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# Heat Integrated Distillation Column (HIDiC)

# Features

*SUPERHIDIC*<sup>®</sup> provides excellent energy savings of more than 50% compared to conventional distillation systems in various industrial applications. *SUPERHIDIC*<sup>®</sup> offers attractive economics without utilizing special equipment, but by applying a well-proven technology related to distillation and heat transfer. Moreover, good maintainability can be achieved with *SUPERHIDIC*<sup>®</sup>.

#### **Basic Concept or Summary**

*SUPERHIDIC*<sup>®</sup> realizes the concept of a Heat Integrated Distillation Column (HIDiC), which has been recognized as the ultimate energy saving distillation system, in a simplified manner.



In designing *SUPERHIDIC*<sup>®</sup>, the following features were taken into account using a new thermodynamic analysis method are taken into account:

- Internal heat exchange is not necessarily required in every stage of the column and can be done discretely.
- Since the ideal amount of internal heat duty differs depending on the composition inside the column, internal heat exchange should be implemented to satisfy such duty.
- Most often, the stages with a similar demand of heat duty are not at the same elevation when the rectifying and stripping sections are set in parallel.



# **Effects or Remarks**

Excellent energy savings and huge reductions in GHG emissions can be expected for the following conditions by introducing *SUPERHIDIC*<sup>®</sup> in either existing column modifications or new installations:

- Temperature differences, lower than 80°C, between the overhead and the bottom.
- Distillation columns with a high utility cost.
- Large scale reboiler and/or condenser duty.

The figure below shows processes that are confirmed to be suitable for the application of SUPERHIDIC®.



*SUPERHIDIC*<sup>®</sup> has been awarded the "Nikkei Global Environmental Technology Award – the Excellence Award" from the Nikkei, Energy Conservation Grand Award (METI Prize), SCEJ Award for Outstanding Technical Development, JPI Award for Technological Progress, etc., for its excellent energy-saving performance, uniqueness and potential contribution to low carbon society.

It is sometimes not easy to find an appropriate application of SUPERHIDIC because a column may be involved in heat-integration among process streams and/or the steam level of the reboiler may be in excess. To find a way to apply SUPERHIDIC appropriately, TOYO has developed HERO (Hybrid Energy system Re-Optimization), which can find the global optimum for both process and utility plants simultaneously, by utilizing mathematical optimization.

# Installation in Practice or Schedule

- **Domestic** Commercial unit in operation at a petrochemical plant. Expanding our business to domestic refineries, petrochemical and chemical plants.
- **Overseas** Expanding our business to international refineries, petrochemical and chemical plants. In addition to promoting sales, along with partner companies, with worldwide sales networks.

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