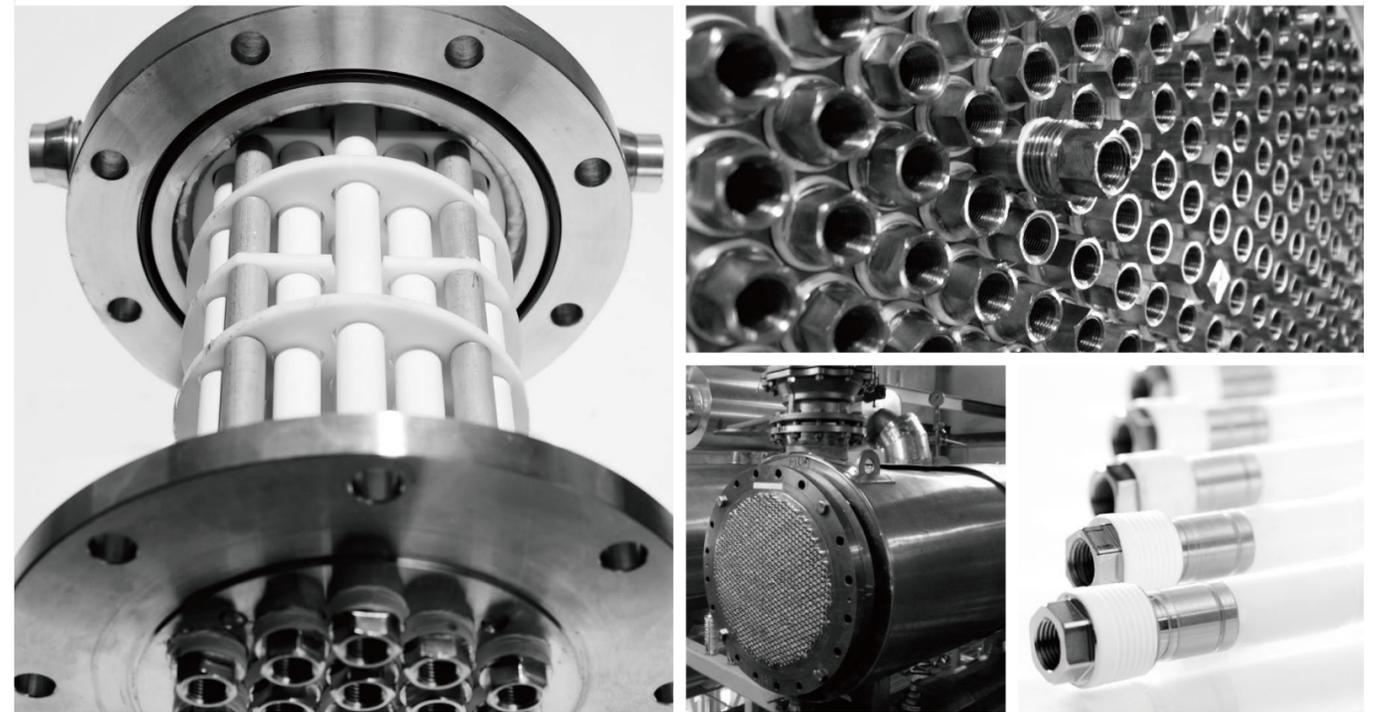


**THE KAITEKI COMPANY**  
Mitsubishi Chemical Holdings Group

*NEW* / Zeolite Membrane Dehydration Technology

 **ZEBREX™**



 **MITSUBISHI CHEMICAL**

Mitsubishi Chemical Corporation, Performance Products Division,  
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[Marketing Partner]

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ask...The Gas Professionals™

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 **MITSUBISHI CHEMICAL**

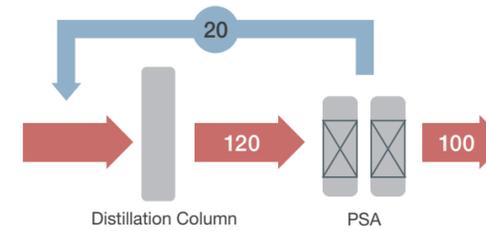
 **MATHESON**  
ask...The Gas Professionals™

# How can ZEBREX™ help you?

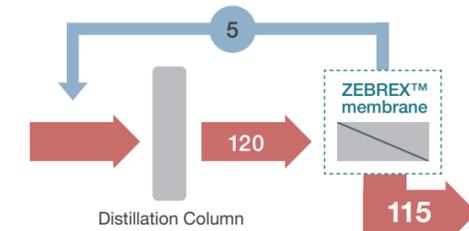
## 1. ZEBREX™ increases production capacity.

- ZEBREX™ increases production capacity by 10-20% if there is enough fermentation capacity.
- A PSA process has a REGEN stream that recycles around 20% of production back to the distillation column.
- ZEBREX™ doesn't have REGEN recycle stream line, so it can increase production capacity.

[Distillation+PSA]



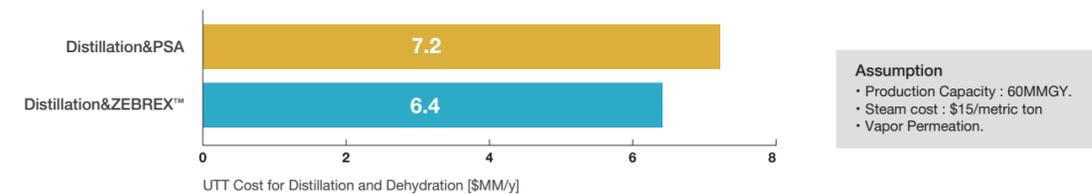
[Distillation+ZEBREX™]



## 2. ZEBREX™ reduces energy cost.

- ZEBREX™ reduces overall operation cost compared to a conventional PSA process.
- Saves significant steam consumption and uses little additional electricity.

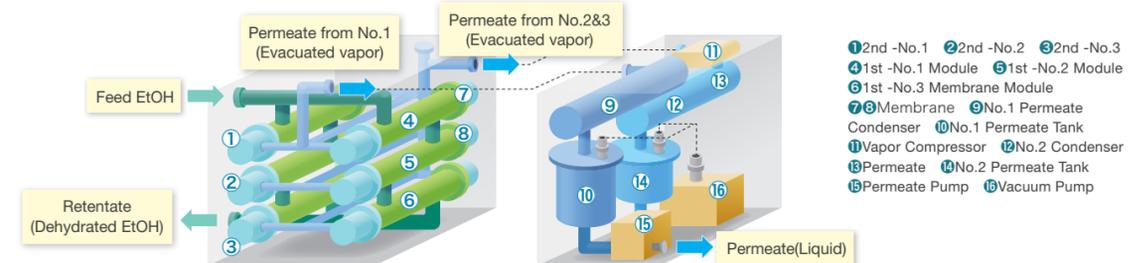
[OPEX comparison and targeting]



## 3. ZEBREX™ is easy to install and start up.

- ZEBREX™ units are mounted on a skid for easy field installation.
- ZEBREX™ process eliminates energy intensive pre-drying operation associated with the PSA process.

[Packaged drop-in skid mounted units]



# What is ZEBREX™?

ZEBREX™ is a cutting-edge zeolite membrane dehydration process.  
ZEBREX™ is proven at over 70 plants outside of the US.

### Separation by Membrane

Ethanol and water are separated by the sharp selectivity of the zeolite, to produce 99.5% purity ethanol and recycle water in a single pass.

[Ex. Water/Ethanol separation]

