



Technology Solutions

TEK-DP 1690B

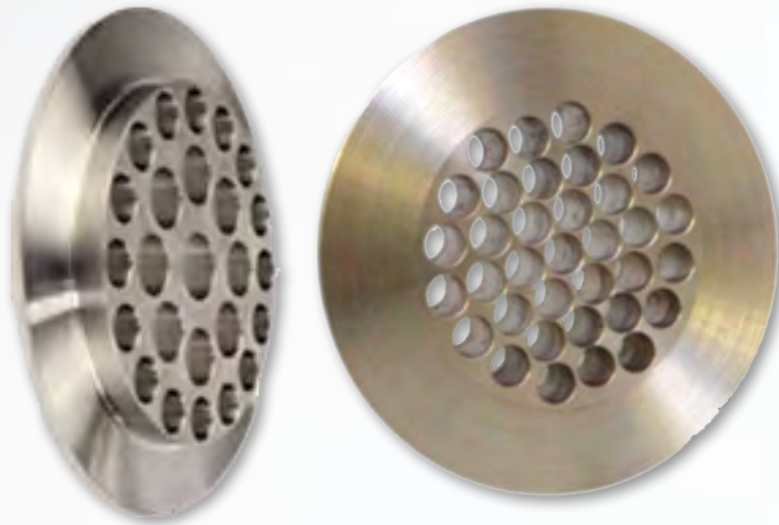
Flow Conditioner



FLOW



Plate Type
Conditioners



AGA /API
Type Tube Bundle



Introduction

Tek-Trol manufactured "Flow Conditioning" plates and tube bundles are built for the very best flow conditioning needs. All flow conditioners have been tested and evaluated by independent laboratories and validated in the most demanding situations.

TEK-DP 1690B flow conditioners are widely accepted designs that help to condition the flow upstream of any flow meter that requires a velocity/flow profile correction in natural gas, air, oil & liquified petroleum products, water, and other single-phase fluid applications where applicable.

All 1690B flow conditioning plate units are available in SS316/SS316L as standard, from 2" to 36" diameter in RF or RTJ options, other steel materials are available on request.

Standard API / AGA Tube Bundle Conditioners are also available, model number 1690-B Type V

Operation

A fluid flow conditioner is a device used to improve the flow characteristics of fluids, such as gases or liquids, in pipes or channels. It works by reducing turbulence and disturbances in the fluid flow, resulting in a more uniform and predictable flow pattern.

Flow conditioners typically consists of a series of specially designed elements or structures placed within the pipe or channel directly in front of the flow meter with a settlement region between the flow conditioner and the entry to the flow meter. The conditioner elements can be various shapes, such as perforated plates, or tube bundles as required for the process conditions. They are strategically positioned to change and redistribute the flow, smoothing out velocity variations and reducing the impact of upstream obstacles or irregularities in the piping.

As the fluid passes through the conditioner, any disruptive flow patterns are altered, and turbulence is dampened. This leads to a more uniform velocity profile across the pipe cross-section in front of the meter.

Overall, well designed flow conditioners help to promote a more controlled flow, which can improve measurement accuracy when used in conjunction with velocity profile sensitive meters, enhance the efficiency of fluid processes, and minimize the impact of flow-related issues such as vibrations, or uneven velocity profile distribution.

Features

- High Performance Design
- Improves accuracy for single – phase fluid metering applications.
- Minimizes flow measurement accuracy.
- Performance testing conducted to API Standards.
- Reduces flow meter run lengths.

Applications

- Petrochemical Industries
- Marine Industries
- Oil and Gas Industry

Specifications

Sizes	2" to 36" Diameter (DN100 to DN900); larger sizes available upon request
Pressure Classification	Class 150# through 1500#
Standard Bores	Schedule 40, Schedule 80, Others on request
Available Materials	316 / 316L Stainless Steel – Standard Supply Other: Carbon Steel, Alloy 20, Hastelloy, Monel and Duplex.
Types	Nova Design , Zanker Design, Straightening Vane/Tube Bundle Design.
Mounting Flanges	150#, 300#, 600#, 900#, 1500#, 2500# lbs.
Performance	In accordance with AGA 3/API 14.3 / ISO 5167 Pt1
Fluid Types	Natural gas, air, light liquids, hydrocarbons, crude oil, water.
Maximum Pressure Rating	ANSI 2500

Variants

The Tek-DP 1690 B Series Flow Conditioners are available in the following three configurations :

- **1690 B -V Tube Bundle/ Straightening Vane Flow Conditioner**

The Tek DP 1690 B Straightening vanes are designed to be installed in the upstream section of meter tube to minimize flow disturbance prior to reaching an orifice plate, or other meter requiring flow conditioning. These vanes are widely acknowledged as the most commonly utilized flow conditioner design in the market for Orifice measurement , we offer them in various sizes, complying with A.G.A. Flow and A.S.M.E. welding standards, in both carbon steel and stainless steel.

The Vane bundle is offered in three distinctive selections, as indicated in Figure 1. each type comes with either Flange Model or Pin Type fittings. The tubes of every Vane bundle are welded at all tangents (to prevent jetting); the inlets and outlets are reamed to minimize any pressure dissipation. Moreover, uniquely designed gaps on each bundle ensure precise placement within the meter piping. Finally, a robust clamp ring keeps the Flange Model tight between two pipeline flanges.

- **Tek-DP 1690B-Z Zanker Plate Flow Conditioners**

The Zanker Type Flow Conditioning plate is designed to reduce stream turbulence and recreate a velocity profile defined by the ISO 5167-1 standard. It is used when it is impossible to ensure the required upstream and downstream straight length. The flow conditioner plate helps eliminate large deformations of the velocity profile and reduces gross errors in flow measurement. This plate can help to shorten the length of an upstream meter run. See Figure 2.

The Zanker Plate Flow Conditioner can be used for all fluids, including gases and liquids. It is placed in a flanged joint and manufactured according to standards such as EN, DIN, GOST, American ASME, and ANSI (RF, RTJ) or according to customer requirements and specifications. The Zanker Plate Flow Conditioner is primarily made from stainless steel, although other materials are available upon request. It can be incorporated into both horizontal and vertical piping and has a long history of operation.

• **Tek-DP 1690B- N Flow Conditioner Plate.**

The Tek-DP 1690 B-N flow conditioner, is based on the tried and tested Nova Design, and is a compact device consisting of a solid metal disk with a precisely designed and machined hole pattern. Its effectiveness can be attributed to three key design factors.

- a tested hole layout,
- an abrupt pressure - drop with a smooth recovery.
- short length.

The hole layout is designed to redistribute the fluid flow across the pipe area, resulting in a balanced and fully developed flow profile at the entry into the flow meter. The layout of the device is carefully crafted to ensure that the fluid is properly balanced and that each hole within the flow conditioner handles the intended amount of fluid. See Figure 3.

By so doing, upstream flow distortions or asymmetry are eliminated. Furthermore, the fluid is accelerated as it passes through the plate, effectively acting as a filter section, removing the rotational vector from the swirl. The compact length of the flow conditioner helps to prevent the fluid from redeveloping flow profiles within the device itself. As a result, symmetrical and swirl-free flow velocities exit the flow conditioner, allowing it to recombine into a bulk, swirl-free, and fully developed flow profile after a short distance of from 5 to 8 D's.

Dimensional Drawings

• **Tube Bundle / Straightening Vane Flow Conditioner.**

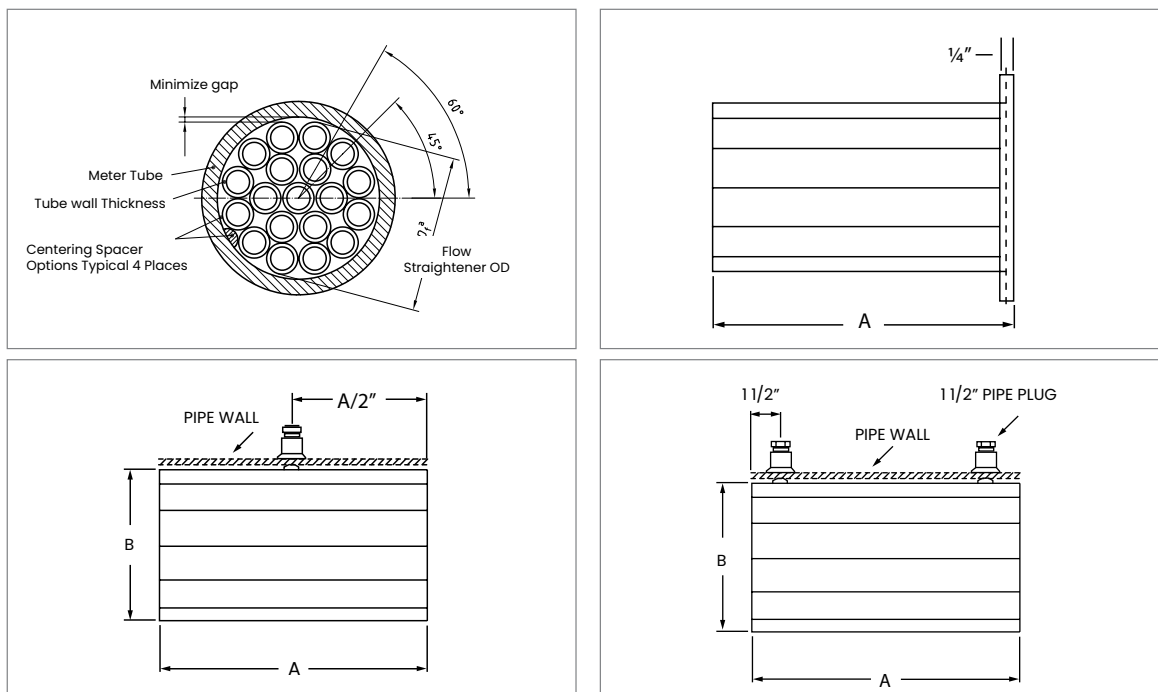


Fig. 1 Tube Bundle/Vane Flow Conditioner

- Zanker Type Plate

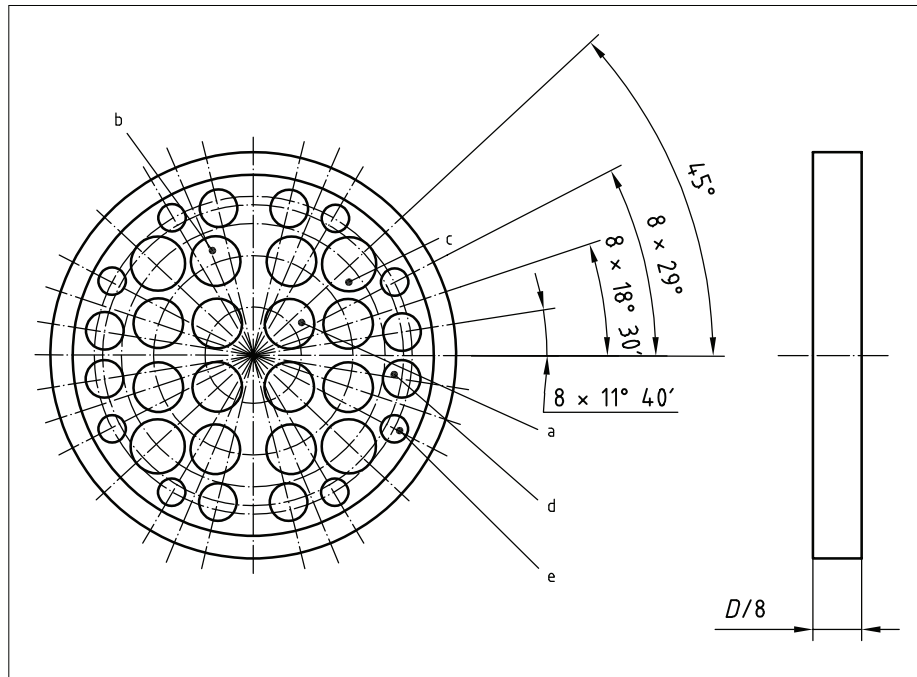


Fig. 2 Zanker Type Conditioning Plate

- Nova Type Plate

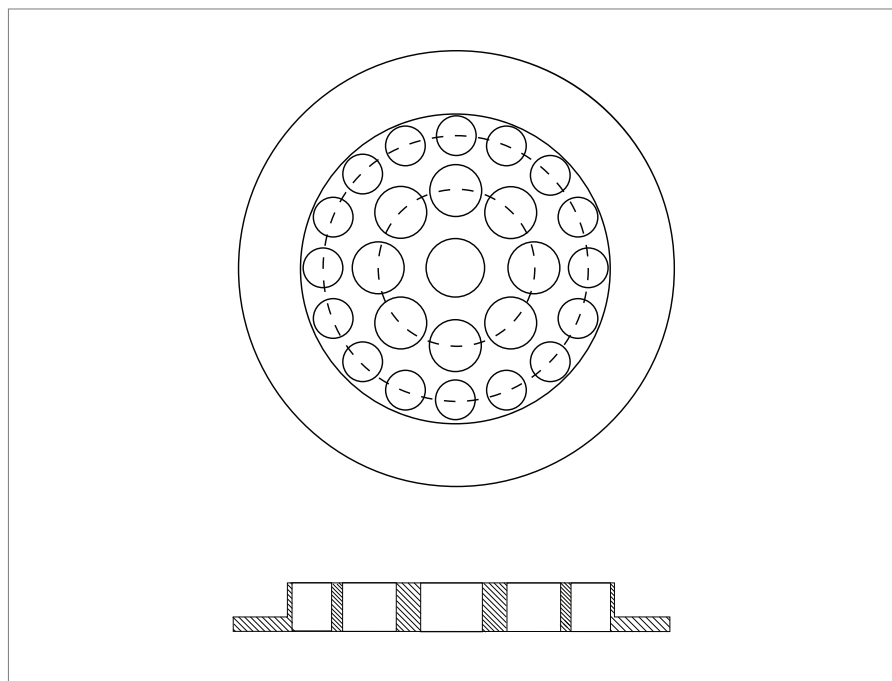


Fig. 3 Nova Type Conditioning Plate

Conclusion :

Correctly applied and installed flow conditioning is highly recommended for measurement systems that require velocity profile alignment, especially differential pressure and ultrasonic type flow meters. The main objective of the flow conditioner when installed in a metering system is to optimize the measurement accuracy and meter repeatability.

TEK-DP 1690B flow conditioners are designed to enhance the fluid dynamics of the whole meter system whichever meter type requiring flow / velocity profile development is installed.

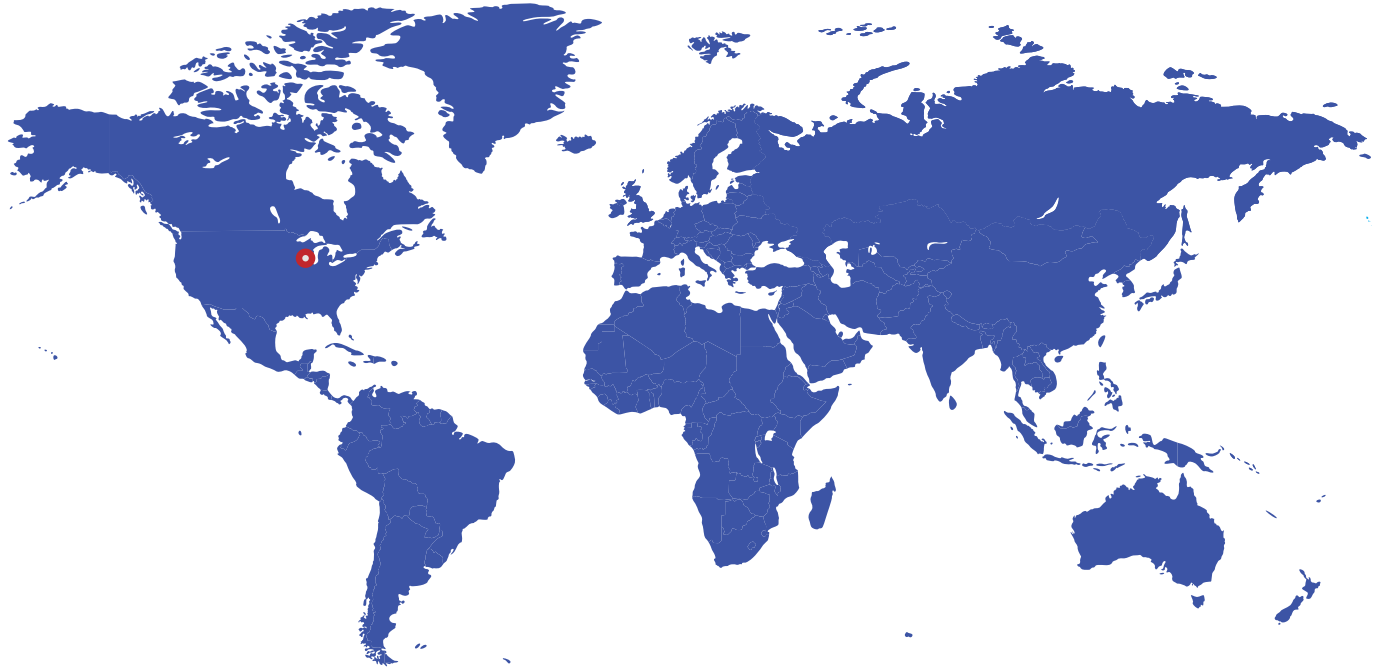
By creating a fully developed flow with minimal swirl, distortions, and other flow asymmetries, the Tek-DP 1690B ensures optimal flow conditions for accurate and consistent measurement.

When installed upstream of the flow meter at the correct distance or settlement region, the flow conditioner's performance remains independent of the meter itself and helps to maintain isolation from flow profile distortions upstream of the flow meter.

Model Chart

Example	Tek-DP 1690B	V	050	01	X	A	MTR	Tek-DP-1690B-V-050-01-X-A-MTR
Series	Tek-DP 1690B							Flow Conditioner
Type		V Z N						Straightening Vane Zanker Nova 50
Size			050 080 100 150 200 250 300 350 400					2" 3" 4" 6" 8" 10" 12" 14" 16"
Connection				01 02 03 04 05 06 07				#150 RF #300 RF #600 RF #600 RJ #900 RJ #1500 RJ #2500 RJ
Internal Diameter (ID)					X			Specify in inches
Material						A B C X		Carbon Steel SS 304 / SS304L SS316 / SS316L Specials, Specify Material
Options							MTR CD	Material Test Report - EN 3.1 Certified Drawings

Customer Service & Support



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