

# Munters Mass Transfer equipment for biogas purification

The biogas challenge: More clean energy and optimum space for conversion of raw biogas to bio-methane. Biogas producers face a constant challenge in maximizing clean bio-methane production while dealing with limited space constraints. This case study showcases how Munters expertise in mass transfer solutions helped a European biogas to biomethane upgrade unit manufacturer overcome these very limitations.

## **Munters solution: Enhancing the process within existing footprint**

By leveraging our in-depth knowledge of the industry and high-performance internals and packing solutions, we were able to help the client meet targeted performance goals. This impressive result was achieved within their existing facility, demonstrating the ability of Munters mass transfer technology to optimize production without requiring additional space.

## **Greener operations: Reduced CO<sub>2</sub> emissions**

The new process helped to reduce CO<sub>2</sub> emissions, contributing to a greener operation for our client. This case study highlights some of the many benefits of partnering with Munters for your biogas upgradation needs.

## **Munters: Your partner in biogas success**

We offer a comprehensive range of mass transfer solutions designed to:

- Maximize biomethane production
- Reduce footprint
- Minimize environmental impact

### **Case study:**

#### **Munters mass transfer equipment for biogas**

- **Location:** Italy
- **Client:** Biogas to biomethane upgrade manufacturer
- **Solution:** Munters mass transfer equipment



## Case study

An experienced European manufacturer of biogas to biomethane upgrade units asked Munters to support them again, this time on their internals in a new green project in Italy.

Key components in the process needed to be selected. And Munters had the equipment, experience and industry understanding to get the job done. “Our 3rd generation random packing and column internals were successfully designed by our team and their performance was confirmed on the field” said Markus Karbach, Business Unit Manager, Munters Clean Technologies.

### Background

The European client has a proven, proprietary technology for biogas to biomethane conversion. Originally produced from OFMSW (Organic Fraction of Municipal Solid Waste), the biogas is then upgraded to renewable and CO<sub>2</sub>-neutral biomethane, an energy source that helps reduce reliance on fossil fuels.

Biomethane has many sustainable uses, from vehicle fuel and cogeneration to usage in the natural gas grid after final conditioning. Carbon balance is negative since recovered CO<sub>2</sub> can be reused as raw material in many areas, and even has food grade quality.

*“Our 3rd generation random packing and column internals were successfully designed by our team and their performance was confirmed on the field”*

Markus Karbach, Business Unit Manager  
Munters Clean Technologies.

### Case study

→ Mass transfer equipment for biogas upgrading

### Benefits

- Munters application expertise helped define optimal solution
- Premium Munters equipment helped client to achieve the expected performance

→ Carbon footprint further reduced thanks to Munters solutions

### Products featured

- Munters Medal-Pak™
- Munters riser deck distributors, DRD503
- Munters support plates, SPM522
- Munters support plates, SPM522





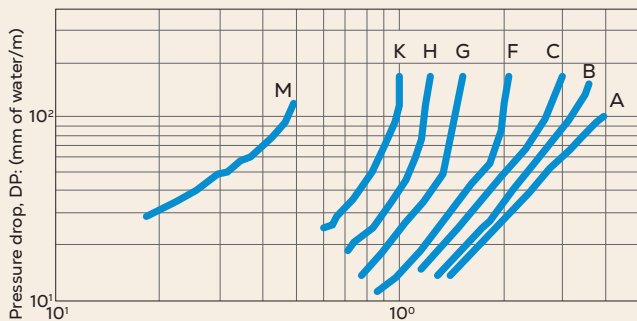
# Process overview

Biogas is usually compressed for the selective removal of CO<sub>2</sub> and then recovered from the top of the absorption column as biomethane. A CO<sub>2</sub>-enriched solution then leaves the bottom of the absorption tower and is fed to a regeneration column where the absorbed CO<sub>2</sub> is released and recovered from the top of the regeneration column at high purity.

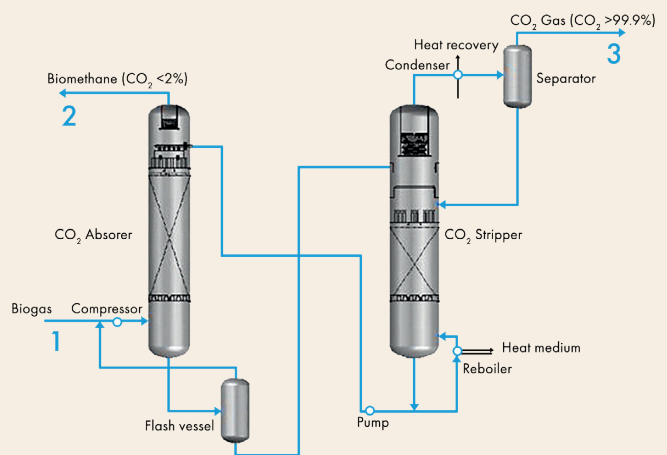
The biogas to biomethane manufacturer approached Munters for a second time and requested help with key components for their process.

Their aim was to achieve maximum capacity levels using as little space as possible. This project is in line with the European climate targets and renewable energy utilization.

Air water pressuredrop data, Medal-Pak™ # 25, random packing



A: 0 m <sup>3</sup> /m <sup>2</sup> hr	F: 49 m <sup>3</sup> /m <sup>2</sup> hr	K: 122 m <sup>3</sup> /m <sup>2</sup> hr
B: 10 m <sup>3</sup> /m <sup>2</sup> hr	G: 74 m <sup>3</sup> /m <sup>2</sup> hr	M: 147 m <sup>3</sup> /m <sup>2</sup> hr
C: 25 m <sup>3</sup> /m <sup>2</sup> hr	H: 98 m <sup>3</sup> /m <sup>2</sup> hr	



**1. Biogas**  
 Pressure: any  
 CO<sub>2</sub>: 20–60%  
 CH<sub>4</sub>: 80–40%  
 Other gases: as per grid injection regulation/fuel standard

**2. Dried biomethane**  
 Pressure: 4–15 bar (g)  
 CO<sub>2</sub>: 0.5–1%  
 CH<sub>4</sub>: balance  
 Other gases: as per grid injection regulation/fuel standard  
 Dew point: -5°C@70 bar (g)

**3. Off-gas**

# The Munters solution

Thanks to deep application knowledge and proven track record as international mass transfer equipment suppliers, Munters was able to help our European client enhance their biogas to biomethane process, while also reducing their carbon footprint. Some of the initiatives included: Internals for the absorber and stripper were selected after comprehensive discussions with Munters engineers.

3rd generation tower packing with Munters Medal-Pak was selected, offering high mechanical strength and a large effective interfacial area.

Other internals selected included Munters riser deck distributors, which propagate liquid crossflow and enhance distribution quality. Support plates, SPM522 for efficient gas injection were also provided. "Accurate hydraulic calculations and detailed technical support during the engineering phase of the projects lead to the appropriate selection of column internals," concluded Markus Karbach.

## Mass transfer equipment

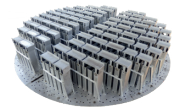
### Medal-Pak™

Medal-Pak™ (formerly IMTP®) delivers both low-pressure drop and high efficiency, ideal for high-pressure and vacuum towers. Its monolithic design avoids end "opening out" issues found in ring-shaped packings.



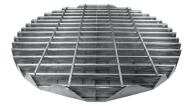
### Riser deck distributor/redistributor

The riser deck distributor improves liquid distribution by using gas risers between orifices on its base, enhancing distribution quality. It's typically multi-piece with sealed joints and attaches via clamping to a ledge/support ring welded to the column wall.



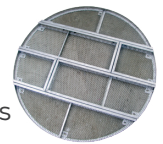
### Support plate

Designed for towers under 900mm (36 inches) diameter, the support plate can be multi-piece or single-piece based on installation method. Slot size matches packing size, and it rests on a ledge/support ring or bolts/clamps to a tray support ring.



### Bed limiter for random packing

The bed limiter adjusts to fit various sizes and supports loads. Under high-performance distributors, an expandable design with jack screws eliminates the need for a ledge/support ring, ensuring good distribution near the column wall.



→ Would you like to find out if Munters has a solution for your production process? If so, please visit [www.munters.com/en/solutions/mass-transfer/](http://www.munters.com/en/solutions/mass-transfer/)