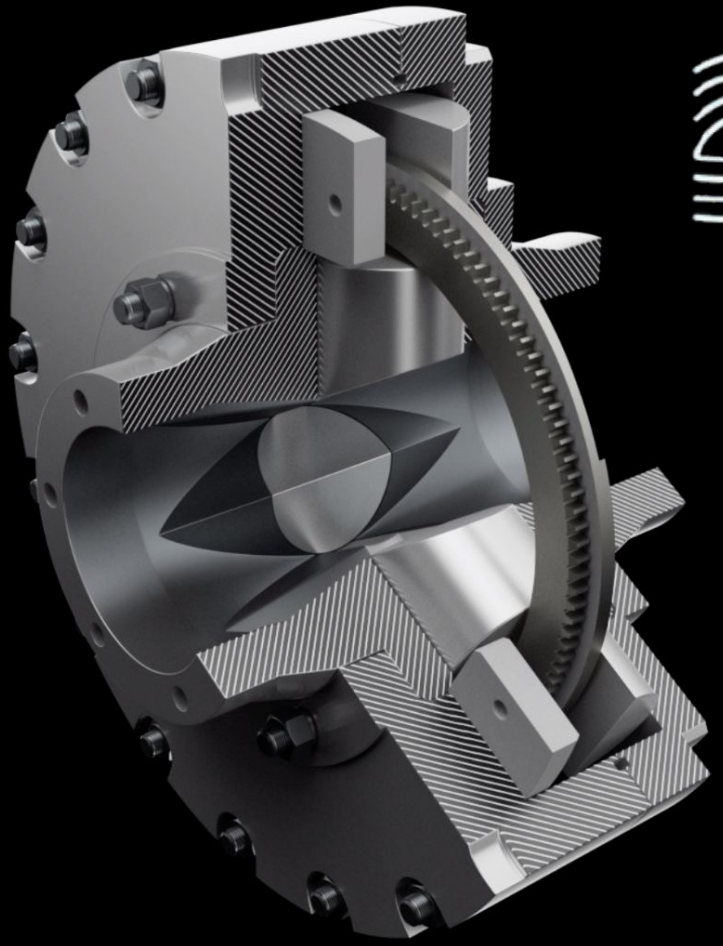


AeroThru

Gas Valve by Revalvelution Corporation

IMPROVES GAS PIPE THROUGHPUT SIGNIFICANTLY USING ADVANCED HYDRODYNAMICAL PRINCIPLES

U.S. Patent #11015721
U.S. Patent #11415231

Introduction

The primary objective for most companies worldwide is to reduce costs.

In the oil and gas industry, increasing the efficiency of gas transportation is paramount.

Our innovative flow control valve named **AeroThru** reduces energy losses from 23% to just 5% by optimizing specific problem areas within gas pipeline systems.

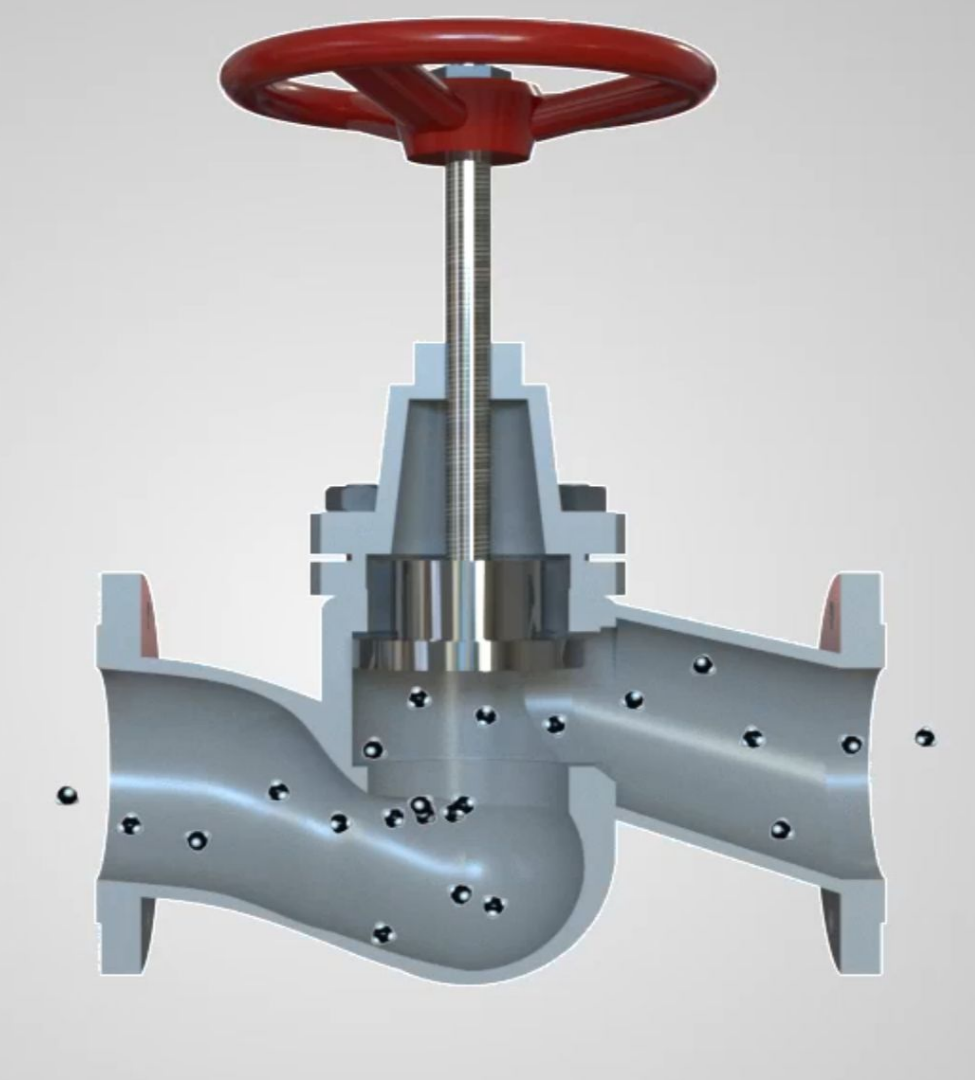
Why AeroThru Valve Is More Efficient

Traditional flow control valves in gas pipelines were originally designed for liquids.

But gas is not a liquid. The key difference lies in compressibility.

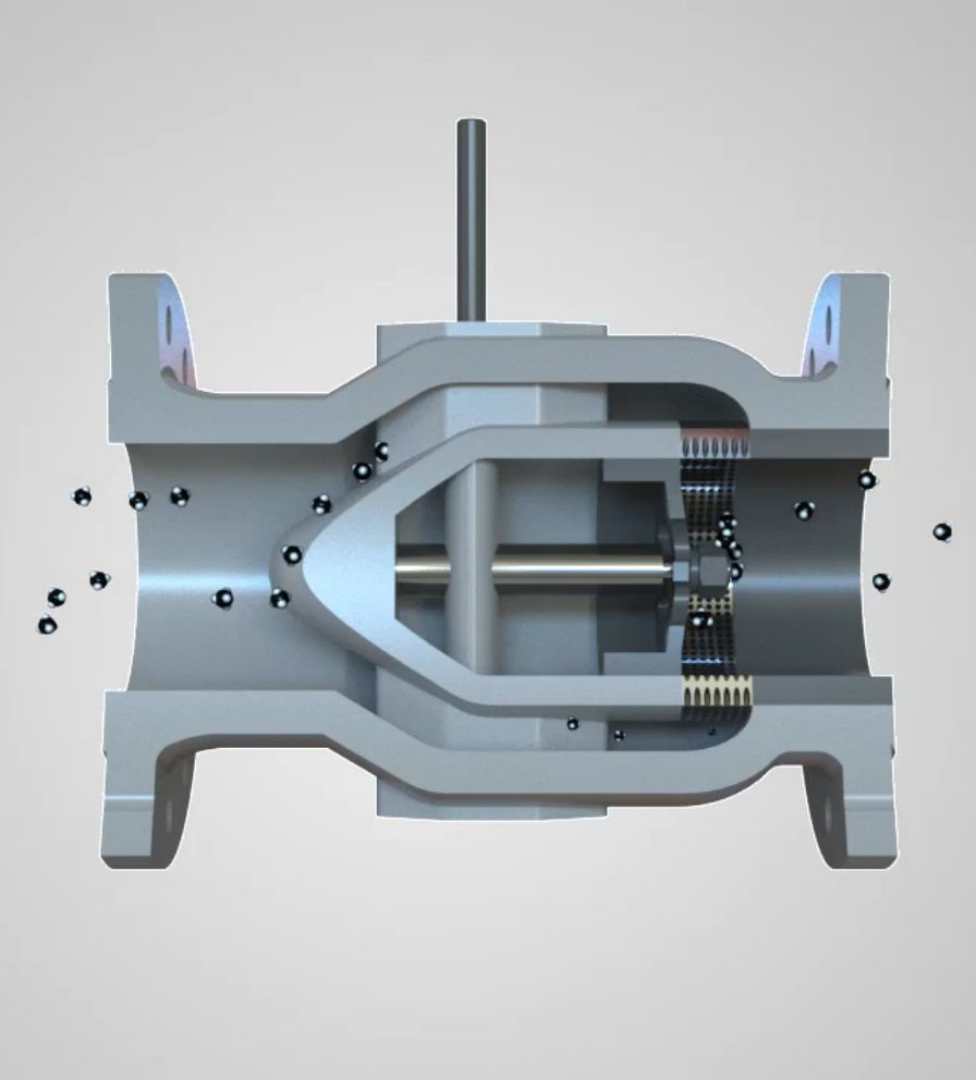
When comparing the two most common flow control designs, significant problematic areas become apparent.

In the next two slides the problematic areas of the conventional valves are disclosed.



S-Shaped Valves:

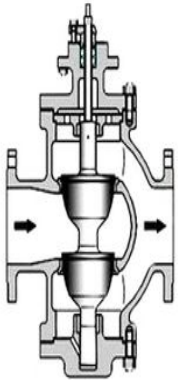
- Gas flow must change direction twice by 90°, and throttling mechanisms create additional obstructions.
- Energy losses can be as high as 50%.



Ring Separator Valves:

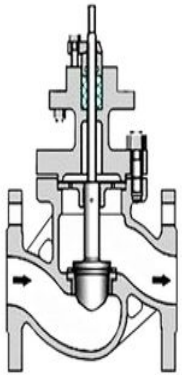
- Flow disturbances occur first as the gas navigates around the mechanism, then again when passing through opposing holes.
- The separator area reduces gas flow energy by approximately 35%.
- Each directional change or diversion results in reduced velocity, energy loss, and turbulent vortex formation – leading to unstable system performance and compressor surges.

Comparative Energy Loss Rates – Traditional Valves



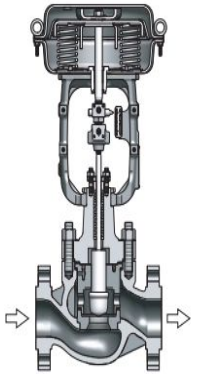
Double-seated S-shaped control valve

Energy loss ~71%



Single-seated S-shaped control valve (straight through)

Energy loss ~82%



Cage-type S-shaped single-seated control valve

Energy loss ~82-86%

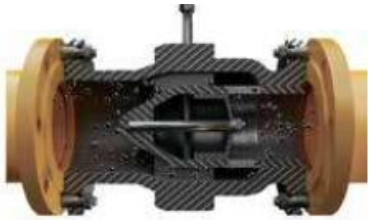
Comparative Energy Loss Rates – Modern Valves

Control disc valve

Energy loss ~38%

Full bore control ball valve

Energy loss ~21%



Axisymmetric AKA ring separator valve (Mokveld)

Energy loss ~63%

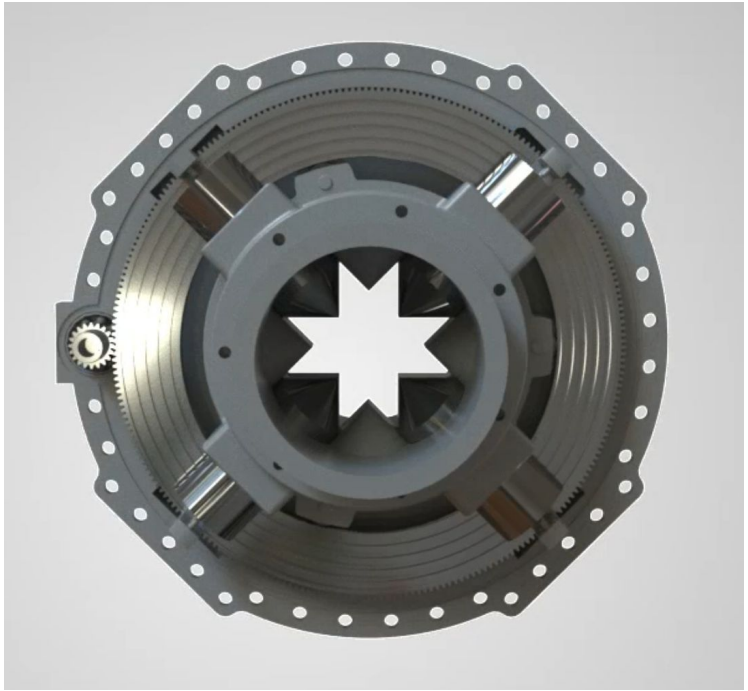
Our AeroThru Valve has energy loss rate less than 5%

Comparison of Maximum Transmission Coefficient (Kv)

Valve Type	Maximum transmission Kv, m3/hr
AeroThru Valve	**3490**
Double-seated S-shaped control valve	1000
Cage-type S-shaped single-seated control valve	630
Control disc valve	500 – 630
Full bore control ball valve	2200 – 2800
Axisymmetric AKA ring separator valve (Mokveld)	1295

The table represents the results of the experiments. Pipe diameter = 200 mm.

Features & Unique Properties of AeroThru Valve

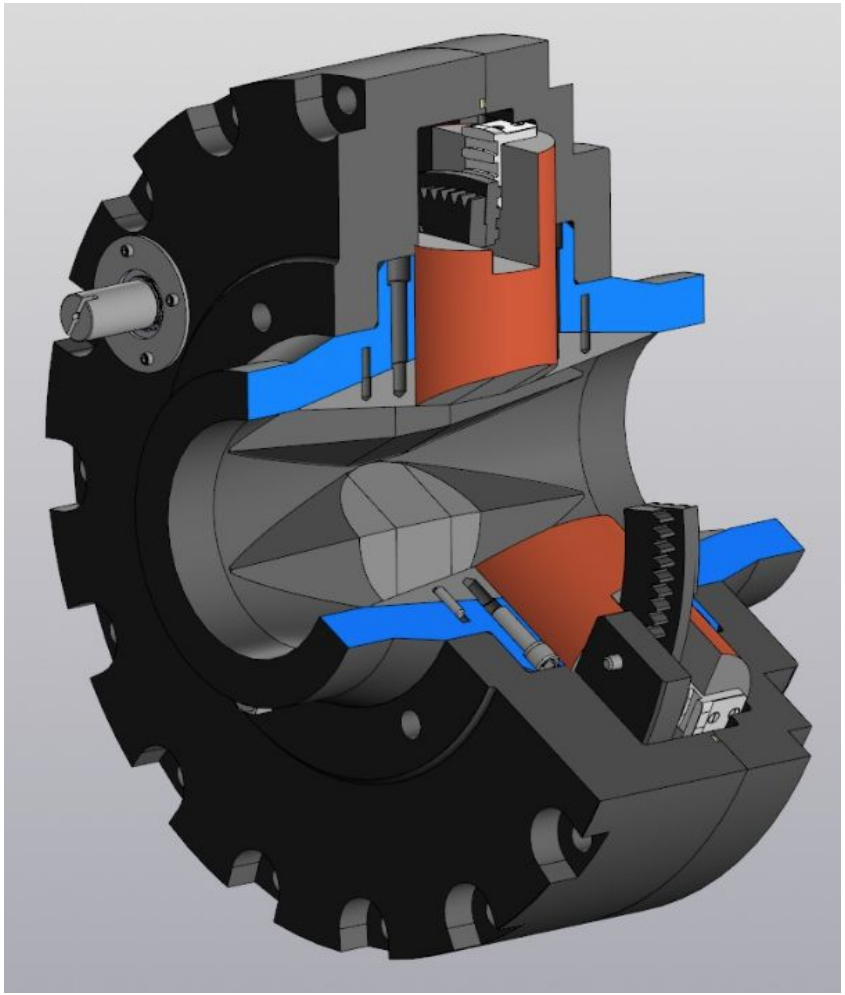


Innovative Flow Control:
Flow control is achieved by constricting the passage along the perimeter, minimizing directional changes.

Aerospace-Inspired Engineering:
The design incorporates advanced gas dynamics, similar to those used in aerospace engineering, ensuring optimal performance.

Enhanced Efficiency:
AeroThru Valve design in the throttling zone reduces energy loss to no more than 5%.

Additional Benefits:
- Integrated heating of the throttling zone.
- Self-cleaning capability to expel foreign objects, sand, and welding slag.



Structural isometry

Frontal photography when open at 100%

Frontal photography when open at 25%

Areas of Application

Gas Transportation

Gas Production

Extraction From Underground

Heat Power Industry

Nuclear Power Industry

Special And Medical Cases

Comparative Flow Test: AeroThru Valve vs. Mokveld Valve

Conducted at Gazprom

Objective: Compare gas throughput between the new AeroThru valve and existing Mokveld valves.

Setup:

- All valves installed on **8-inch** diameter pipelines *(200 mm ≈ 7.87 inches → rounded to standard 8”).*
- Operating pressure: **2,321 psi** *(16 megapascals ≈ 2,321 pounds per square inch).*
- Test duration: **1 day (24 hours)**.
- Target volume: **300 million ft³** of natural gas *(8.5 million m³ ≈ 300.1 million ft³).*

AeroThru Valve Configuration:

- Single valve, **25% open**.
- Transported **300 million ft³** in 24 hours.

Mokveld Valve Configuration:

- **Two** valves in **parallel**, both **fully open (100%)**.
- Combined, transported the **same volume** in the **same time**.

Conclusion (Implied)**:**

AeroThru Valve **matched the throughput of two fully open Mokveld valves** while only partially open — highlighting significantly higher flow efficiency.

Production Integration & Validation

Field Testing:

On-site testing has demonstrated ideal flow patterns through AeroThru Valve.

Industry Adoption:

Following successful integration with a world Tier-1 natural gas producer, the AeroThru Valve has become their new standard for flow control valves.

Verification by Kuhme Armaturen GmbH

AeroThru Valve specifications have been verified in the expert laboratory of Kuhme Armaturen GmbH in Germany.

Table: Transmission Koefficient (Kv), m3/hr

Pipe Diameter, mm	Pre-Calculated Expected Kv, m3/hr	Experimentally Proven Kv, m3/hr
100	936	910
200	3450	3280
300	8778	8505
400	15471	
500	25502	

The protocol of experiments and technical information can be provided upon request.

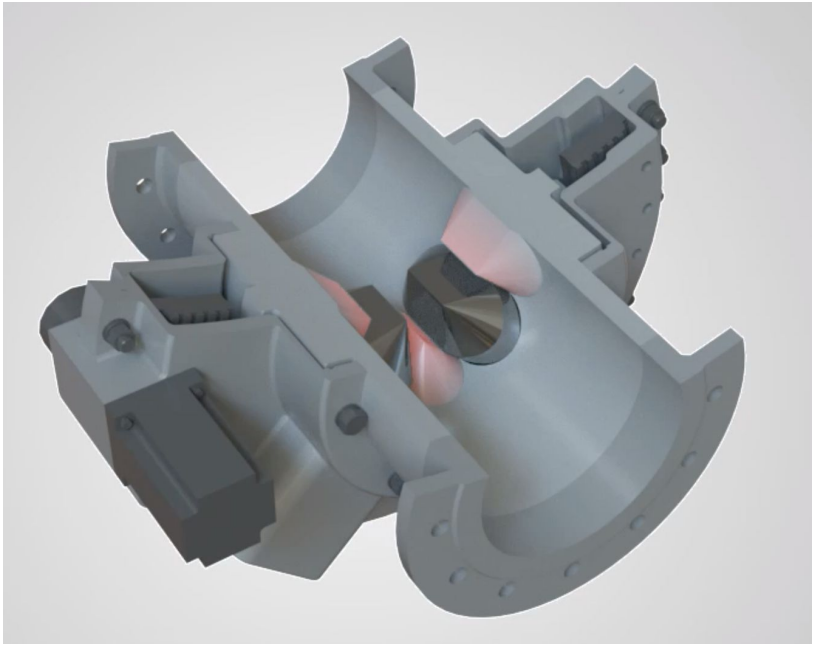
AeroThru Valve — A Game Changer

Why **AeroThru Valve** Is The Future of the Gas Flow Control Technology?

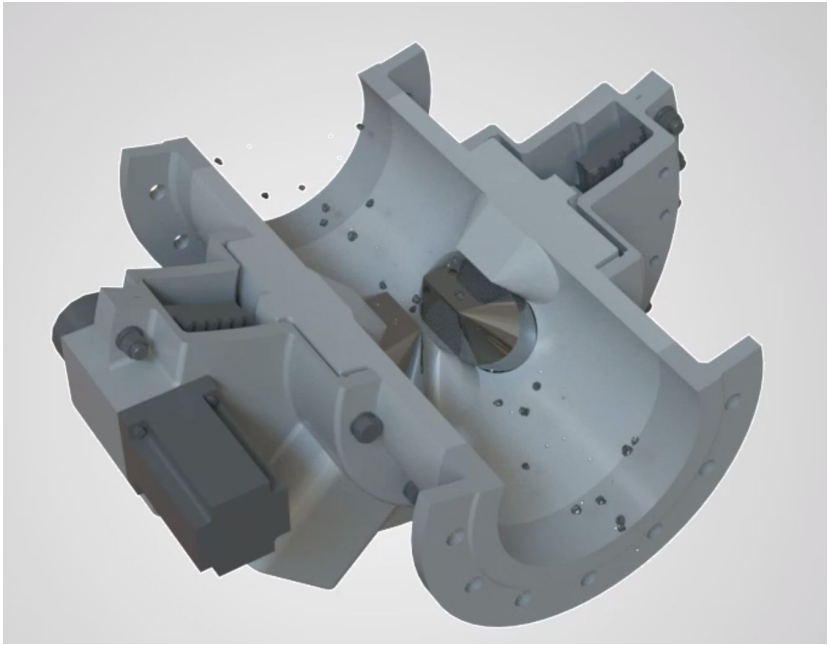
✅ **Optimized Gas Flow:** Eliminates unnecessary directional changes to reduce turbulence.
✅ **Precision Control:** Dynamically adjusts for maximum throughput.
✅ **Aerospace-Inspired Engineering:** Leverages advanced gaseous dynamics for unmatched efficiency.
✅ **Enhanced Functionality:** Offers optional flow-section heating and reversible flow for greater adaptability.

AeroThru Valve redefines gas flow control, **delivering unparalleled efficiency, cost savings, and operational flexibility.**

Additional Unique Properties of AeroThru Valve



Heated Throttling Zone
The design incorporates a heating system for the throttling zone.



Self-Cleaning Functionality
Automatically cleans itself when sand, welding slag, or other debris enters.

Environmental Effect

Table: Annual volumes of pollutants emissions during valve operation

Pollutant	Unit	Mokveld RZD-RMX2 8”	AeroThru Valve
Nitrogen dioxide (Nitrogen (IV) oxide)	tonn / year	2,635	0,268
Nitrogen (II) oxide (Nitrogen oxide)	tonn / year	1,571	0,160
Carbon monoxide	tonn / year	2,468	0,251
Total		**6,674**	**0,679**

As a result, excess emissions of pollutants have been **reduced by 88%.**

AeroThru Valve In The Real World

Photo: AeroThru Valve at the Exhibition

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Find informative videos, interactive 3D-Model and technical documentation on our website: aerothru.com.
Feel free to contact us over the phone or via email.
Our engineers will review carefully and answer your questions.

AeroThru

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