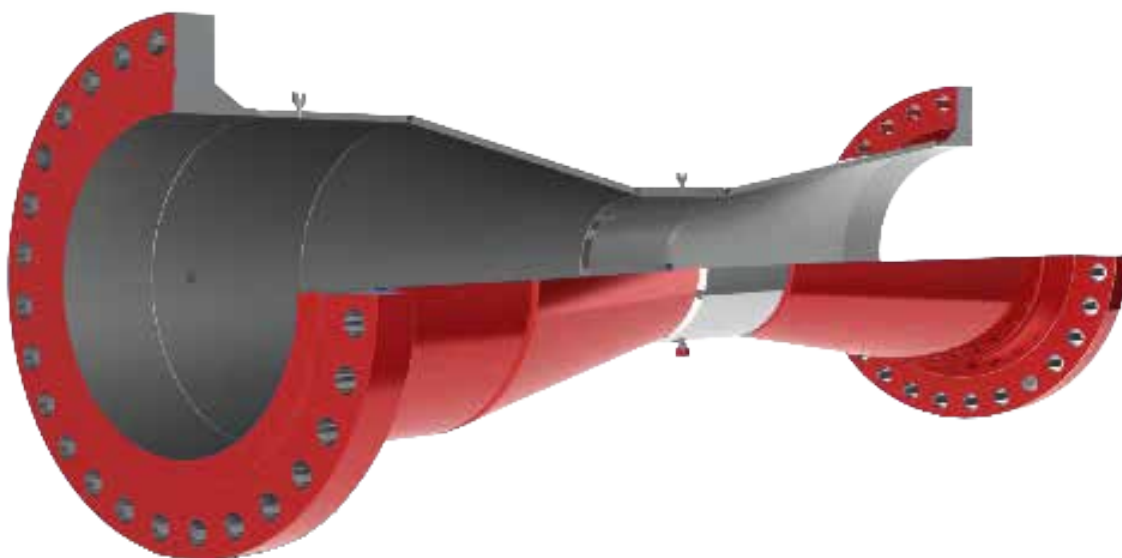
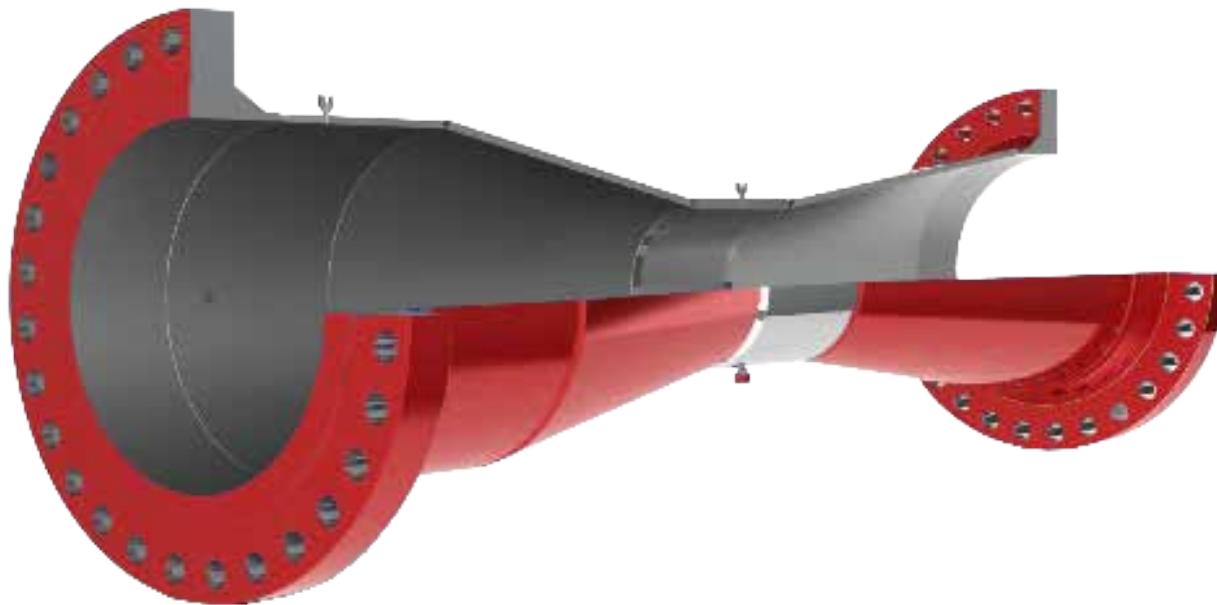


DANIEL<sup>®</sup>  
**VENTURI TUBE**  
PRODUCT GUIDE

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**PRIMARY FLOW  
ELEMENTS**





*Venturi Tubes, available in short and long form, are highly versatile and offer reliable performance in a wide range of process conditions.*

### OVERVIEW

With over 100 years of industry use, the venturi tube is a proven and reliable, low-maintenance solution to fluid measurement applications. The rugged design has no sharp edges or angles, and the gradual sloping profile makes the device less susceptible to build-up and ideal for measuring solid-laden fluids and slurries.

One of the key features that set the Venturi tube apart from other DP primary elements is the low pressure drop across the device, which greatly reduces pumping and operating costs and is ideal for LP systems where small differentials are required. Venturi tubes are commonly used for gas, liquid and steam measurement in a variety of industrial applications including oil and gas processing, petrochemicals, power generation, water and wastewater industries, and more.

### FEATURES

- High accuracy of  $\pm 0.8\%$ , Repeatability of  $\pm 0.1\%$ .
- Wide range of pipe sizes available from 2" to 24" and larger available by request.
- Multiple end configurations available, including flanged, threaded, beveled, and wafered.
- All grades of SS, Duplex SS, Carbon Steel and any other weldable material available by request.

### BENEFITS

- Minimal pressure loss compared to other primary elements.
- Minimal maintenance required due to lack of moving parts or sensitive instrumentation.
- Ability to measure liquid, steam or gas.
- High pressure resistance and wide temperature ranges available.

## FUNDAMENTALS

### PRINCIPLE OPERATION

The Venturi Tube consists of a convergent inlet connected to a cylindrical throat which in turn is connected to a divergent outlet. The reduced diameter of the throat creates a differential pressure between the inlet and throat sections, which is used to calculate the flow rate using Bernoulli's principle.

$$Q = K_c \times \sqrt{\Delta P}$$

Where:

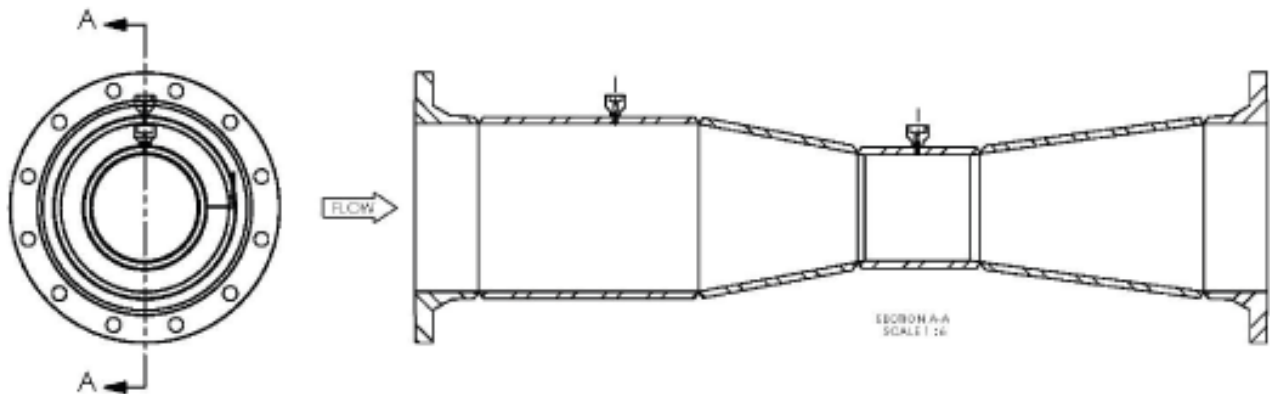
$Q$  Flow Rate

$K_c$  Proportionality Constant

$\Delta P$  Measured Differential Pressure

There are two pressure taps located on the meter. The high-pressure tap is located at the pipe inlet and measures the static pressure. The low-pressure tap is located in the reduced-diameter throat section and measures the pressure after flow passes through the restriction. The difference between the two is the differential pressure, which is used to calculate the flow rate.

The flow range for the meter is designed by specifying the Beta ratio, which is the relationship between the diameter of the inlet pipe and the diameter of the throat. See the cone meter diagram below for additional details.



Consult the Daniel team to select the proper dimensions, Beta ratio and construction materials to design the correct Venturi Tube for your application.

## SPECIFICATIONS

### PERFORMANCE AND PHYSICAL SPECIFICATIONS

<b>Standard Accuracy</b>	0.5% standard, higher accuracies available with calibration
<b>Flow Ranges (turndown)</b>	10:1 or greater
<b>Repeatability</b>	± 0.1% or better
<b>Permanent Pressure Loss</b>	Varies with DP and Beta (H/D) Ratio
<b>Beta Ratio</b>	0.4, 0.5, 0.6, 0.7; Additional betas available by request.
<b>Line Sizes and Pressure Ratings</b>	2" to 24" – ANSI 150# thru 2500# 26" and larger – available in any flange specification.
<b>Construction Materials</b>	All Grades of Stainless Steel, Carbon Steel and Alloys or any other weldable material
<b>End Configuration</b>	Wafer, Flanged, Beveled, Threaded and Others

*Daniel offers tailor-made solutions for your metering needs. Daniel Venturi tubes are built according to ISO 5167-4. All components are customizable to fit your specific system. Just ask our team, and we will find the solution.*



## VENTURI TUBE

### ORDERING INFORMATION

#### TO PLACE AN ORDER

Review the venturi tube catalog and select one option from each of the categories below to identify the part number for your application. Provide the part number to Daniel for a detailed quote at [sales@daniel.com](mailto:sales@daniel.com)

#### VENTURI TUBE - CVT PART NUMBER STRING (1 OF 2)

	CVT	XX	X	XX	XX
<b>Pipe Size</b>					
2" -----		02			
3" -----		03			
4" -----		04			
6" -----		06			
8" -----		08			
10" -----		10			
12" -----		12			
14" -----		14			
16" -----		16			
18" -----		18			
20" -----		20			
24" -----		24			
Larger -----		XX			
<b>End Configuration</b>					
Flanged -----			F		
Beveled -----			B		
Wafer -----			W		
Other -----			X		
<b>Throat Material</b>					
304/L Stainless -----				34	
316/L Stainless -----				36	
Carbon Steel -----				CS	
Low Temp Carbon Steel -----				LT	
Other -----				XX	
<b>Body Material</b>					
304/L Stainless -----					34
316/L Stainless -----					36
Carbon Steel -----					CS
Low Temp Carbon Steel -----					LT
Other -----					XX

(continued on next page)

## VENTURI TUBE

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#### VENTURI TUBE - CVT PART NUMBER STRING (2 OF 2)

CVT	XX	X	XX	XX	X	X	X	X	X	X	X
<b>Venturi Type</b>											
Short Form -----											S
Long Form -----											L
<b>Pipe Schedule</b>											
Standard -----											1
X-StrongWall -----											2
Other -----											X
<b>Process Connection</b>											
ANSI 150# Flange -----											1
ANSI 300# Flange -----											2
ANSI 600# Flange -----											3
ANSI 900# Flange -----											4
ANSI 1500# Flange -----											5
ANSI 2500# Flange -----											6
<b>Instrument Connection</b>											
1/4" NPT or SW -----											1
1/2" NPT or SW -----											2
Other -----											X
<b>Calibration</b>											
None -----											0
Third Party Lab Calibration -----											1
<b>NDE Testing</b>											
Visual Inspection -----											0
Hydrostatic -----											1
Radiography -----											2
Magnetic Particle/Dye Penetrant -----											3
PMI (SS only) -----											4
Other -----											X

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With over 90 years of experience, Daniel is the only manufacturer that has the knowledge and experience to engineer and offer superior products that are trusted to provide the most reliable and accurate measurements in the global oil and gas industry.

**Contact Us**

Email: [sales@Daniel.com](mailto:sales@Daniel.com)

Phone: +1 (346) 509-3700

[www.Daniel.com](http://www.Daniel.com)

