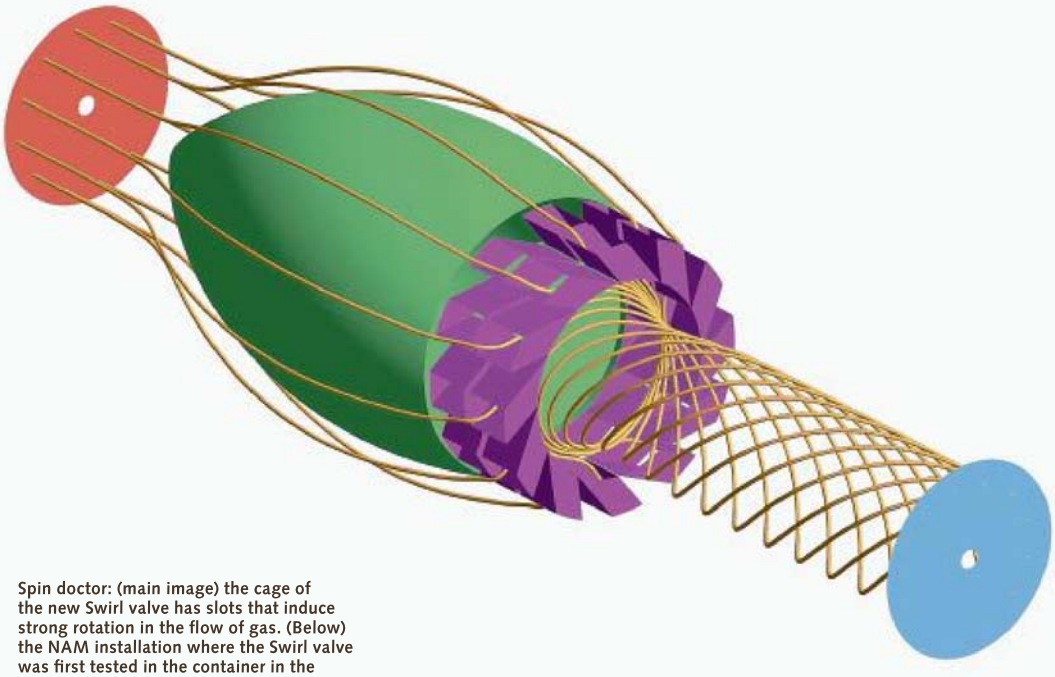

Spin doctor: (main image) the cage of the new Swirl valve has slots that induce strong rotation in the flow of gas. (Below) the NAM installation where the Swirl valve was first tested in the container in the foreground

Graphic/Photo: TWISTER

Twister unfurls Swirl as separate offering

Dutch process specialist comes up with sub-sonic variant for valves

ADRIAN COTTRILL
Houston

DUTCH company Twister has just launched a sub-sonic product — a new type of choke valve called Swirl — that fills a gap at the bottom end of its offerings.

This complements the supersonic gas processing technology that it has successfully established over the last decade.

In the company's words: "Swirl improves the separation of two-phase flow across a pressure reduction valve, such as a choke valve, Joule Thomson (JT) valve or control valve. This in turn significantly improves the separation efficiency of downstream separators.

"It is expected that this valve technology will be effective in flow debottlenecking of existing separator trains, minimising liquid carry-over and enabling significantly higher liquid recovery."

Twister sales director Hugh Epsom said: "We've been concentrating on supersonic separation since we launched Twister, steadily bringing out improvements on the original design and we are now in our third phase of evolution.

"Each time we have achieved a better pressure drop and better performance out of the product, easily outperforming a JT valve with low temperature separator, so we are very happy with that.

"What we did find was that we had a bottom level cut-off with Twister, where we couldn't handle flows below a certain rate.

"So we came up with Swirl to allow us to handle low flow applications or duties similar to JT valves.

"We can go right down to a two-inch valve if necessary," said Epsom. "All we do is take an existing valve and modify it by replacing its cage with one that swirls the gas around. On the other hand there is no limit to the maximum size, up to the normal 72-inch valve size."

The Swirl valve uses available free pressure and tangential slots in the cage to force the flow into a strong rotational motion, causing small droplets to concentrate and grow along the perimeter of the pipe wall.

Twister technology development manager Marco Betting said in a recent update: "The valve enhances the coalescence of dispersed liquids in the gas stream, in this way improving the efficiency of downstream separators.

"The centrifugal forces on the liquid droplets in the Swirl valve design result in a concentration and hence coalescence of droplets around the perimeter of the valve outlet. In a conventional valve the liquid fraction will not coalesce along the wall surface."

Epsom said: "We have secured two contracts and are now just on the verge of getting a third. The first was the original test carried out late last year at a field operated by NAM.

"It worked so well there that when the test finished they wanted to keep it. They will continue to operate the valve there for the foreseeable future, and now we are in the process of discussing a second one for them."

In that first test a conventional JT valve was replaced by a Swirl valve. This proved highly successful in both reducing the hydrocarbon dew point of the export gas and in debottlenecking the flow capacity of the production facility. It allowed the plant capacity to be increased by 20%.

Epsom said: "This opens up a brownfield market where we can go and replace existing JT valves — that's a market we are really interested in going after now.

"This could be a very low cost solution to help de-bottleneck plants and increase flow rates. Alternatively, it is also possible to reduce the pressure drop over the plant while maintaining the same dew points."

Launched by Shell Technology Ventures in April 2000, the core competence of the Netherlands-based Twister company is in modelling gas behaviour, and it has developed Swirl using knowledge of expanding multi-phase flows that it has gained during 10 years of developing the Twister separator.

That main product conditions gas by condensing and extracting water and natural gas liquids from it at supersonic velocities. Unlike conventional technologies, it does this using a simple static device with no moving parts and without the need for chemicals.

Nuclear for flow assurance

A SMALL team of flow assurance specialists in Houston is looking to gauge industry interest in further development of a new technique for monitoring multiphase flows, *writes Adrian Cottrill.*

They say that the application of nuclear magnetic resonance (NMR) technology in this field should provide a much better early warning system than existing methods currently used to guard against the potential appearance of pipeline-blocking solids such as hydrates, wax and asphaltenes.

The application has been developed by Shuqiang (Shawn) Gao, currently a flow assurance specialist at Shell Global Solutions in Houston, along with his Rice University colleague Walter Chapman, and Waylon House of Texas Tech University.

"Current flow assurance monitoring techniques rely mainly on measuring production system parameters like pressure and flow rate," said Gao. "They only warn the operators after problems have started to occur, and may not give enough time to rectify the situation quickly enough to avoid a catastrophic failure of flow.

"Such mishaps are costly both to remediate and in lost production, and the overall financial losses that result from such incidents can easily reach millions of dollars."

NMR is a technique for observing the properties of an atomic nucleus when an external magnetic field is applied.

With the patented technology that Gao and his team are working on, they aim to "directly detect and quantify the kinetics and amount of precipitated phase in a hydrocarbon stream, including gas hydrate, asphaltene, and wax".

In laboratory settings, this technique can also provide more accurate gas hydrate behaviour envelopes than current experimental methods, said Gao.

"The high-quality data we can obtain is invaluable during the design phase of offshore developments and critical for properly managing hydrate risks during oil industry operations where flowlines are often at low temperatures and high pressures which favour the formation of hydrates.

"The science and technology of our technique is proven. Fundamentally, following our research that started in 2005, we have confidence this application should work," said Gao.

"However, I don't know how many people in industry right now are fully aware of it.

"Now, given interest from industry, we'd like to go on to develop prototype equipment and test it, first onshore, maybe in a year from now, and later offshore. Programmes like Deepstar and RPSEA may be good places to do this.

"Besides application in flow assurance monitoring, this technology can also potentially be adopted as an accurate multiphase flow meter," he adds.