Kanadevia INOVA

Datasheet Gas upgrading

Amine scrubbing

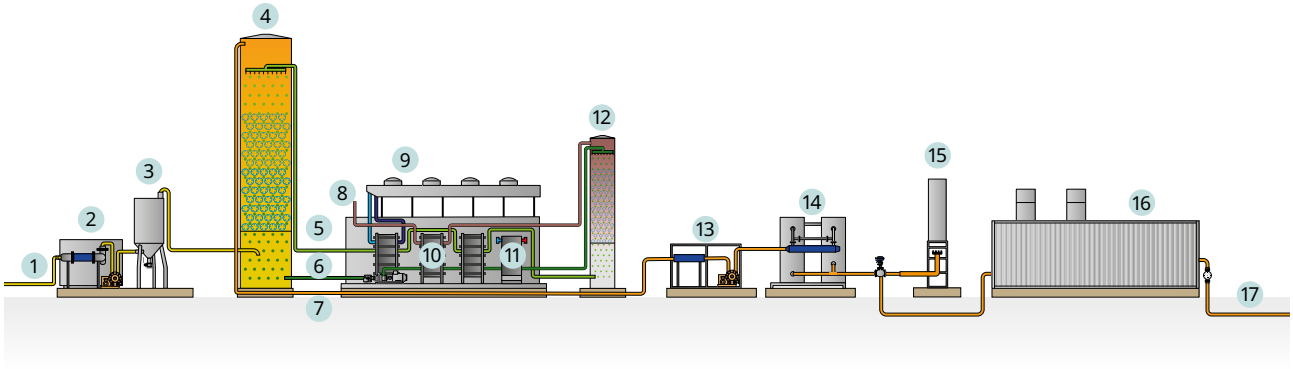
Amine scrubbing

Future-proof resource economy
A comprehensive, reliable supply of renewable energy and the ability to produce regenerative fuels such as bio-LNG and bio-CNG are key to decarbonisation and energy transition efforts. Whether it's combined with a Kompogas™ plant to create a complete solution or deployed on a standalone basis, biomethane gas upgrading technology completes the range of Kanadevia Inova products enabling energy to be produced from any sort of waste or biomass. In this case it employs an upgrading process to convert raw biogases into high-purity biomethane that can be used as a versatile energy source.

Advantages of biomethane technology
Raw gases from a wide range of different sources are suitable for upgrading: the digestion of municipal green waste, organic household waste or agricultural biomass. Sewage and landfill gas can also be converted into energy. This extends a plant's value chain and promotes the circular economy. Depending on the composition, raw gas pretreatment may be required. Then comes the main process, where the carbon dioxide in the stream of gas is separated from the methane, with the resulting biomethane conditioned to the desired quality parameters.

Technical description
Amine scrubbing is a chemical process that is suitable for sites with a source of heat and high product gas requirements, and where the gas has to be delivered from the gas upgrading unit to the feed-in station at low pressure. It is also no problem to increase the pressure for sites outside Germany where higher pressure is required. After pretreatment, the raw gas flows through a packed column, where an amine solution that absorbs carbon dioxide trickles from top to bottom in the opposite direction to the gas. Then biomethane of up to 99.9% purity is removed at the top of the tower. The used amine scrubbing solution is regenerated for reuse in the process. This process is highly robust when it comes to dealing with impurities in the stream of biogas, and like membrane technology stands out in terms of high plant availability.

Schematic of principal setup



Pretreatment
1 Raw gas piping
2 Drying and precompression
3 Desulphurisation

Raw gas upgrading
4 Scrubbing column
5 Lean amine scrubbing solution
6 Rich amine scrubbing solution
7 Methane piping
8 CO_2 for further use
9 Free cooler
10 Heat exchanger
11 Process heat supply
12 CO_2 desorber column
13 Drying and compression
14 Fine drying

Energetic utilisation
15 Safety flare
16 Gas grid injection
17 Public gas grid

Gas upgrading: A-Series

		Model S			Model M			Model L
Upgrading capacity	kg CO_2/h	500	700	1,000	1,400	2,000	2,500	≤ 5,600
Technical data								
Container		1 x 45’			2 x 40’			Skids
Length of container	mm	13,700			12,000			12,000
Width of container	mm	3,000			6,000			6,000
Height of container excl. superstructure	mm	3,000						
Area of outdoor installation	m^2	75	75	130	130	156	156	300
Height of scrubbing column	mm	12,000						16,000
Weight of container 1	t	20			31			40
Weight of container 2	t				19.6			25
Connection RBG	DN	150	200	250	250	400	400	400
Connection BM	DN	100	100	100	150	150	150	250

Performance data								
Voltage	V	400						
Frequency	Hz	50						
Scrubbing liquid		MDEA/water						
Content of scrubbing liquid	m^3	4	5	6	8	10	10	28
Processable RBG		Biogas/waste gas/sewage gas						
BM quality	Vol.% CH_4	up to 99						
Outlet pressure BM [1]	mbarg	50–150						
Dew point BM [2]	°C	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4
Specific power demand of upgrading [3]	kWh/Nm^3 RBG	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Specific power demand of pre-cleaning [3]	kWh/Nm^3 RBG	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Heat demand at 47 vol.% CO_2 in RBG	kWh/Nm^3 RBG	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Max. inlet temperature of cooling water	°C	30	30	30	30	30	30	30
Max. outlet temperature of cooling water	°C	40	40	40	40	40	40	40
Theoretically removable cooling water heat	kW	325	455	650	910	1,300	1,300	3,640
Heat extraction, primary < 90 °C	kW	60	84	120	168	240	300	670
Heat extraction, secondary 45≠/55 °C	kW	160	224	320	448	640	800	1,790
Water demand	m^3	none						
Condensate [4]	kg/h	39	55	78	110	156	156	174
Resulting waste water	m^3	none						
Designed for temperatures	°C	–15 to +35						

Emissions		
Methane loss	%	≤ 0.1
Sound pressure level at 10 m distance [5]	dB(A)	75

[1]optional increase possible, [2]@norm conditions, [3]tolerance of ± 10% according to DIN 1945/VDI 2045/ISO 5389. Electricity consumption depends on operating parameters and environmental conditions, as well as the gas specification. The requirement is specified for an ambient temperature of 15 °C as well as standard gas input parameters (30 °C, atmospheric pressure). [4]resulting condensate in g/Nm^3 raw biogas per hour, [5]optional reduction possible
Abbreviations: RBG = raw biogas, BG = biogas, BM = biomethane

Kanadevia INOVA

Kanadevia Inova AG

Hardturmstrasse 127
8005 Zurich
Switzerland
P +41 44 277 11 11
info@kanadevia-inova.com
www.kanadevia-inova.com

202504