporation temperature inside Vacuum tube
- *Heat transfer by "Latent Heat" of the liquid inside the vacuum tube.



Loss from the exhaust manifold of diesel engine is 33.6% of the total heat input. Setting aside the chimney loss of 13.6%, 20% can be recovered by heat pipe waste recovery boiler.



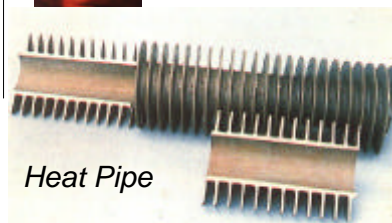
Heat Pipe Technology: Heat Pipe technology was developed by NASA of USA for space industry. It's excellent heat transfer efficiency has been utilized in many parts of space shuttle body. When used for heat recovery from relatively low temperature waste gas of 200-400 oC, heat pipe gives unbeatable excellency over any other conventional method. 1/3rd of Vacuum heat pipe is filled with water and lower portion is exposed to the waste gas.



Water inside the tube start evaporating at as low as 60 oC and it transfer the heat by latent heat of the evaporation to the higher portion of tube emerged into the boiler water. It maintains always slightly higher pressure than the pressure of the boiler, thus transfer of latent heat will be constant. Application of Heat Pipe is very wide. It can also be used to recover the waste heat of the room airconditioning unit when heat pipe unit is connected to the frion gas circulation kit to heat up the water for home use.

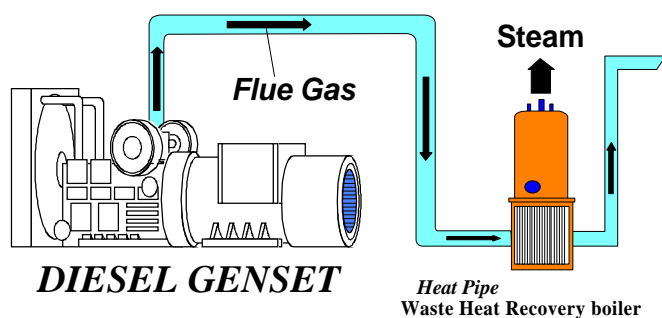
Gas Temp.

- Low 20 - 100 oC
- Med-Low 100 - 250 oC
- Med-High 250 - 400 oC
- High 500 - 1000 oC



We also supply Vacuum Tube only. Please specify the purpose and size /material of tube.

GENERATOR SET + THERMAL VACUUM TUBE BOILER



Material of pipe	Carbon steel, Stainless steel
OD of base pipe (mm)	OD ϕ 25 - 219 mm
Length of Fin pipe(m)	0.5 - 1.4 Meter
Materia of Fin	Carbon steel, Stainless steel
Height of Fin(mm)	13, 15, 18, 20, 25, 30 mm
Thickness of Fin(mm)	1, 1.3, 1.6, 2, 3 mm
Density of Fin(mm)	5 - 20 mm