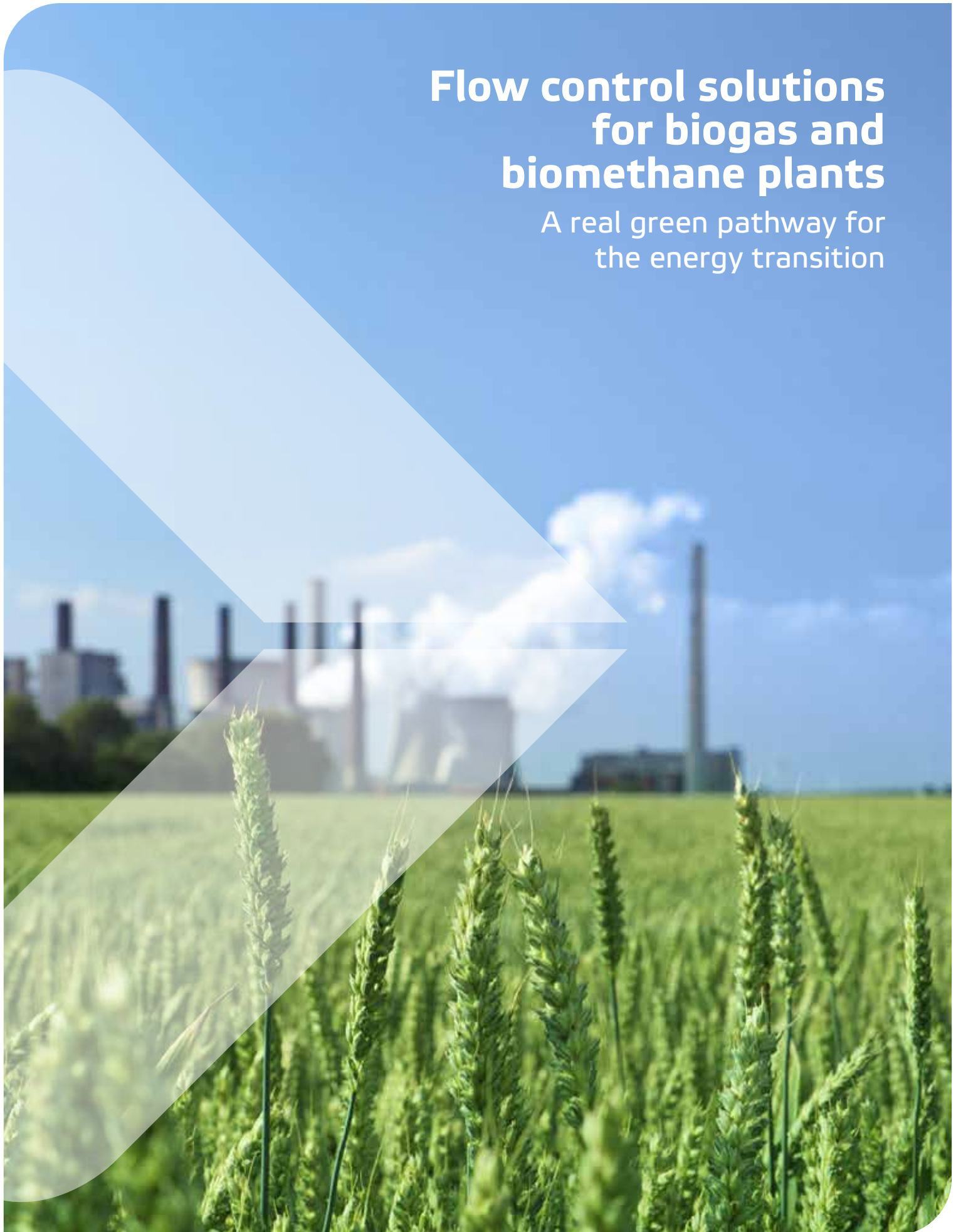


Flow control solutions for biogas and biomethane plants

A real green pathway for
the energy transition





Embracing renewable natural gas (RNG) can lead to a cleaner, more sustainable future, benefiting both industry and society as a whole.



Biogas and biomethane – also referred to as renewable natural gas (RNG)

Biogas is a valuable renewable energy source with its roots planted in organic waste materials such as agricultural residues, food waste, and animal manure. Through a process called anaerobic digestion, these materials are broken down by microorganisms, resulting in the production of biogas.

When we talk about biogas, we are typically referring to methane (CH_4) and carbon dioxide (CO_2). Bio-Methane, also known as Renewable Natural Gas (RNG), is a purified form of biogas. By removing impurities and carbon dioxide, bio-methane achieves the same quality as conventional natural gas. RNG can be injected into natural gas pipelines, providing a renewable and environmentally friendly alternative to fossil fuels.

Decarbonization of industries and societies

RNG can significantly reduce carbon emissions in various sectors, including manufacturing, transportation, and energy production. By replacing conventional natural gas with RNG, industries can lower their carbon footprint and contribute to global decarbonization efforts.

These gases are increasingly used as fuel for heavy-duty vehicles, such as buses and trucks. This shift helps reduce greenhouse gas emissions and reliance on diesel, promoting cleaner air and more sustainable urban transportation systems.

Energy security and economic growth

By diversifying energy sources with RNG, countries can enhance their energy security and resilience. RNG production from local organic waste reduces dependence on imported fossil fuels and supports a more stable and sustainable energy supply.

The RNG industry also stimulates local economic growth by creating jobs in the construction, operation, and maintenance of biogas plants and related infrastructure. This growth

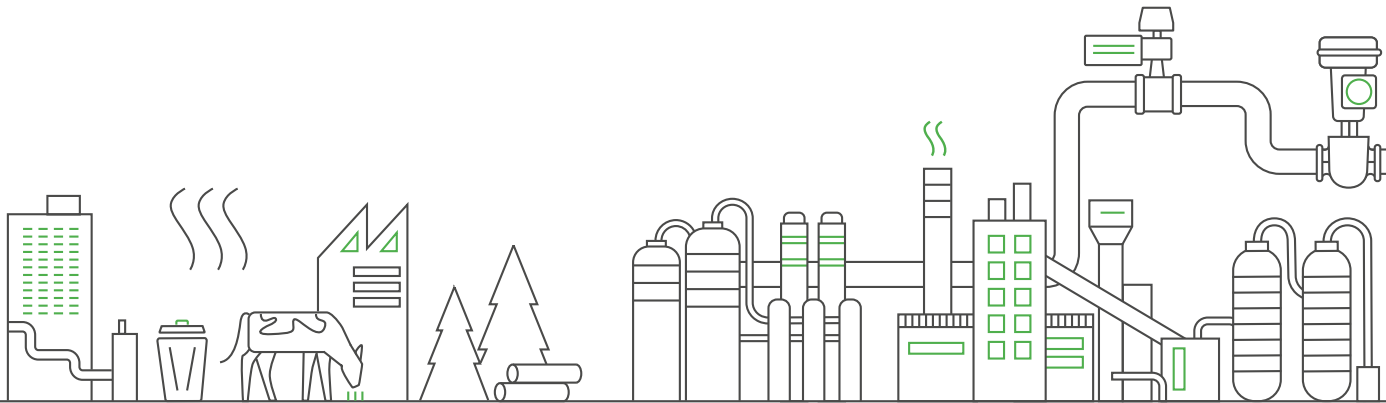
can be particularly beneficial for rural and underserved communities.

Aligned with existing infrastructure and circular economy

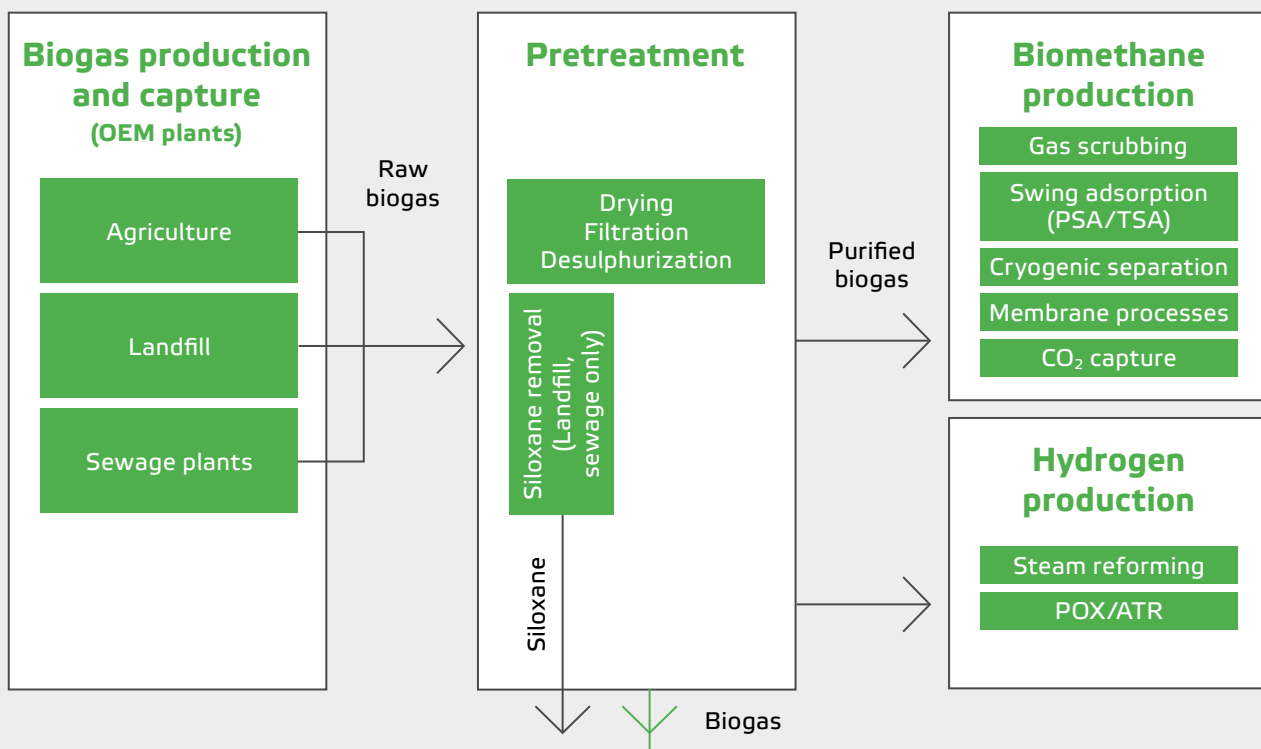
RNG can be seamlessly integrated into existing natural gas pipelines and infrastructure, making it a practical and immediate solution for reducing emissions without the need for extensive new investments. Production also supports the principles of a circular economy by turning organic waste into valuable energy.

Many companies are adopting RNG to meet their Environmental, Social, and Governance (ESG) goals. By using RNG, businesses can demonstrate their commitment to sustainability and reduce their Scope 1 and Scope 3 emissions.

The RNG process in brief



Explanation of process:



Biogas production and capture

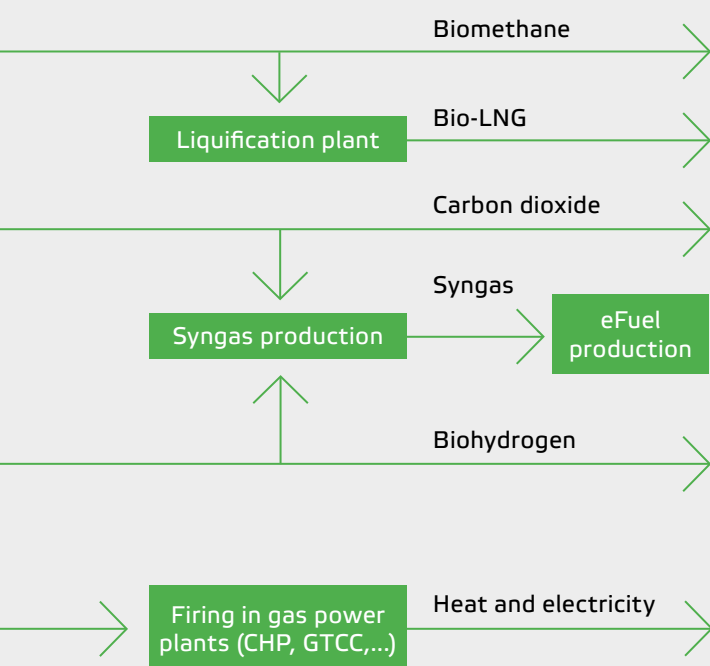
The biogas, which consists mainly of methane and carbon dioxide, is collected in the upper part of the digester, where organic waste from farms or wastewater is digested anaerobically. Biogas is also collected from a network of wells and pipes installed in a landfill. This gas is called raw biogas.

Pretreatment

Raw biogas is dried and purified to remove harmful compounds like VOCs, hydrogen sulfide, and siloxanes, making it suitable for use in gas turbines and CHP plants with reduced toxic emissions. Siloxanes, often from silicones in cosmetics and industry, are common in landfill and wastewater biogas and can be recycled into new products.

Biomethane production

The purified biogas is treated further to remove CO₂ and other impurities using methods like water scrubbing, swing absorptions (PSA/TSA), or cryogenic separation. Amine based absorption is another method, but it requires heat to regenerate the solvent.



Sustainable gas streams and intermediates

Biogas upgrading produces biomethane, which can be fed into the gas grid, liquefied as Bio-LNG, or converted to hydrogen via steam reforming or partial oxidation and autothermal reforming. CO₂ can be captured and combined with hydrogen to form syngas, which can be used to produce fertilizers, methanol, and sustainable fuels.

Our experience and offering for RNG

Decades of experience

As a leading valve manufacturer with decades of experience in ethanol plants, industrial gas, refinery, and petrochemical sectors, we specialize in flow control for gases like methane, CO₂, hydrogen, and syngas. Our global footprint includes installations in swing adsorption, liquefaction plants, and burner management systems.

Valmet's advanced valve technologies ensure reliable, efficient, and environmentally compliant operations – from biogas collection to purification and liquefaction. Our range includes actuated on-off, safety, and control valves for applications such as shutoff, venting, high-cycling, and precision flow control, all designed to meet the highest quality and regulatory standards.

Superior products and features

Our Jamesbury Xtreme™ soft seats and metal-to-metal seat systems ensure superior tightness and long life, even in high-cycling swing adsorption plants exceeding 1 million cycles annually. These valves meet ISO15848-1 standards and handle temperatures from -200°C to +600°C, with special designs available for more extreme conditions.

For top precision, choose Neles™ globe valves; for wide rangeability, our Neles™ segment rotary valves. Trim solutions like Tendril™, Omega™, and Neles Q-trim™ reduce cavitation, noise, and vibration. Backed by expert support, Valmet delivers reliable performance and value for your process.

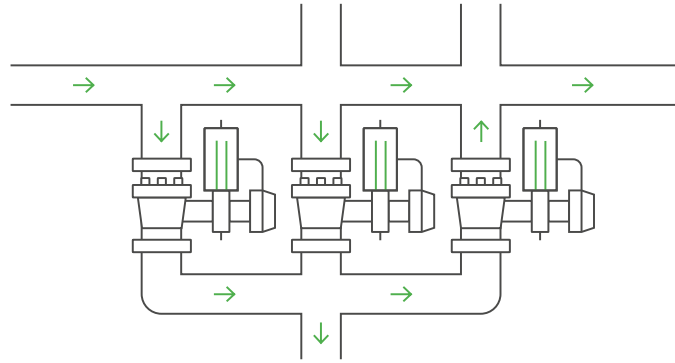
Carbon capture

Carbon capture is essential for reducing CO₂ emissions and improving safety in processes like ethanol production. Valmet has been a trusted provider of valves for critical CO₂ applications since the 1970s, offering proven reliability and continuous innovation.

Our valves are designed for tightness, minimal pressure loss, and zero external leakage—key requirements in carbon capture. Material selection is

also crucial, as wet CO₂ can be highly corrosive. Valmet offers a wide range of valves with various materials and coatings, along with expert support

and sizing tools like Nelprof™ help you choose the optimal solution.



Reliable performance in cryogenic



Liquefying gases like oxygen, nitrogen, and methane presents extreme engineering challenges. Cryogenic processes demand valves that perform flawlessly at temperatures as low as -196°C, where material brittleness, leakage risks, and thermal contraction can compromise safety and efficiency.

Valmet's Neles™ cryogenic valves are engineered to meet these challenges with precision. Featuring extended bonnets, fire-safe designs, and tight shut-off capabilities, they ensure

reliable operation in air separation, LNG, and industrial gas applications for decades. Intelligent valve solutions with integrated diagnostics enhance process visibility and predictive maintenance.

Valmet's state-of-the-art cryogenic test laboratory rigorously validates valve performance under real-world conditions, ensuring compliance with the most demanding standards. This in-house capability guarantees that every valve delivers proven reliability before it reaches your site.

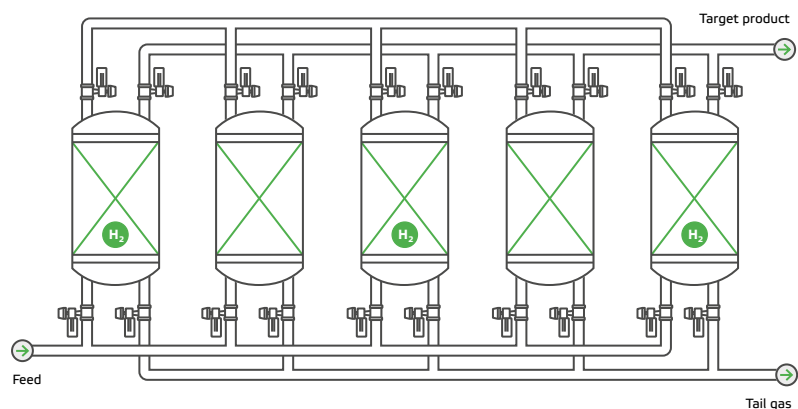
Unlocking efficiency with Valmet's valve solutions for swing adsorption technologies

Valmet's flow control solutions for PSA, VSA, and TSA processes are tailored for the biogas industry, ensuring efficient removal of impurities to produce biomethane, hydrogen, and CO₂. Our fast-switching

valves offer repeatable tightness and withstand up to one million cycles under varying conditions.

Designed for durability and precision, Valmet valves boost operational

efficiency, reduce maintenance, and support environmental sustainability by capturing carbon emissions from core processes.



Valves for biomethane processing

Biomethane processing conditions

Continuous operation / Slurry handling / Erosive fluids / High temperatures / Caustic and corrosive chemicals

Neles valves for biomethane processing

Jamesbury™ Wafer-Sphere™ high-performance butterfly valves



Jamesbury Quadra-Powr™ X spring diaphragm rotary actuators



Neles™ pneumatic cylinder actuators, B1-series



Jamesbury™ small weld/threaded end ball valves, 4000-series



Flowrox™ pinch valves



Jamesbury™ ball valves, 7000- and 9000-series



Flowrox™ knife gate valves



Neles™ V-port segment valves, R-series



Neles™ Neldisc™ butterfly valves, L-series



Neles™ GU- and GB-series globe control valves



Stonel™ Axiom™ valve controllers



Neles™ intelligent digital valve controllers



Features and benefits

- High reliability
- High uptime
- High process accuracy and efficiency
- Corrosion resistant
- Low automation costs
- Easy maintenance
- Low maintenance needs
- Very long service life
- Very cost effective

Highlights

Jamesbury Wafer-Sphere high performance butterfly valves offer significantly longer operation life than rubber lined butterfly valves, as well as delivering higher uptime and lower maintenance costs.

Valmet's professionals around the world work close to our customers and are committed to moving our customers' performance forward – every day.



Valmet Flow Control Oy

flowcontrol@valmet.com

For more information, please visit
valmet.com/flowcontrol

To find the location nearest to you,
please scan here:

