HOW GEM TRAPS WORK

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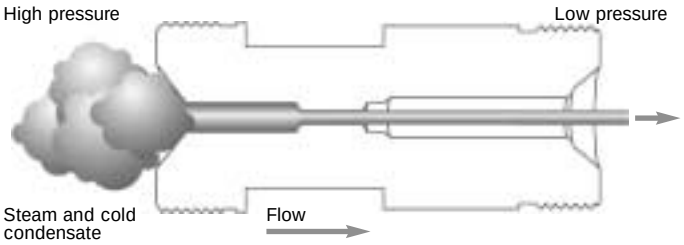
Steam traps have to work under a full range of variable load conditions*

START UP

Unlike mechanical traps with valves and mechanisms, GEM Traps have nothing to impede air venting through at start up. Thus, air vents through the orifice at high velocity, during start up. So GEM do not require separate air venting mechanisms.

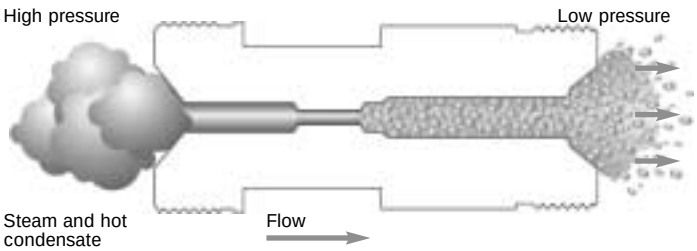
Cold condensate builds up and jets straight through the discharge throat at two to three times the rate of running load.



RUNNING LOAD

Steam held back and condensate continuously forms and drained away. Condensate is channelled into the orifice and preferentially discharged. The steam is squeezed out and held back by the slow moving condensate.

Hot condensate flows through the orifice moving from high to low pressure conditions. This causes a proportion of the condensate to re-evaporate as 'flash' steam within the discharge throat. This flash steam causes a turbulent flow and has two effects. It cleans the throat of the trap and it increases resistance to flow through the orifice. Added to this, the rapidly expanding mixture of condensate and flash steam accelerates down the throat. Just like in a jet engine, and according to Newton's Law 'for every action there is an equal and opposite reaction' this expansion puts a back pressure locally on the orifice.

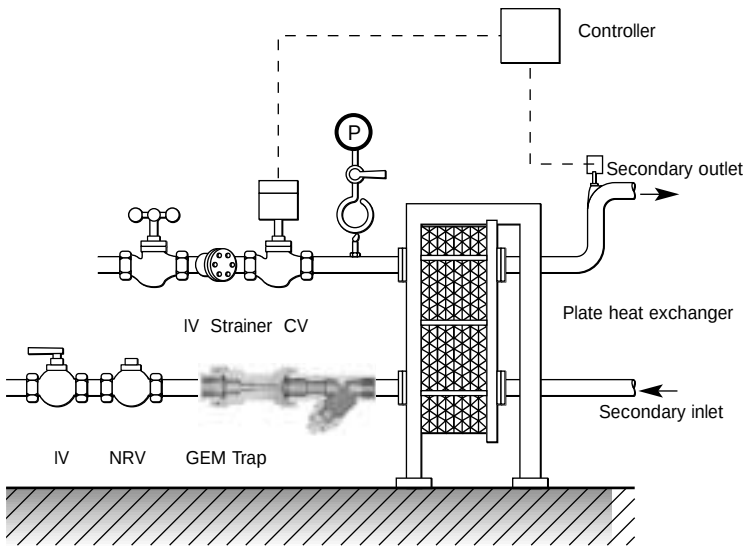


VARIABLE LOADS

a) With control valves
As the heat demand drops, the control valve progressively closes. This drops the pressure and temperature within the heat exchanger, reducing heat output and condensate load. Simultaneously the pressure differential across the GEM trap drops, reducing its discharge capacity when less condensate is produced. So the GEM's capacity is self regulating from 100% down to zero load conditions.

b) Without control valves
As less condensate is produced the point of flashing within the discharge throat moves nearer the orificel creating more local back pressure and reducing capacity. So the GEM's capacity is self regulating, like expansion coils in air conditioning systems. Similarly, if the system is 'On', then condensate is continuously being produced and will continuously hold back steam.

CONTROLLED VARYING LOADS – SELF REGULATING



Notes: Isolating valves (IV's) on either side of GEM Traps are recommended for ease of maintenance and non return valves (NRV's) should be fitted where the application is switched on and off or has a control valve, otherwise condensate may flow back and flood the application when the steam is off

*See "Background on steam traps old and new" brochure insert

See "University Research" brochure insert.