



DROPWISE CONDENSATION TECHNOLOGY APPLICATION

Improved Operation of Ammonia Recovery Reboiler

KEYWORDS

- Dropwise Condensation Technology
- Reboiler
- Improved U-Value (Improved Heat Transfer Rate)
- Heating Target Temperature Rise
- Reduced Steam Consumption

+28.5%

Improved U-Value

+34°F

Improved Heating Target Temperature Rise

-2.2%

Reduced steam consumption

BACKGROUND

In this factory, the heat exchanger (reboiler) that heats ammonia with steam during the ammonia recovery process had a problem in that the ammonia did not reach the set temperature in spite of supplying the maximum amount of steam.

OBJECTIVES

Improve the operation by applying Kurita's Dropwise Condensation Technology that improve the U-value to the reboiler.

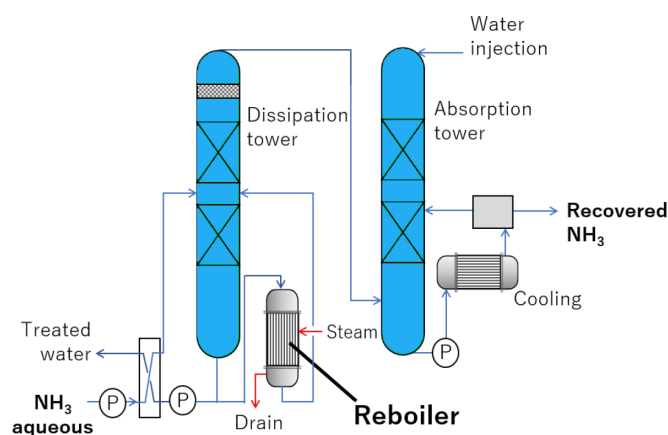
SYSTEM DESCRIPTION

Equipment type:	Vertical shell & tube heat exchanger (Shell side: Steam)
Tube material:	Titanium (TTH340)
Operating hours:	24 hours/day
Steam flow rate:	12,786 lbs/hour
Steam pressure:	116 psi
Target set temperature:	250°F

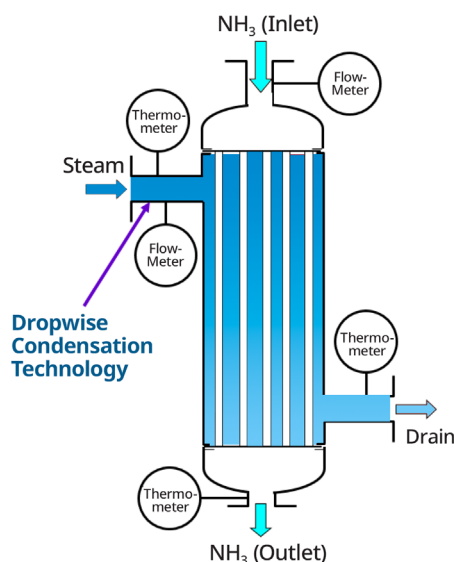
ACTIONS

Kurita's Dropwise Condensation Technology was applied to the steam line in front of the reboiler to make the steam side of the heat exchanger water-repellent. After that, the operation data before and after application was compared.

Ammonia Recovery Process (General Flow)

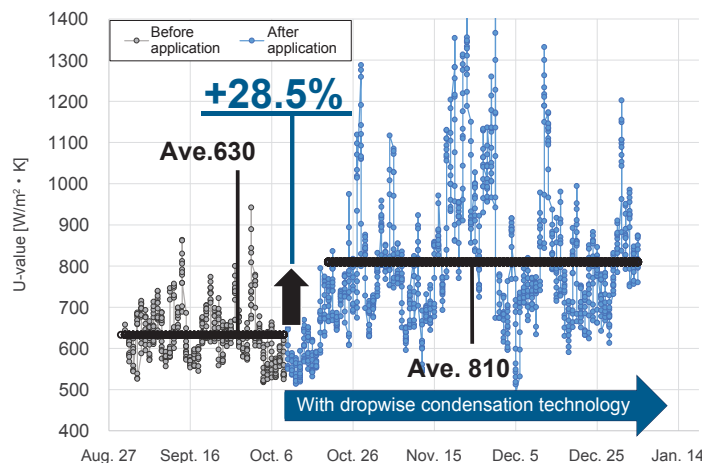


Outline of Reboiler & Data Measurement Locations]

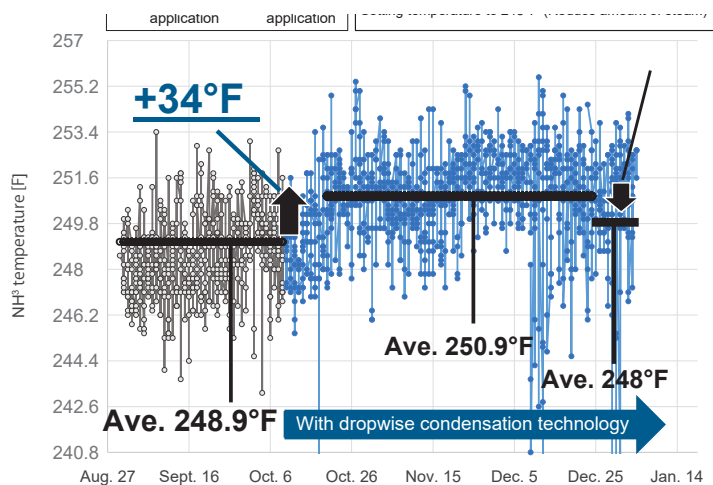


RESULTS

Change in U-value



Change in heating target (NH₃) temperature



Change in steam consumption rate

Before application: 2.69 lbs-steam/Gal-NH₃
 After application: 2.63 lbs-steam/Gal-NH₃

The application of this technology improved the U-value by 28.5%, and the heating target temperature rose to 250.88°F, exceeding the set temperature of 248°F, which could not be reached before.

In order to adjust the set temperature to 248°F, the steam amount was reduced by 2.2% compared to before application.

CONCLUSIONS

The application of Kurita's Dropwise Condensation Technology to this ammonia recovery process reboiler resulted in the following effects:

- Improved U-value: 28.5%
- Rised Heating target temperature : Max. 24°F
- Reduced steam consumption: 2.2%