

Oil & Gas INNOVATION[®]

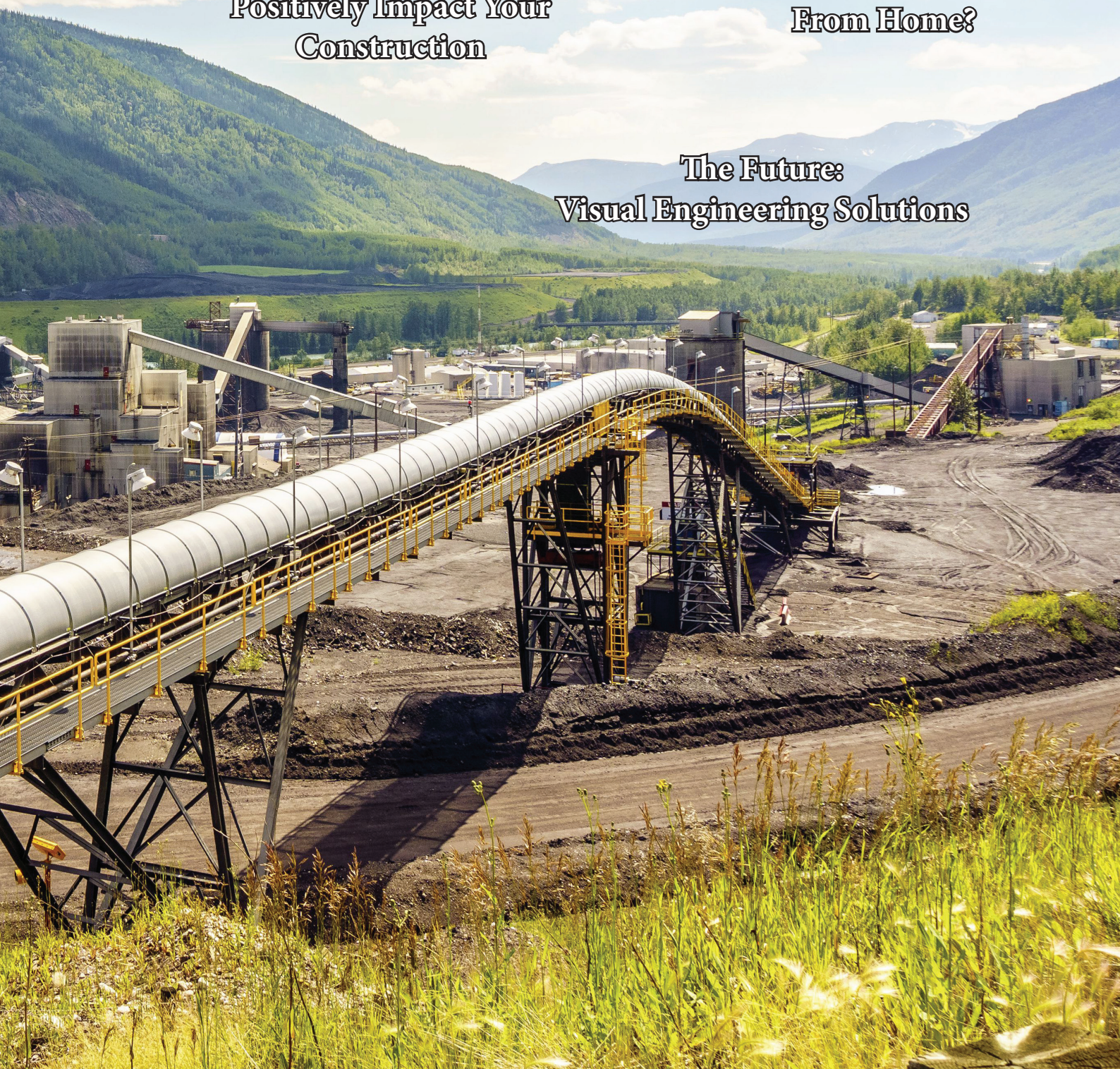
Autumn 2018

Business Information.
Industry Solutions.

How the Right
Pipeline Coating Can
Positively Impact Your
Construction

Executive Education:
Get an MBA..
From Home?

The Future:
Visual Engineering Solutions



Delivering Safe, Sustainable and Economic Gas Processing and Separation

By Twister BV

Increased Demand & Increased Infrastructure Pressures

Whether greenfield or brownfield, onshore or offshore, gas separation remains a complex but vital industrial process in the oil & gas value chain, characterized by a number of current challenges.

The increase in the global oil and gas demand, for example, is pushing operators to constantly increase production from existing assets while minimising costs, with production facilities stretched to their design capacity limits.

Within these facilities, the separation of oil, water, gas and added chemicals plays a key role in meeting export gas specifications, safeguarding downstream operations, and minimising chemical costs. The carry-over of liquids from a liquid gas separator vessel, however, can easily lead to compressor failure or increase the dewpoint, creating potential slugging or corrosion in export pipelines and reducing production rates.

Another challenge is droplet size. The working principle of the majority of separator vessels is based on gravity, centrifugal forces, or coalescence. A key parameter in the sizing of separator equipment is therefore liquid droplet size. The larger the incoming droplet size, the easier it is to separate the droplets, with minimal need for large vessels and complex equipment. Any upstream flow control valve with associated pressure

reduction, however, will cause an atomisation of the liquids present.

Employing the Joule-Thomson effect, named after the two people who discovered it in 1854, JT-LTS process plants prepare gas for pipeline transmission by removing hydrocarbon liquids, thereby providing an additional revenue stream. In this way, the JT plant is effectively a self-refrigeration system that uses a drop in gas pressure (which allows the gas to expand) to create a cooling effect. The unit then condenses heavy hydrocarbons and water out of the gas to meet required gas pipeline specifications.

Additionally, upstream injected glycol absorbs the water vapour present in the gas. Liquid, containing the heavy hydrocarbons, water and glycol, are separated in the low temperature separator vessel downstream of the JT or choke valve.

However, while striving for greater gas and oil throughput, the increased flow often causes a reduction in droplet size, affected by increased shear forces which - for existing facilities - set the maximum production rates.

In such cases, the only solution is then to install new separator vessels with sizing based on the increased flow rates, with the inevitable higher costs, long overhaul times and diminishing returns from what was desired in the first place - higher production rates.

That is until now..

Twister® – Delivering High Yield and Robust Natural Gas Processing & Separation

Netherlands-based Twister B.V. delivers reliable, high-yield and robust natural gas processing and separation solutions to the upstream and midstream oil and gas sectors and is a leading authority on fluid dynamics and separation processes. Innovative gas



A Twister SwirlValve Test Installation.

separation technologies include the Twister Supersonic Separator™; the Twister Hydrate Separator™; the Twister SwirlSep™; and the Twister SwirlValve®.

The Twister SwirlValve is a patented solution for improved performance over traditional JT-LTS solutions (where pressure throttling in a conventional choke or JT valve is achieved by the dissipation of the kinetic energy present in the gas flow through randomly distributed eddies). Through proprietary computational fluid-dynamics models and use of the excess free pressure in a fluid stream, the Twister SwirlValve establishes a coherent vortex motion.

The SwirlValve is an intelligent adaptation of existing and proven axial control valve technologies achieved by applying tangential slots in the valve cage. These slots force the choking flow into a strong rotation, causing small droplets to concentrate and collect along the perimeter of the pipe wall. The advantage of creating this swirling flow in the valve is improved separation efficiency, the reduction of downstream separator size, and the debottlenecking of existing separation facilities.

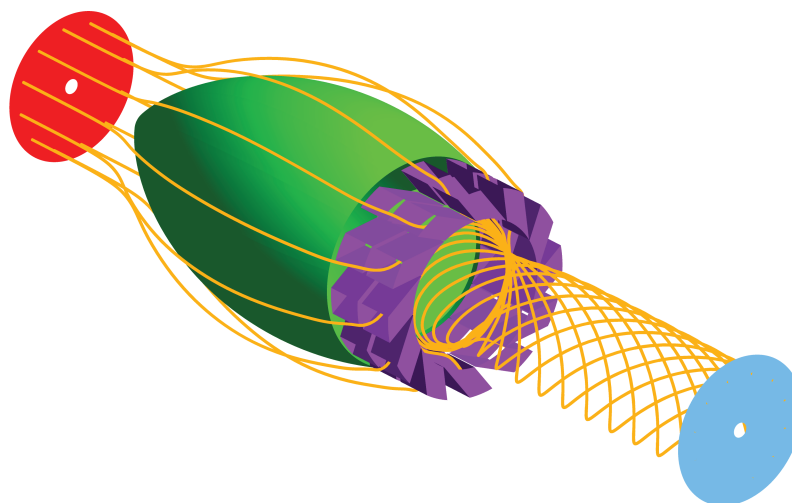
Based on a standard cage flow control valve, the manufacturing of the SwirlValve is outsourced by Twister to established suppliers, ensuring safe operation and the added benefits of pressure balanced pistons with smaller actuators and minimal moving parts. There is also a strong focus on reducing space and weight.

A SwirlValve Field Trial

Twister performed a field trial, with a SwirlValve applied as a JT choke in an LTS train at a gas production facility in The Netherlands. New production wells came on stream, making the maximum operating flow (650000 m3/d) the constraining factor, and hence the preferred

The flow path in a SwirlValve with the specific SwirlValve feature of the cage with tangentially oriented slots (in purple).

ANSYS



1. SwirlValve® and Twister® are registered trademarks of Twister B.V.

location for a test. The plant had a feed pressure of 99 barg and a design capacity of 670000 m3/d. The facility's vertical SMSM cold separator operated at a temperature of -18°C and pressure of 68 barg. Export specifications consisted of a hydrocarbon dewpoint of -3°C at 27 barg, and a water dewpoint of -10°C at 70 barg. The operating limit, using the conventional choke valve, was a maximum flow of 650000 m3/d in order to avoid off-spec gas and excessive carry-over of glycol.

The export gas quality was monitored during the test through an online hydrocarbon dewpoint analyzer and a mobile automatic condensate metering unit. For comparison, the traditional choke valve performance was measured prior to applying the SwirlValve. The flow rate could be increased to at least 735000 m3/d while maintaining export gas specification and without increased glycol consumption through carry-over.

Other SwirlValve installations include Brazil and Colombia with possible future ones in Nigeria and South East Asia.

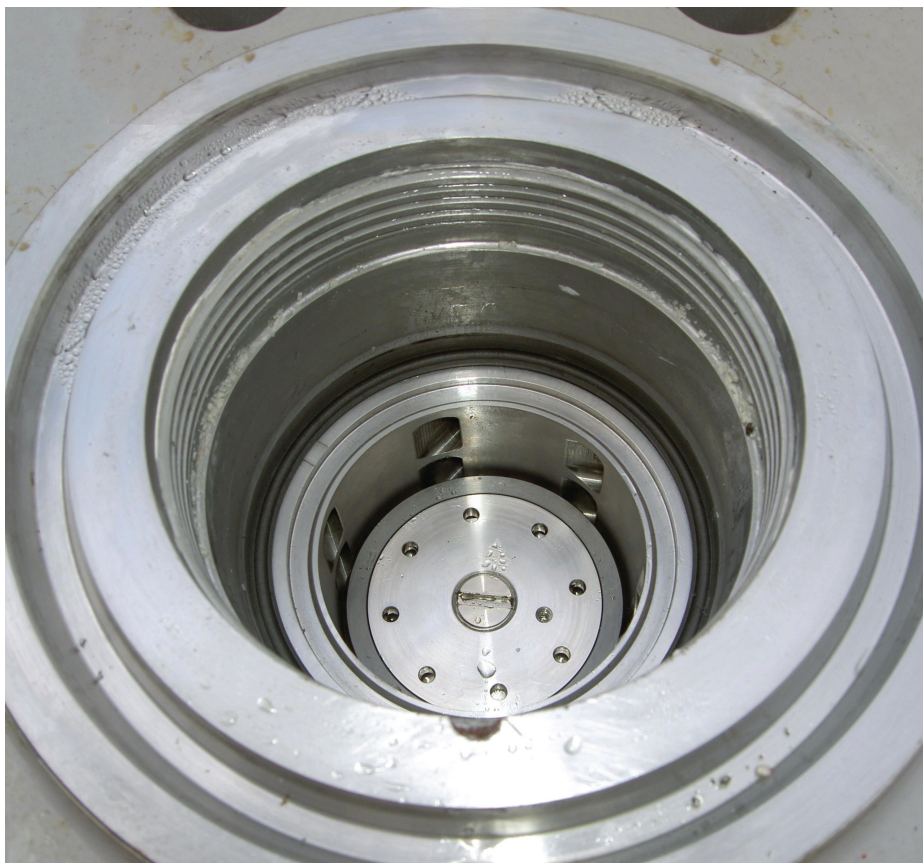
The Twister SwirlSep

Combining the SwirlValve with a compact inline separator results in the patented Twister SwirlSep, providing improved separation efficiency over the full range of flow rates and at a fraction of the plot space and weight. There is also no deterioration in turndown operations. The Twister SwirlSep's extreme compactness make it ideal for subsea applications which is currently being developed with technology partners.

Safe, Sustainable and Economic Gas Processing and Separation

Twister is changing the natural gas processing landscape and providing a commercially viable, safer and more sustainable alternative to traditional separation systems.

As this article demonstrates, the Twister SwirlValve is leading the way, delivering more flow throughput, increasing gas handling capacity, and resulting in safe, sustainable and economic gas processing and separation. •



The SwirlValve Cage1.

For any further information on how Twister BV can help your company's operations please visit <http://twisterbv.com> or contact us at: +31 (0) 70 303 0006 or office@twisterbv.com