

Global Network

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 ● Group Company / production base
 ● Group Company and local sales office
 ● Technology transferee

for CO₂ Capture / Recovery Process

Plate Heat Exchanger



Mangroves capture more carbon than other trees.

HISAKA WORKS, LTD. Heat Exchanger Division

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HISAKA WORKS, LTD., Heat Exchanger Division acquires both ISO9001 and ISO14001 certification.

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Agent

Amine Heat Exchangers for Gas Treatment Application.

The reduction of CO₂ emissions to prevent global warming is a common issue for the whole world.

Hisaka Works, Ltd. has developed Plate Heat Exchanger SX-80 series for the CO₂ Capture / Recovery Process.

The SX-80 series is our new lineup that is specialized for the energy saving from amine service of CO₂ Capture / Recovery Process.



Rich/Lean Amine Heat Exchanger



Rich/Lean Amine Heat Exchanger



Lean Amine Cooler



MDEA Heat Exchanger



Rich/Lean Amine Heat Exchanger



Plate Heat Exchanger for CO₂ Capture / Recovery Process

SX-80 series dramatically improves operation efficiency through its innovative plate design and gasket improvements of more stability to amine solutions.

Hisaka Works, Ltd. has supplied a number of Plate Heat Exchangers at gas refinery plants where amine solutions are used.

Our SX-80 series contributes to realization of running cost reduction and stable operation of the plants, through the adoption of further high-performance heat transfer chevron patterns to suit its heat recovery operation conditions as well as the new development of more stable gaskets to amine solutions.

Rich/Lean Amine Heat Exchanger

Higher heat recovery contributes to much lower energy consumption. More than 85% heat recovery by SX-80. Amine solution (generally called Rich Amine) where CO₂ is absorbed at Absorption Tower needs to be heated in order to release CO₂ at Regeneration Tower. Plate Heat Exchangers are normally used for heat recovery, to then reduce the volume of steam for the Regeneration Tower by use of heat of Amine solution (generally called Lean Amine) that CO₂ has been released.

Heat Recovery of SX-80 reaches more than 85%

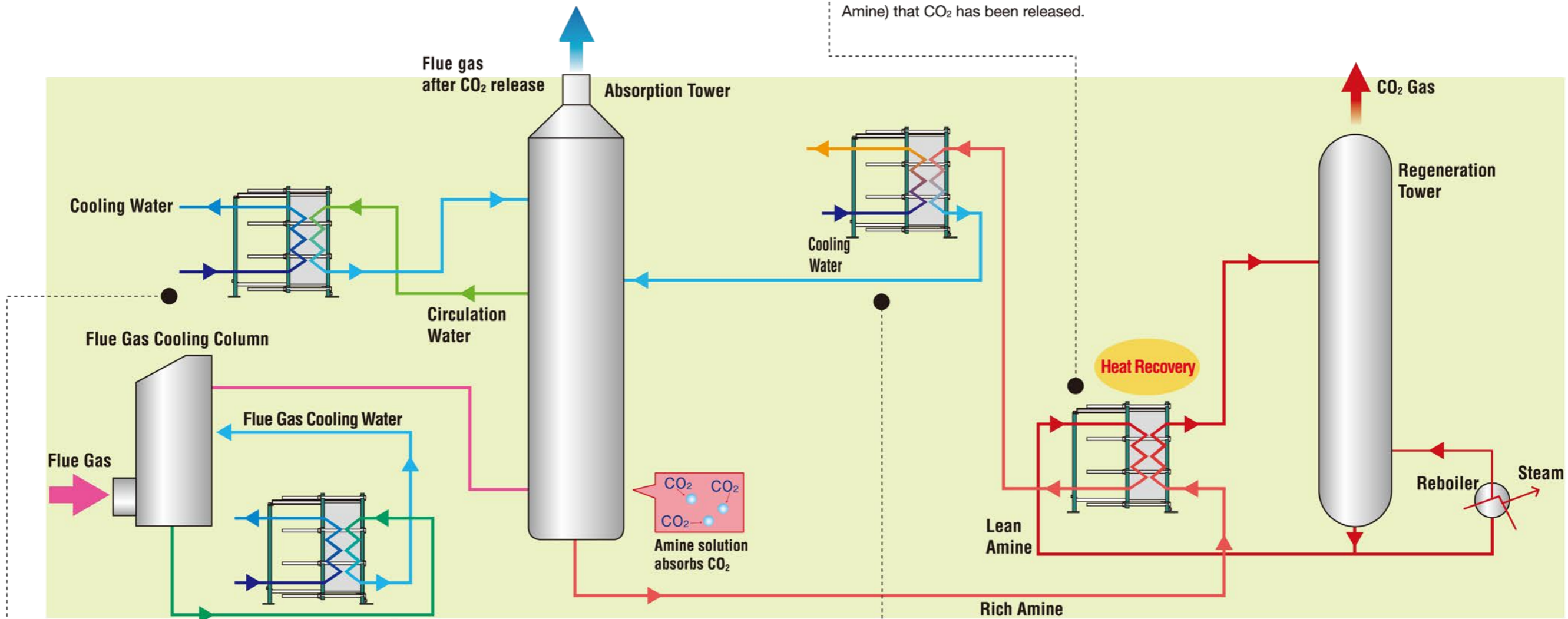
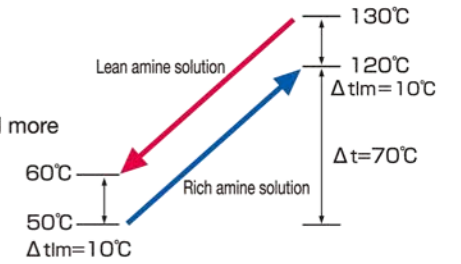
NTU(Number of Heat Transfer unit:θ) that is defined as below formula explains the characteristics of Heat Exchanger.

$$\theta = \Delta t / \Delta t_{lm}$$

And heat recovery (η) is defined

$$\eta = \Delta t / (\Delta t + \Delta t_{lm}) = \theta / (\theta + 1)$$

As θ value of SX-80 is about 7, its heat recovery can be reached more than 85% by above formula.



Absorption Tower Circulation Water Cooler

Plate Heat Exchangers are to cool top circulation water to cool flue gas from Absorption Tower.

Flue Gas Cooling Column Cooling Water Cooler

Plate Heat Exchangers are to cool cooling water used to cool high-temperature flue gas.

Lean Amine Cooler

Plate Heat Exchangers are to cool amine solution (Lean Amine) from which CO₂ is removed, in order to return to Absorption Tower.



Features of SX-80 Series

Our SX-80 series is specially developed Plate Heat Exchangers for heat recovery in Rich Amine and Lean Amine CO₂ recovery processes using chemical absorption methods. Major features of our SX-80 series is described below.

1. Plates ; a marvelous level of heat recovery as well as stable sealing performance at high temperature range

Our SX-80 series adopts the most suitable plate design for higher NTU for amine operation conditions of Lean/Rich Amine heat recovery. These plate series are developed, by use of our whole thermal and hydraulic knowledge that we've got ever through our long experiences, to feature the highest heat transfer performance with less pressure drop. By this, Rich Amine will be able to be heated up by Lean Amine, then steam consumption required at Regeneration Tower will be able to be extremely reduced. At the same time, Lean Amine will be able to be cooled down, which make cooling water consumption reduce for/at Absorption Tower. Only the SX-80 series allows such highest energy-saving operation with use of the smallest size of Plate Heat Exchangers. Also, Our SX-80 series has a variety of plates to then optimize its design for every specification condition.

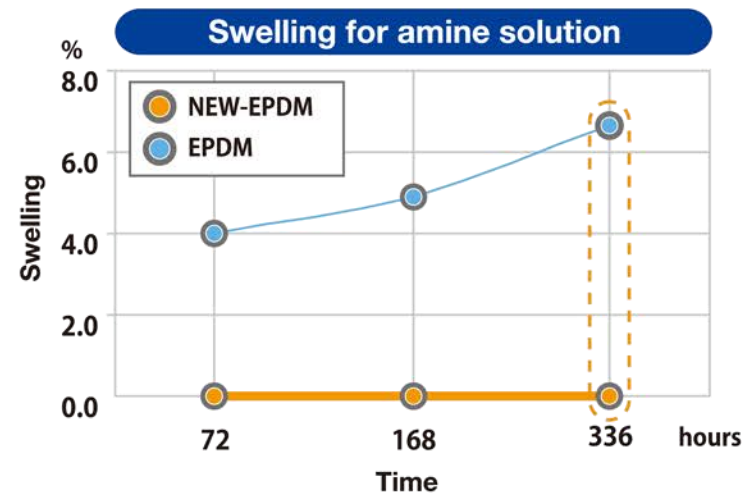
On the other hand, SX-80 series has a unique feature of gasket sealing groove to have advantage to maintain stable gasket seals even by swelled gaskets by amine solution.



SX-80

2. Gaskets ; a characteristic effectiveness to amine solutions at such high operation temperatures

Desirable features for gaskets of Lean/Rich Amine Heat Exchangers are both swelling-resistant performance to amine solutions and higher temperature resistance at approx.130°C at CO₂ regeneration(desorption). NEW- EPDM which was, developed by HISAKA has most effective compounds of gaskets. NEW-EPDM has more superior characteristics than EPDM for amine solution. Then SX-80 series has more stable sealing performance.



3. Construction ; easier maintenance than S&T and welded Plate Heat Exchangers

Flue gas normally contains a bit hydrocarbon content like a soot, and Rich Amine after Absorption Tower (CO₂ rich) may make plate surface fouled and dirty. In order to make continuous operation efficiently, therefore, periodical maintenance by complete cleaning is required.

SX-80 Series is possible to be dismantled and manually cleaned plate by plate, and at the same time visually checked, same as conventional Gasket-type Plate Heat Exchanger, while Shell-and-Tube Heat Exchanger and welded type Plate Heat Exchanger (incl. semi-welded type) seem to be difficult in dismantling.

4. Initial Cost-saving ; further compact and light-weighted size

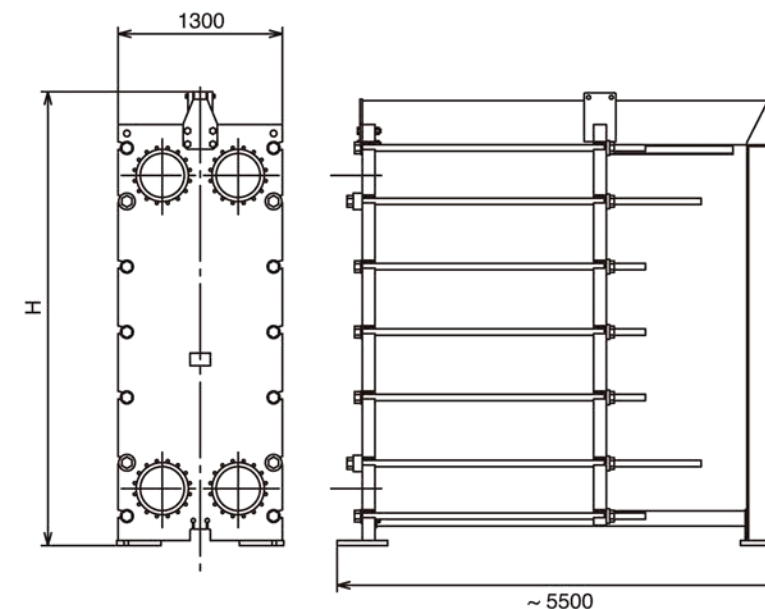
In addition to smaller heat transfer area, due to highest thermal performance (heat transfer co-eff.), higher pressure-resistance is achieved by unique plate and sealing design, although this amine process operates at high temp., rather than conventional Gasket type Plate Heat Exchanger. By this, the SX-80 series enables further compact and light-weighted size.

Moreover, our SX-80 series is capable of design optimization for every specification from three different patterns. As the result, it will realize initial cost-saving for new PHE units themselves as well as for easy handling and installation.

5. Operational Cost-saving ; less maintenance frequency

Not only extreme steam consumption reduction at Regeneration Tower for heating up, as stated in Feature 1, but also less maintenance frequency due to stable gasket sealing performance will contribute to enormous operational cost-saving.

[Dimensional Information]



Heat Transfer Area: 150 ~ 2200m²

Dimension:

Type	H mm
SX-80S	3000
SX-80M	3600
SX-80L	4200

Connection: 350mm / 14" or less