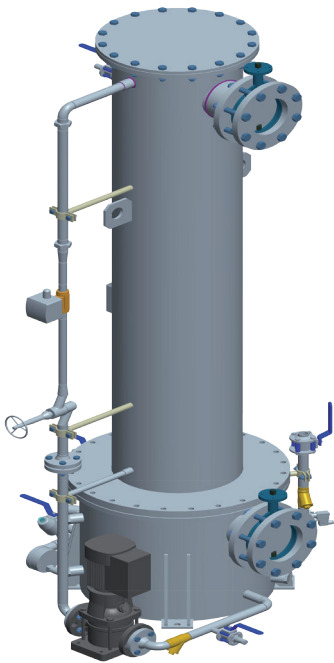


HAFFMANS ETHANOL RECOVERY SYSTEM

ETHANOL RECOVERY FROM FERMENTATION GAS

PRODUCT LEAFLET



HIGHEST ETHANOL RECOVERY RATES

In bioethanol plants and distilleries, operations are challenged to increase production yield while keeping to the venting norms and water quota.

One area where ethanol yield can be increased is at the ethanol scrubber. Traditional ethanol scrubbing methods consume high amounts of water and recycle recovered ethanol back to upstream processes. Using a Pentair Haffmans' Ethanol Recovery System, the heat, ethanol and water vapor entrained in the fermentation gas can be recovered more efficiently, thus increasing production yield while reducing utility consumption.

Working principle

Pentair Haffmans provides technology that can recover close to 100% of the ethanol vapor entrained in the fermentation gas. The Ethanol Recovery System is a cost-effective, proven technology using a counter flow water wash system to remove ethanol from vented gas.

The application of structured stainless steel packing ensures an efficient gas-water contact time and a minimal pressure drop.

Low pressure drop

The low pressure drop over the system helps reduce uncontrolled ethanol loss through safety valve venting triggered by pressure build-up.

Additional revenue

By re-circulating chilled scrub water over the packing, ethanol can be concentrated beyond 12% v/v with reduced water consumption. The concentrated ethanol can then be fed directly to the distillation columns (instead of back to an upstream process), thus breaking the ethanol recycling loop. In locations where site production is restricted by water quota, the water saved allows extra mash production, with potential to generate additional ethanol revenue.

Heat recovery

The recycled chilled water also extracts water and heat from the fermentation gas. Through application of a cooling system (heat pump) fermentation heat can be recovered to pre-heat onsite utilities: a welcome by-product in colder climates.

During the ethanol recovery process other water soluble volatiles, such as acetaldehyde and ethylacetate are extracted from the fermentation gas, thus providing additional sustainability benefits.

HAFFMANS ETHANOL RECOVERY SYSTEM

ETHANOL RECOVERY FROM FERMENTATION GAS

PRODUCT LEAFLET

BENEFITS

- **Low ROI**
<1 year achieved
- **Improved yield**
through high ethanol recovery efficiency:
> 98% achieved
- **High ethanol concentration**
> 12% achieved
- **Water savings**
< 0,1 l/kg fermentation gas achieved
- **Retrofittable**
easy integration for quick production expansion
- **Potential heat recovery**
preheat utility streams
- **Low pressure drop**
200 mm WC achieved

APPLICATIONS

Pentair Haffmans Ethanol Recovery Systems & Scrubbers are running successfully in various parts of the world in the following industries:

- Bioethanol production
- Distilleries
- Breweries
- Wineries
- Cider production

Whether the site situation requires a complete new solution, a replacement, a retrofit or expansion, Pentair Haffmans provides a suitable Ethanol Recovery Solution.

SCOPE OF SUPPLY

A complete solution includes:

- Customer specific design engineering
- Ethanol recovery column
- Stainless steel structured packing & distributors
- Water chiller & Heat recovery system (where applicable)
- Water saving system - water flow proportional to incoming gas flow
- Gas & liquid valves
- Process monitors
- Ethanol rich water pump
- System control panel
- Installation supervision

For a successful implementation, all this and more is coordinated in close cooperation with the site team and our dedicated and experienced Project Managers.

Presented values are indicative and subject to site specific conditions.



Ethanol Recovery System 2013



HAFFMANS BV

P.O. BOX 3150 NL-5902 RD VENLO, NETHERLANDS INFO@HAFFMANS.NL WWW.HAFFMANS.NL

All Pentair trademarks and logos are owned by Pentair. All other brand or product names are trademarks or registered marks of their respective owners. Because we are continuously improving our products and services, Pentair reserves the right to change specifications without prior notice.

Pentair is an equal opportunity employer.

ETHANOL E-11/14 © 2014 Pentair. All Rights Reserved.

