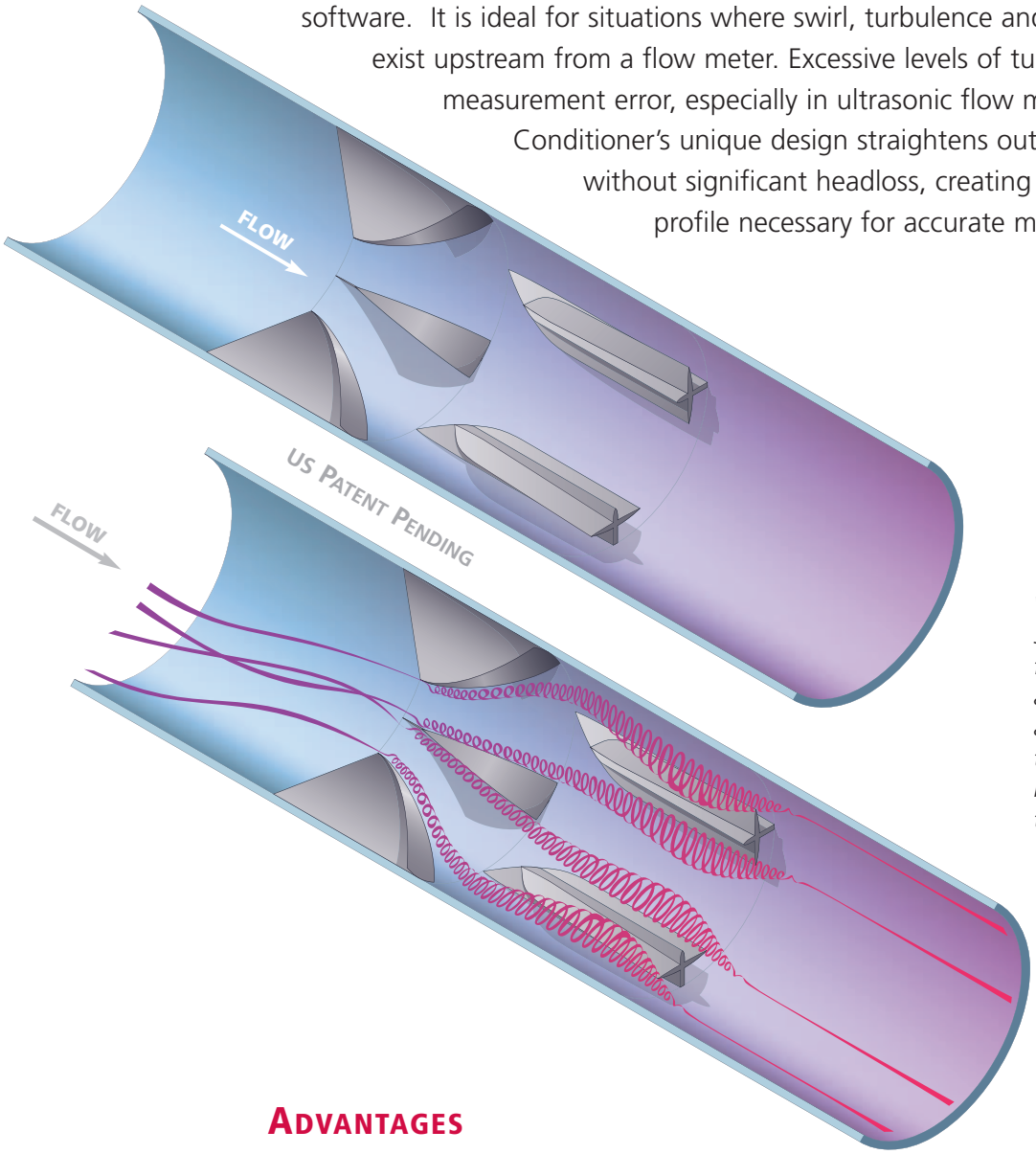
WESTFALL

Model 3000
Flow Conditioner

● US Patent Pending

Achieve Fully Developed Velocity Profile with Minimal Headloss

This flow conditioner was tested and developed at Alden Research Laboratory using FLUENT CFD software. It is ideal for situations where swirl, turbulence and mal-distribution of flow exist upstream from a flow meter. Excessive levels of turbulence can be a cause for measurement error, especially in ultrasonic flow meters. The Westfall 3000 Flow Conditioner's unique design straightens out the flow over a short distance without significant headloss, creating the fully developed velocity profile necessary for accurate measurement.



Two sets of tapered and curved vanes with precisely designed geometry are positioned to eliminate swirl and turbulence without reducing the high velocity core essential to a fully developed velocity profile – all with very little headloss.

Westfall's Flow Conditioner Model 3000 conditions turbulent flow quickly for improved flow meter accuracy. It addresses mal-distribution by inducing a small amount of pressure loss, and turning the flow "inside-out" so that momentum is fully exchanged across the flow stream.

Typical Applications

- Municipal and Industrial Water Treatment
- Potable Water
- Waste Water

Advantages

- Creates ideal conditions for accurate flow measurement, reducing flow meter error
- Provides fully developed velocity profile within 8 diameters
- Creates minimal headloss – $^{2}/_{3}$ less than other condioners
- Eliminates swirl induced by out-of-plane pipe bends
- Minimizes turbulence regardless of flow conditions or mal-distribution upstream
- Saves space with short installed length
- Can be fabricated from PVC, FRP, 316 Stainless Steel, with or without Teflon coating, and any other engineering materials to meet industry needs.
- Is available in pipe diameters from 1/2" to 120"
- Low cost, easy installation
- Long service life and low maintenance requirements

10/2009

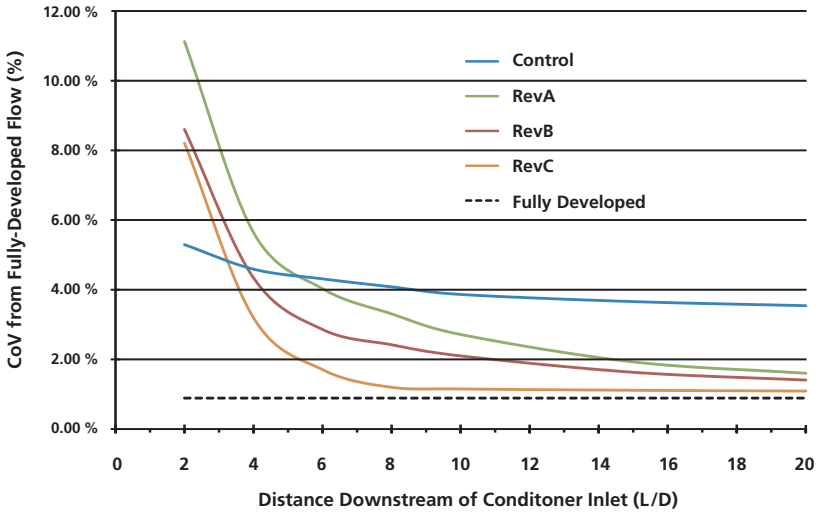
Beneficial Flow Characteristics Reported by Alden Research Laboratory

- The Westfall 3000 Flow Conditioner reduces turbulence downstream much more quickly than a trailing tab or perforated plate flow conditioner, by forcing the turbulence to the walls where increased shear stress dissipates it.
- The radial vanes are very effective at eliminating swirl near the pipe walls where the angular momentum is highest.
- The edges of each of the primary vanes generate two strong counter-rotating vortices that rapidly exchange momentum between the flow at the center of the pipe and at the wall.
- The angle of the vanes and the vortex pair's close proximity cause the vortices to quickly migrate to the wall where they rapidly decrease in intensity due to high shear stress. Rotational momentum is lost and excessive turbulence is dissipated.
- Secondary downstream vanes taper toward the pipe walls eliminate trailing vortices and swirl, and quickly establish a radially symmetric fully developed velocity profile.
- The extension of the radial fin above the transverse surface of the secondary vanes considerably reduces the swirl that would otherwise be aggravated by the slight expansion of the spanwise surfaces on the secondary vanes.
- Tapered leading edges and other geometric features prevent fouling.
- The conditioner creates relatively low pressure loss: 0.94 inwg with ambient air at 1000 acfm in a 6: pipe, or a k-value of 0.57.

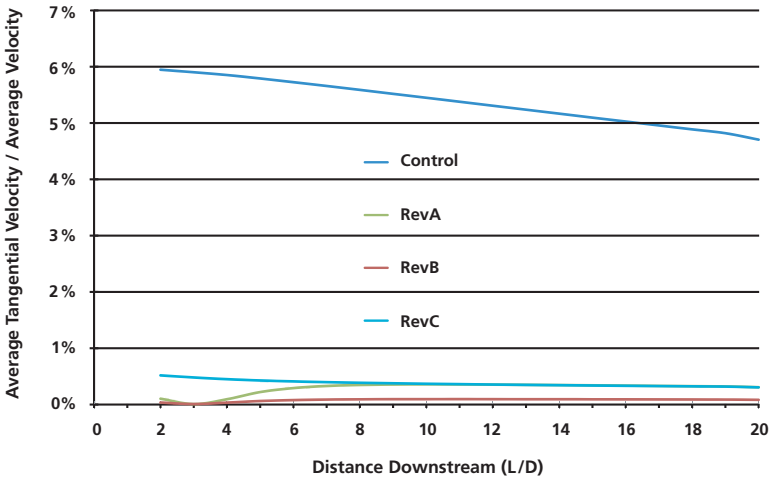
Fully Developed Velocity Profile Reached within Eight Diameters

1000-cfm air flow in a 6-in Sch40 steel pipe, after two out-of-plane 90º bends. The flow conditioner is installed 4D downstream of the second bend.

Deviation from Fully Developed Flow



Swirl Suppression – 1000cfm



Conditioner Eliminates Swirl within Two Diameters

1000-cfm air flow in a 6-in Sch40 steel pipe, after two out-of-plane 90º bends. The flow conditioner is installed 4D downstream of the second bend.

WESTFALL

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