

O-15	Keywords	Y2	device	Z3	natural gas	S3/4	ZEB/BEMS/FEMS
						E25	general-purpose machinery

KAWASAKI HEAVY INDUSTRIES, LTD.

Triple Effect Absorption Chiller-heater

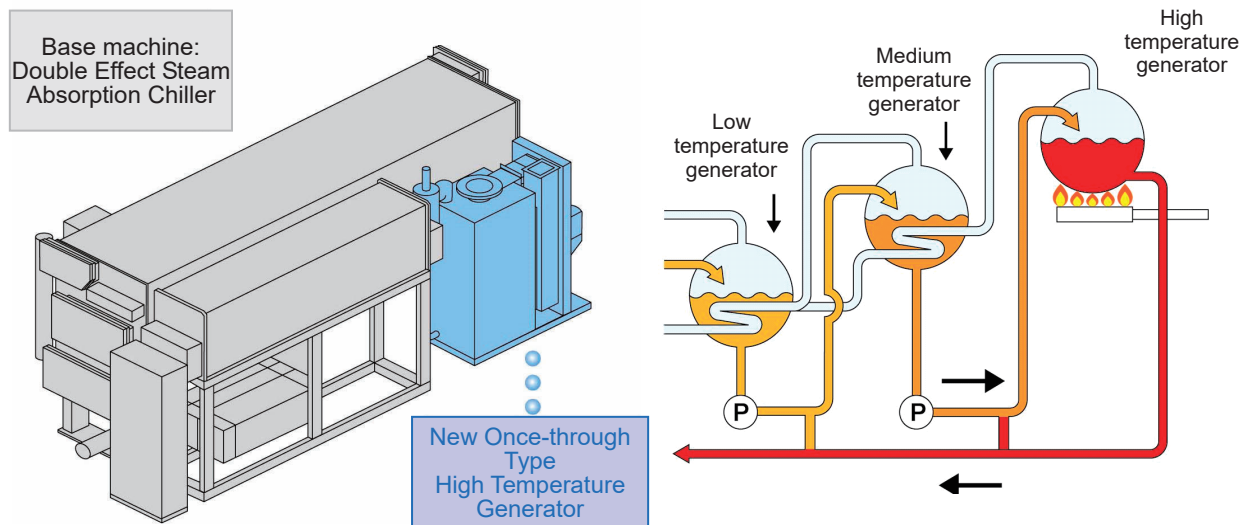
Features Heat Source Equipment for Air Conditioning

- Freon Free:
Absorption chiller-heaters contain “water” as refrigerant and Freon gas which has high global warming potential is not used.
- Low Electricity Consumption:
Absorption chiller-heaters provide chilled water by means of natural gas combustion, which contributes to significant reduction of electricity consumption.
- The world’s First Triple Effect Absorption Chiller-heater:
In 1968, we commercialized the world’s first double effect direct fired absorption chiller-heaters.
In 2005, we commercialized the world’s first triple effect direct fired absorption chiller-heaters.
Natural gas consumption is further reduced by upgrading from double effect type to triple effect type.
- The highest COP in the world
1.6 (Higher Heating Value basis)
1.7 (Lower Heating Value basis)
- Application for gas engine co-generation system is also available.



Basic Concept or Summary

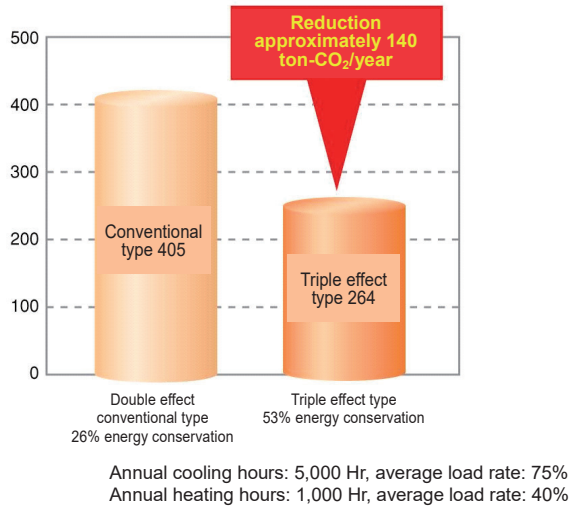
Construction of the triple effect absorption chiller-heater (Image)



- The triple effect absorption chiller-heaters have three generators and lithium bromide solution is generated in three steps.
- The triple effect absorption chiller-heaters have been developed by combination of a double effect steam fired absorption chiller as a base machine and a once-through boiler as a new high temperature generator.

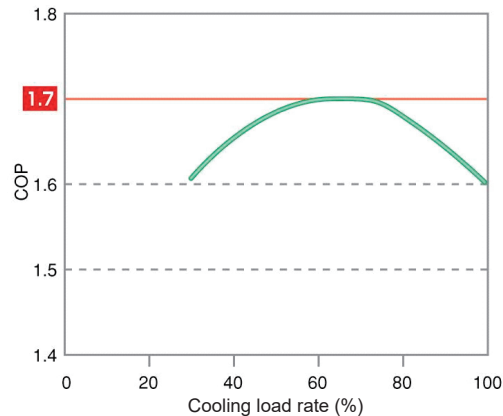
Grand Reduction in CO₂ Emission

For example, in the case of cooling capacity 651 kW (185 RT), annual CO₂ emission can be reduced by approximately **140 tons** compared with conventional types.



Maximum Efficiency COP1.7

Being equipped with the new solution circulation inverter control (the patent is being applied for) as a standard function, the maximum efficiency **COP1.7** is achieved in the partial load area where the system is most frequently used.



- The energy consumption is lower by 38% compared with double effect type (COP = 1.0) which is commonly operated now.
- The COP in the partial load area can be improved by the optimum inverter control for solution pumps.
- Total motor output is only "6.5 kW in the case of 185 RT".
- Awards received

February 2006: The Japan Institute of Energy Progress Prize (Technology Division)
June 2006: The 8th Electric Load Leveling Equipment, System Award
The Heat Pump & Thermal Storage Technology Center of Japan, Chairman Prize
January 2007: The 17th Energy Conservation Grand Prize
The Energy Conservation Center, Japan, Chairman Prize
June 2008: The Japan Gas Association Technology Prize of FY2008



**FY2008
Energy Conservation
Grand Prize**

The Energy Conservation Center,
Japan, Chairman Prize

Hosted by Ministry of Economy, Trade and
Industry

Installation in Practice or Schedule

Domestic Delivered mainly to factories, hospitals, general buildings, etc.

Overseas Based on the deliveries in Japan, overseas sales activity is under way.

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