Vortex*FLOW*™

DX Series Tools

Tools for Advanced Fluid Movement

vortextools.com

The Science Behind Vortex DX Tools

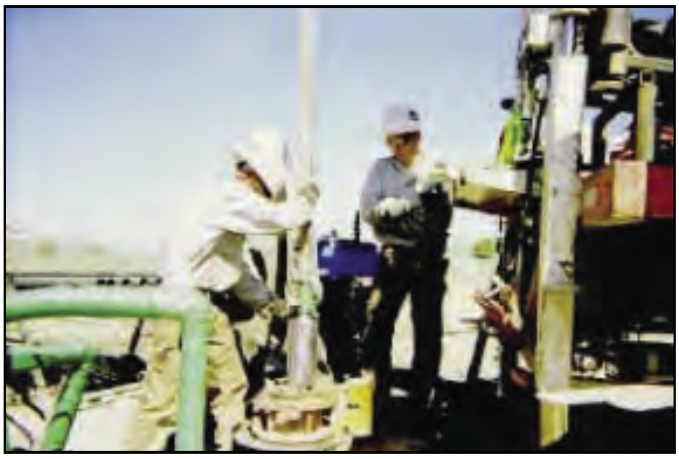
The DX Series tools are based on the latest breakthroughs in fluid dynamics. Building on the success of the SX tool line, the DX tools bring the Vortex Technology to gas wells for dewatering applications. The DX tools were developed and tested at DOE, Texas Tech and Texas A&M University facilities. The result: a breakthrough opportunity for your team to improve production.

How The Vortex DX Technology Works

Fluid flow traveling through a tubing string is typically turbulent and disorganized. This disorganization uses flow energy and is less effective in lifting liquids as it travels through the tubing string. In the case of multi-phase flows, the disorganization problem is compounded by the fact that different phases of the flow interacts in an inefficient manner, further reducing flow energy. The result of this flow disorganization is a well with liquid loading occurring at higher rates than those equipped with the DX tools.

The DX tool takes a disorganized multi-phase flow and creates an organized "vortex" flow. This organized flow has three main benefits in gas well tubing strings:

- DX tools reduce the gas rate required to lift liquids from the well bore.
- The flow is more organized, resulting in less wasted energy and greater efficiency. Lab tests have shown that the DX tool increases liquids lifted by 12% and reduces pressure drop due to friction by up to 15%.
- The DX tools create a liquid boundary layer on the inner wall of the pipe that acts as a cushion. This reduces friction and helps to reduce accumulation of paraffin or scale on pipe walls



Vortex DX Creates Real Value

The Vortex DX tool offers a variety of ways to capture significant benefits. Our available case studies provide details and specifics of exactly how the Vortex DX tools can be of benefit. Our goal at VortexFlow™ is to help our Customers realize significant economic and operational value within a short time period.

• An operator in Texas installed a DX tool in an 8,000' well eliminating the need to unload the well weekly and stabilized production.

• An operator in Canada installed a DX tool in a 3,000' well resulting in a production increase of approximately 10% or 20 MCFD.

• An operator in Colorado installed DXPL tools (bumper spring tool) to assist or delay the use of plungerlift.

• An operator in Utah installed a DX tool in a 3,000' well that was already flowing above critical rate, the reduction in BHFP due to lower friction resulted in a sustained increase in gas production of 10%.

	DXI Tools	DXR Tools	DXB Tools
Standard Thread	1.25" to 3"	Call for Sizing	Call for Sizing
Tubing Thread	1.9", 2.375", 2.875", 3.5"	Call for Sizing	Call for Sizing
Tool Outer Diameter	2.5", 3.25", 4", 5"	2.375", 2.875", 3.5", 4.5", 5.5" (OD varies - pipe size listed)	Call for Sizing
Tool Inner Diameter	Call for Sizing	Call for Sizing	0.6',0.7",0.8",0.9", 1.0",1.076",1.15", 1.3",1.5",1.9"
N.P.T	Call for Sizing	Call for Sizing	1.0", 1.25", 1.5"
Base Material	304L Stainless	304L Stainless	304L Stainless
Weld Spec	316L Weld	316L Weld	316L Weld

DX Tool Options and Installation

DX tools are available in "thread on" and retrievable applications. The new DXR tools enable operators to install our technology through slick line, avoiding the cost of pulling tubing. The DX and DXi tools are attached at the bottom of the tubing string during completion or by workover. The inline DXi tool can be installed with or without additional tubing below the tool. VortexFLOW now offers a DXb (bullnose) tool which can be threaded on to velocity strings for friction reduction!

Is my well a good Candidate for a Vortex tool?

The DX tools are recommended primarily for use in gas well applications that have the potential to produce formation water. Applications range from dewatering shallow, highly permeable coal-bed wells, to deep tight gas wells and most recently to improving fluid recovery in horizontal wells of the Barnett Shale.

The tools have proven to enable flow beyond the critical rate and also compliment existing artificial lift technologies. DX tools have been used successfully with plungers, soap, intermitting, velocity strings and recirculating gas lift.

Our engineers have the technical knowledge to help you determine the optimum solution to your gas well's liquid loading problems. Visit our website to review case studies and find out more.

Call VortexFlow™ today (303.761.7570) to learn how we can help create value for your company.

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