

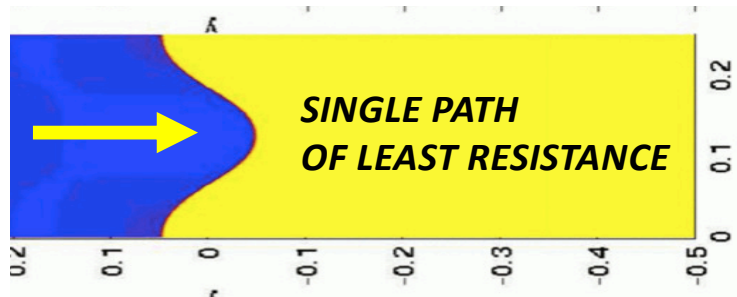


The New Fluid Flow Standard



IRRIGATION ASSOCIATION SAN ANTONIO 2023
MOST INNOVATIVE IRRIGATION PRODUCT

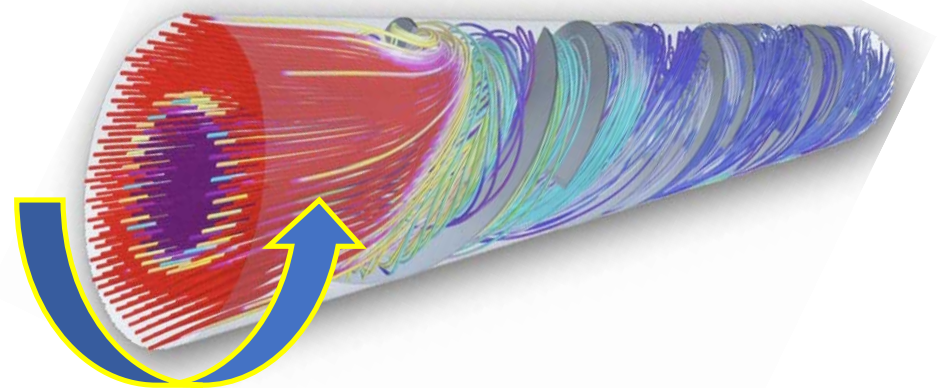
VORTEX TECHNICAL BREAKTHROUGH



PROBLEM

- *Laminar flow has only a single path of least flow resistance*
- Flowing drag causes **COSTLY PUMPING** and **MAINTENANCE**
- Unreliable flows, blockages, expensive intervention
- Yield, productivity and operations continually compromised
- Bigger pumps and pipes raise capital and op costs even higher

UNLIMITED FLOW PATHS OF LEAST RESISTANCE

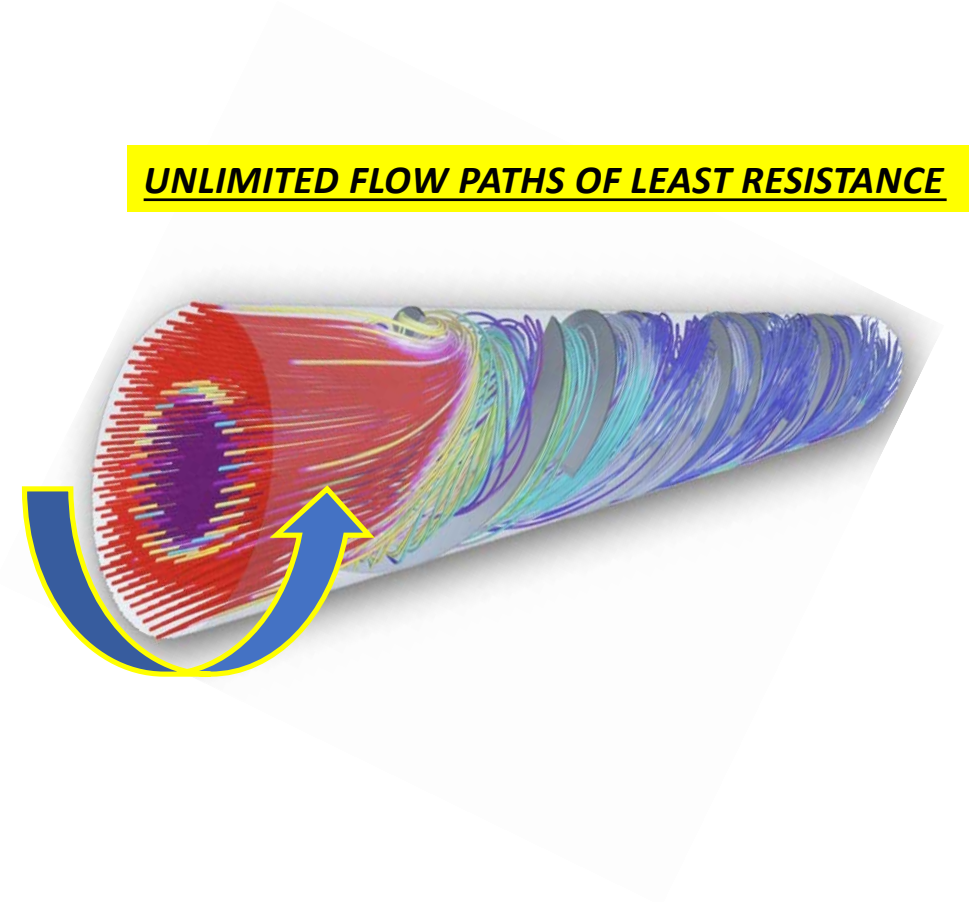


SOLUTION

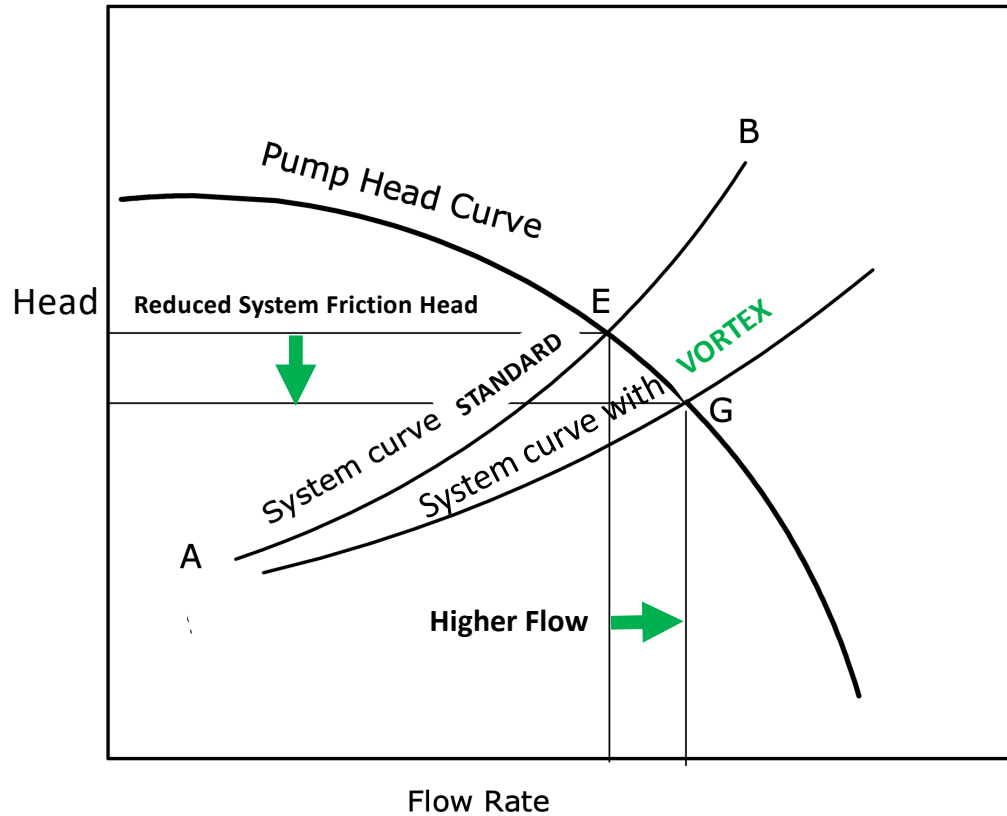
- **FLOW ROTATION REDUCES FRICTIONAL DRAG**
- **LESS ENERGY CONSUMED AT ALL FLOW RATES**
- **FULL PIPE VOLUMETRIC CAPACITY UTILISED**
- **HIGHER FLOW ENABLED IN EXISTING LINES**
- **SIMPLE, INEXPENSIVE VORTEX UNIT RETROFIT**

VORTEX VALUE ADVANTAGES

- Higher **FLOW ASSURANCE IN EXISTING LINES**
- Higher **YIELDS / PRODUCTIVITY**
- Pumping **COST REDUCTION**
- No more **SEDIMENT / SOLIDS BLOCKAGES**
- Reduced **MAINTENANCE / MANPOWER**
- Lower **ENERGY USE AND DOWNTIME**



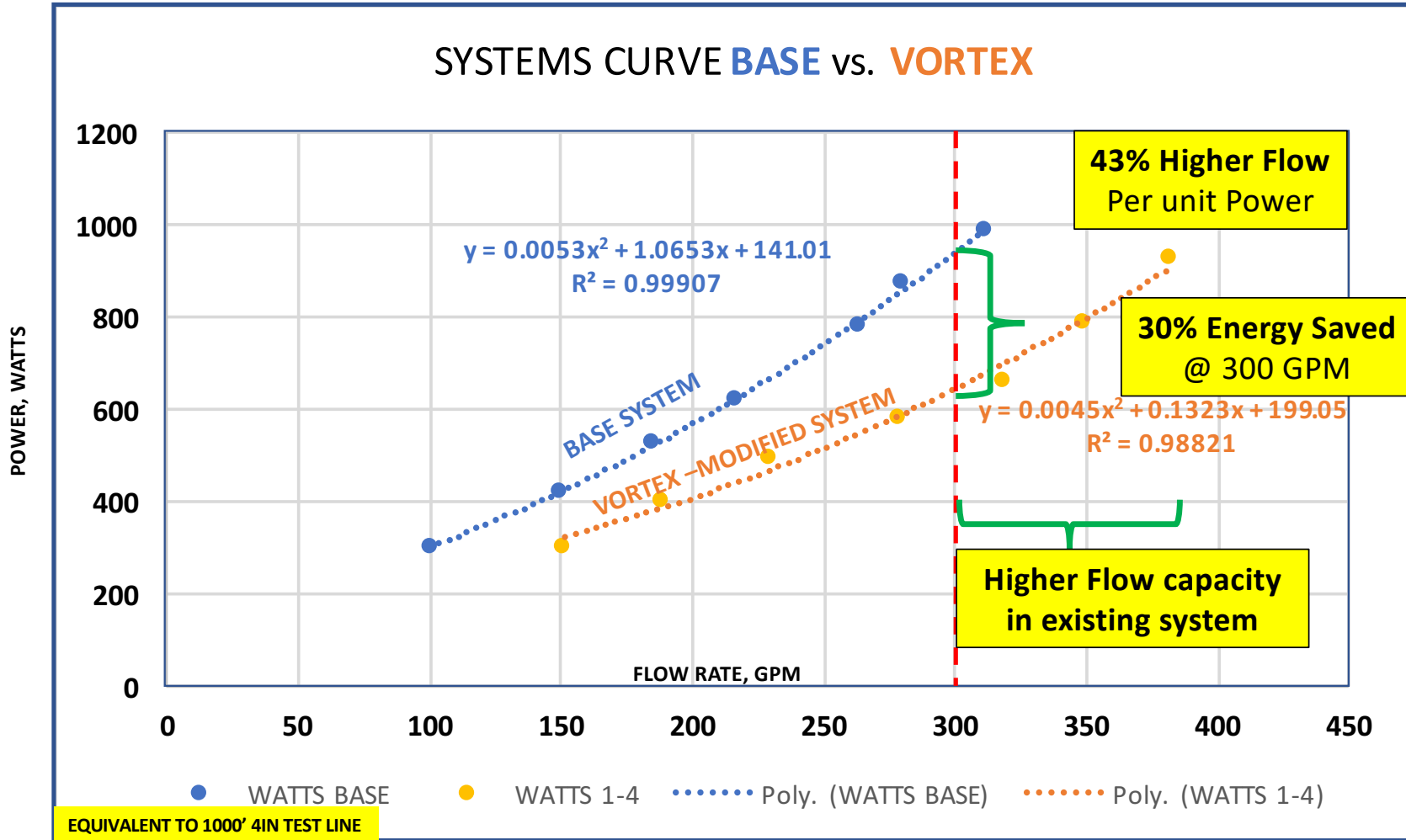
VORTEX - PERMANENT SYSTEMS CURVE IMPROVEMENT



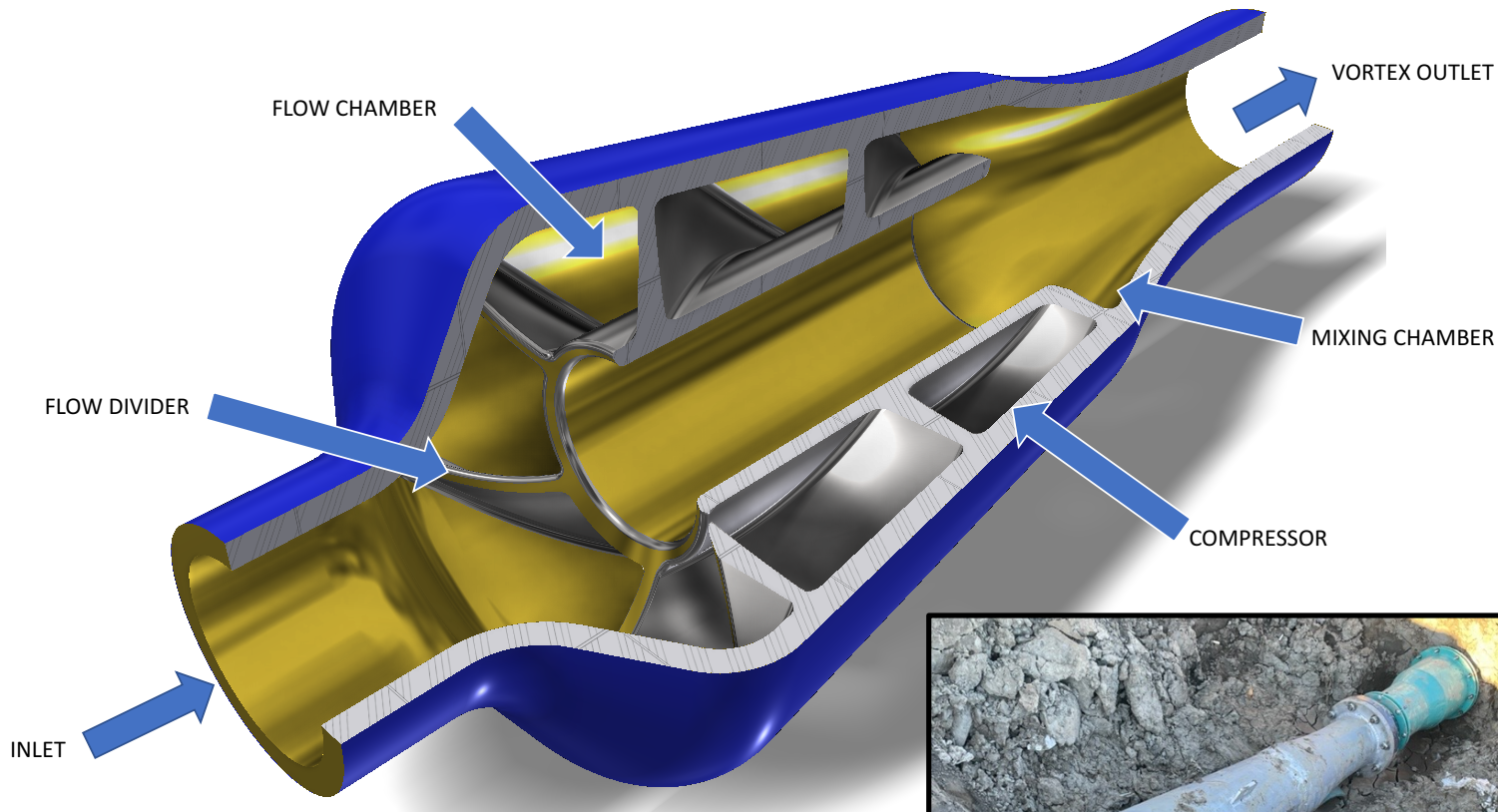
Pipeline Hydraulics, Dr. S. Menon

- 30% LOWER PUMPING ENERGY AND OPEX
- OR 40% HIGHER FLOW RATES
- PERMANENTLY REDUCES SYSTEM CURVE FRICTION
- FLUID ROTATION KEEPS LINES CLEAN AND FREE FLOWING
- LONG-DISTANCE FLOW ASSURANCE
- LESS PUMP STRESS AND MAINTENANCE
- HIGHER RELIABILITY AND UPTIME

VORTEX LAB TESTED PERFORMANCE



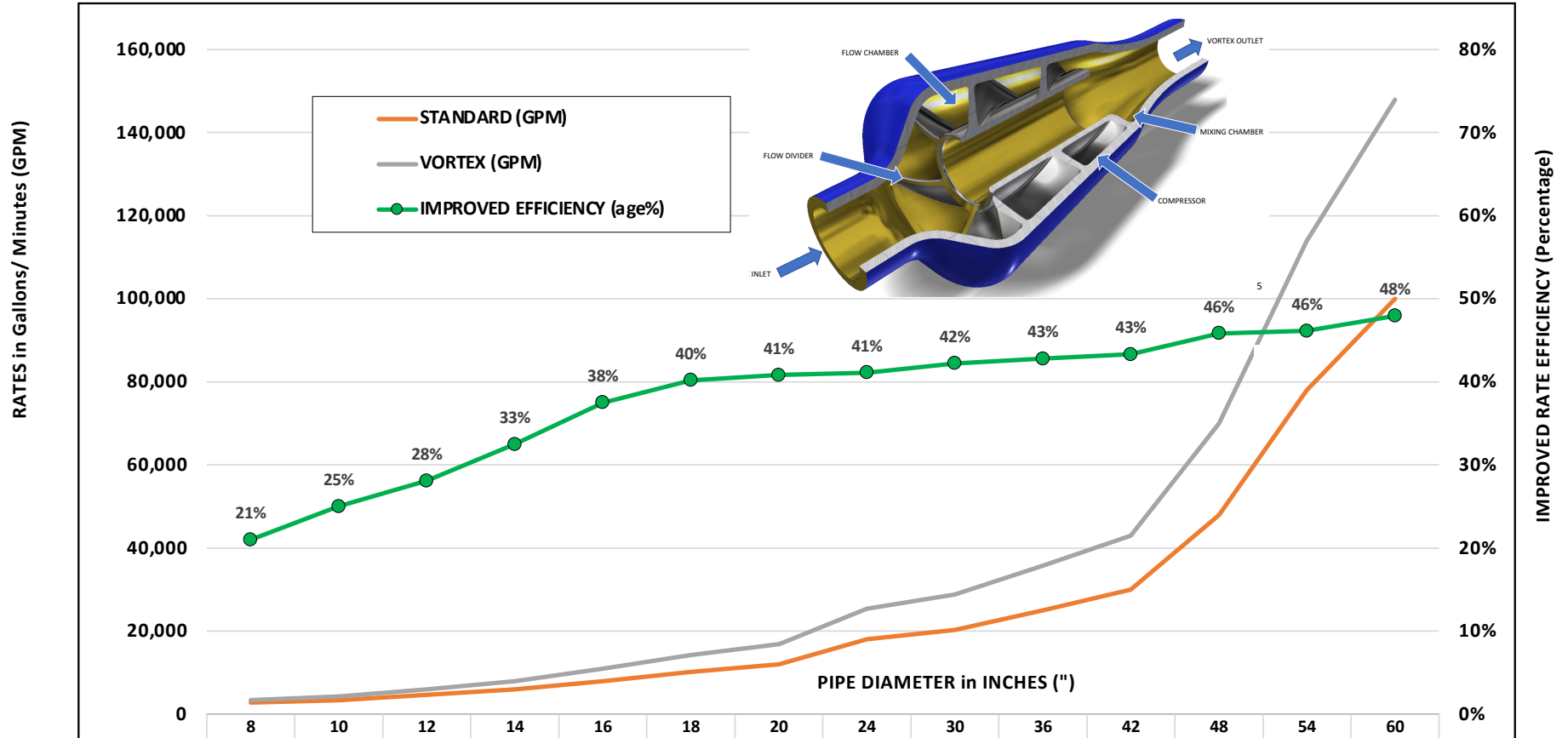
VORTEX AMPLIFIER CROSS-SECTION



- *Installs simply in line*
- *No moving parts*
- *No energy required*
- *No maintenance*
- *Fit and forget*



VORTEX INCREASES FLOW IN EXISTING LINES



STANDARD (GPM)	2,800	3,400	4,700	6,000	8,000	10,200	12,000	18,000	20,250	25,000	30,000	48,000	78,000	100,000
VORTEX (GPM)	3,388	4,250	6,020	7,950	11,000	14,300	16,900	25,400	28,800	35,700	43,000	70,000	114,000	147,939
IMPROVED EFFICIENCY (age%)	21%	25%	28%	33%	38%	40%	41%	41%	42%	43%	43%	46%	46%	48%

VORTEX – FIELD PROVEN



**SOLVED
36 MONTHS'
SUCCESSFUL
OPERATIONS**



VORTEX PERFORMANCE, 4" LINE



2-3 FT BASE FLOW

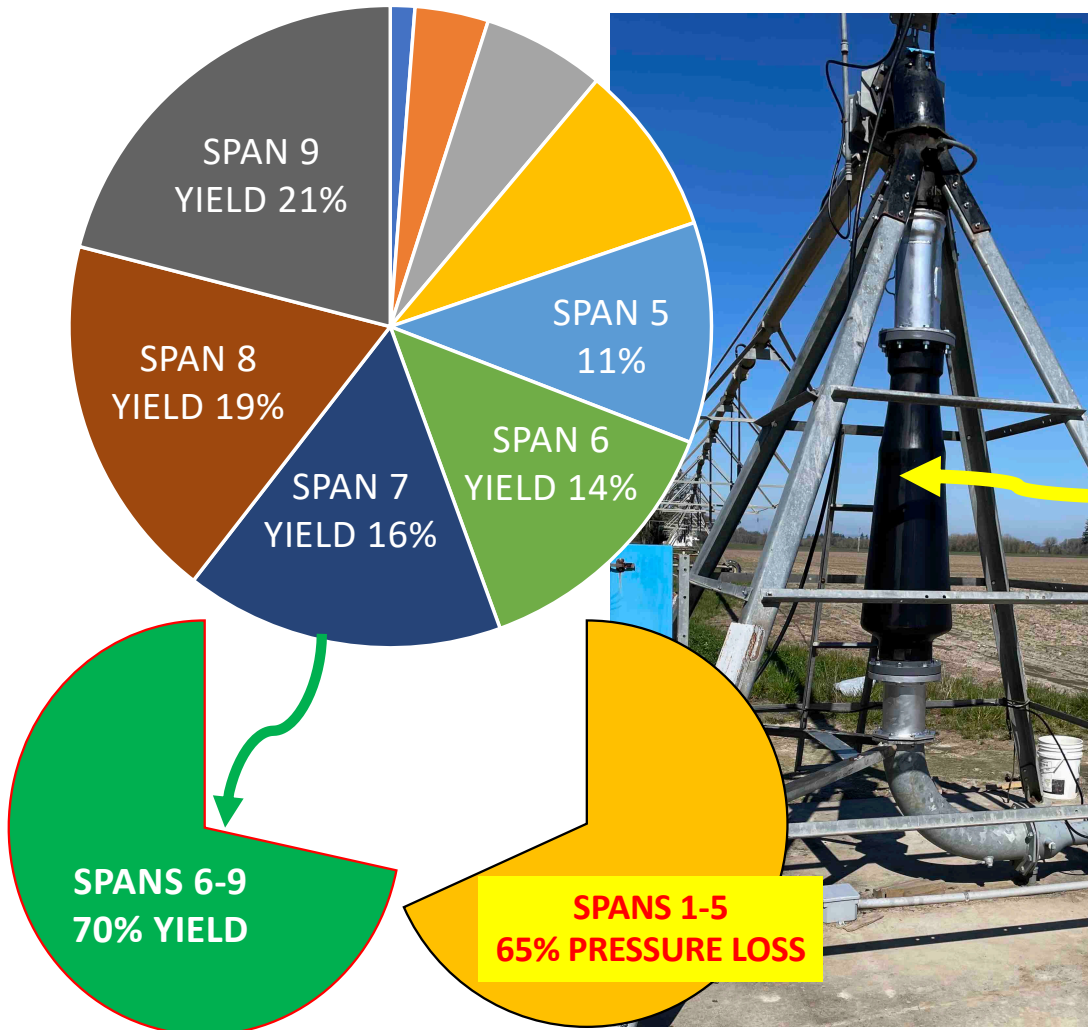
- LINE PRESSURE LOSS WITH DISTANCE IS DRAMATICALLY REDUCED
- ***COMPOUND FLOW RATE ENHANCEMENT***
- ***LONGER DISTANCE FLOW ASSURANCE***



11-12 FT VORTEX FLOW

PIVOT SYSTEM PAIN, VORTEX RELIEF

SPAN YIELD %




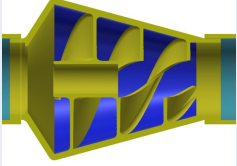
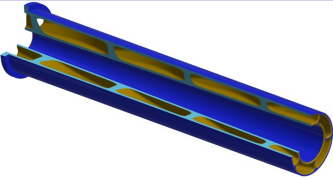
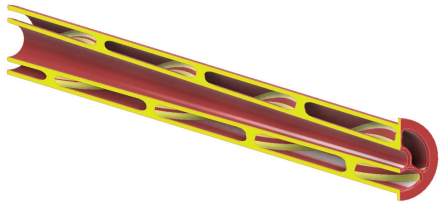
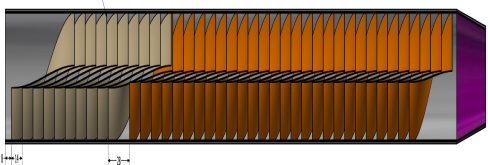
½ MILE PIVOT :

- 70% OF YIELD COMES FROM LAST 4 SPANS
- **SPANS 1-5 REDUCE INITIAL PRESSURE BY ~65%**
- **2/3 PRESSURE WASTED ON 1/3 OF YIELD**

VORTEX PAIN RELIEF :

- REDUCES EACH SPAN'S FLOWING FRICTION LOSS
- COMPOUNDS FLOW GAINS, RAISES YIELD
- REDUCES PUMPING COSTS / RUNS MORE PIVOTS
- EASY INSTALLATION, NO OPEX OR MAINTENANCE

VORTEX PASSIVE PRODUCTS

PASSIVE PRODUCT	VIEW	PURPOSE
<p>FLOW AMPLIFIER FRICTION HEAD REDUCTION VFA</p>		<p>High flow-rate drag reduction device Raises efficiency and line capacity, reduces emissions, Long range, high volume lines</p>
<p>INTERMEDIATE MODIFIER MODERATE FLOW DEVICE VXM</p>		<p>Intermediate flow-rate drag reduction device Raises efficiency and line capacity, reduces emissions, Chemicals, refineries, terminal handling</p>
<p>FLOW MODIFIER FLOW ASSURANCE VFM 'SURESTREAM'</p>		<p>Flow assurance at trunk-line flow-rates Raises efficiency, suspends particulates, stops blockage Chemicals, refineries, terminal handling</p>
<p>DRIP LINE BOOSTER TERMINAL FLOW DELIVERY VDL</p>		<p>Supports drip line and micro delivery to plant roots Low-rate, long distance flow assurance Cotton, row crops, orchards, vineyards</p>
<p>CULVERT FLOWMASTER FLOOD SURGE CONTROL VCF</p>		<p>Automatic, Self-Cleaning Storm Surge Protection Flexible applications in wide-ranging storm events Just-In-Time Drainage and Flood Control Allows aquatic migration</p>



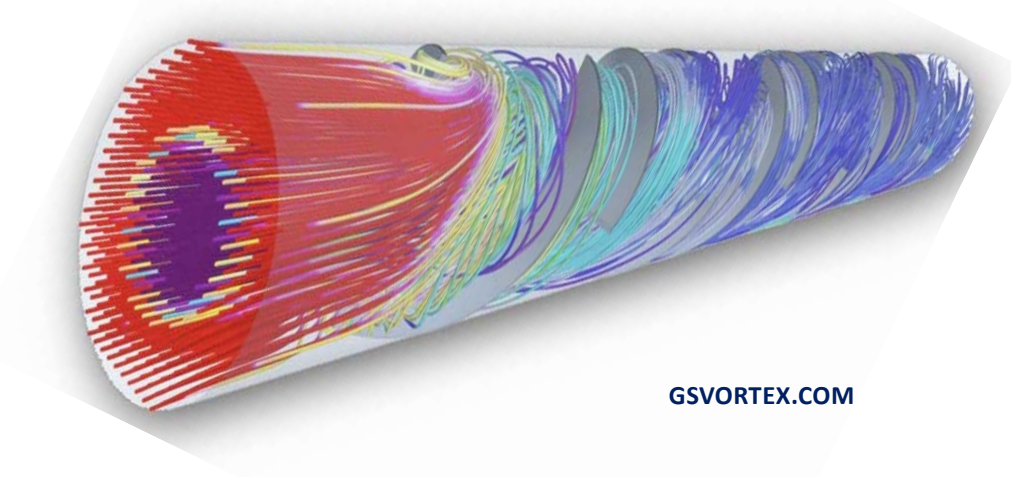
2-3 FT BASE FLOW

Cost Reduction, Higher Yields
Total Flow Assurance

VORTEX – The New Flow Standard



11-12 FT VORTEX FLOW



GSVORTEX.COM