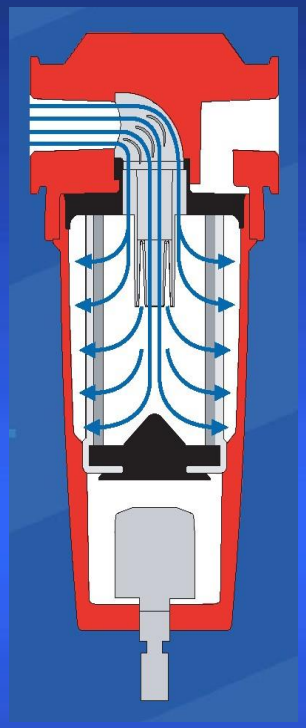
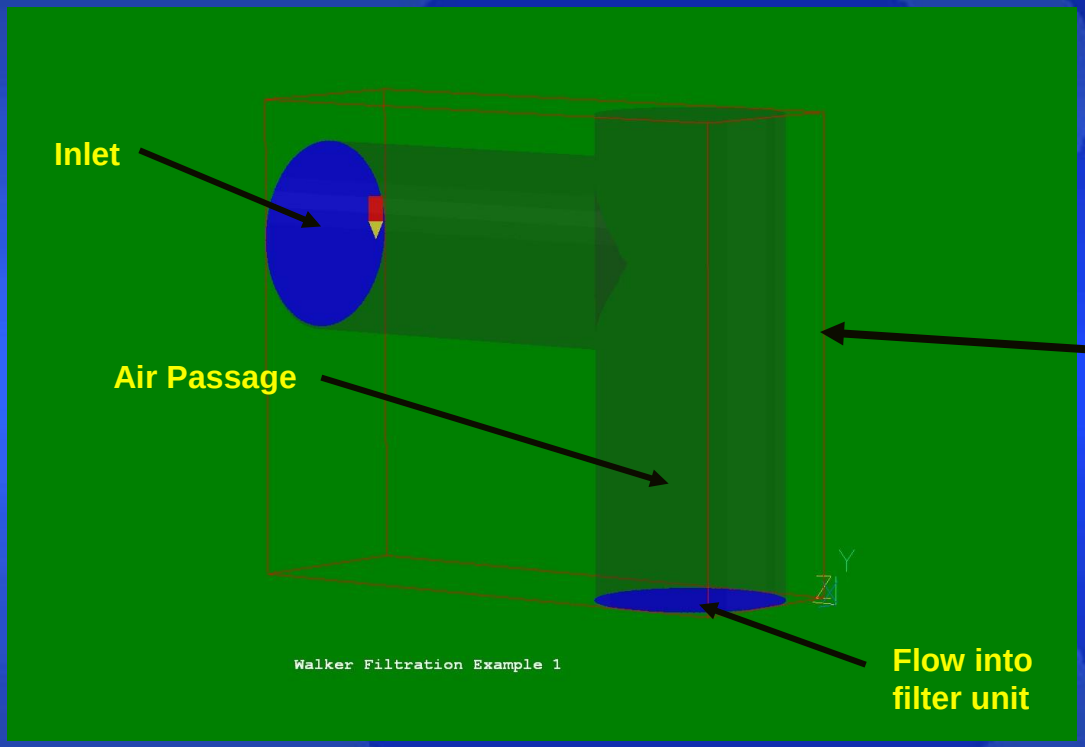


PHOENICS
Pressure Drop in 90^0 Bend

Introduction

This presentation outlines the modeling of the pressure drop in a 90^0 bend for a range of configurations. The objective being to illustrate how PHOENICS can provide valuable data on alternative designs, BEFORE any material is cut.

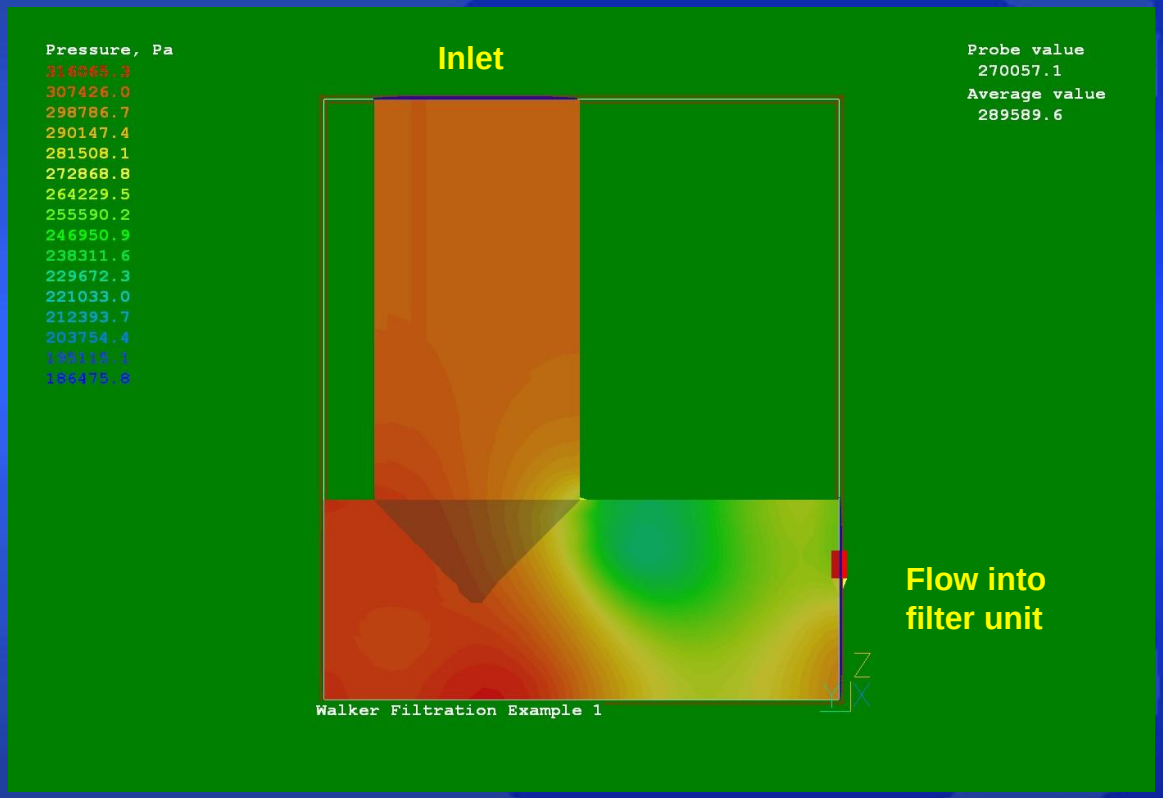
The Geometry



An approximation of the current Walker Filtration inlet design in the PHOENICS VR viewer.

The inlet has a diameter of 20mm and is pressurised to 3Bar. The working fluid at the inlet is air at 20^0C.

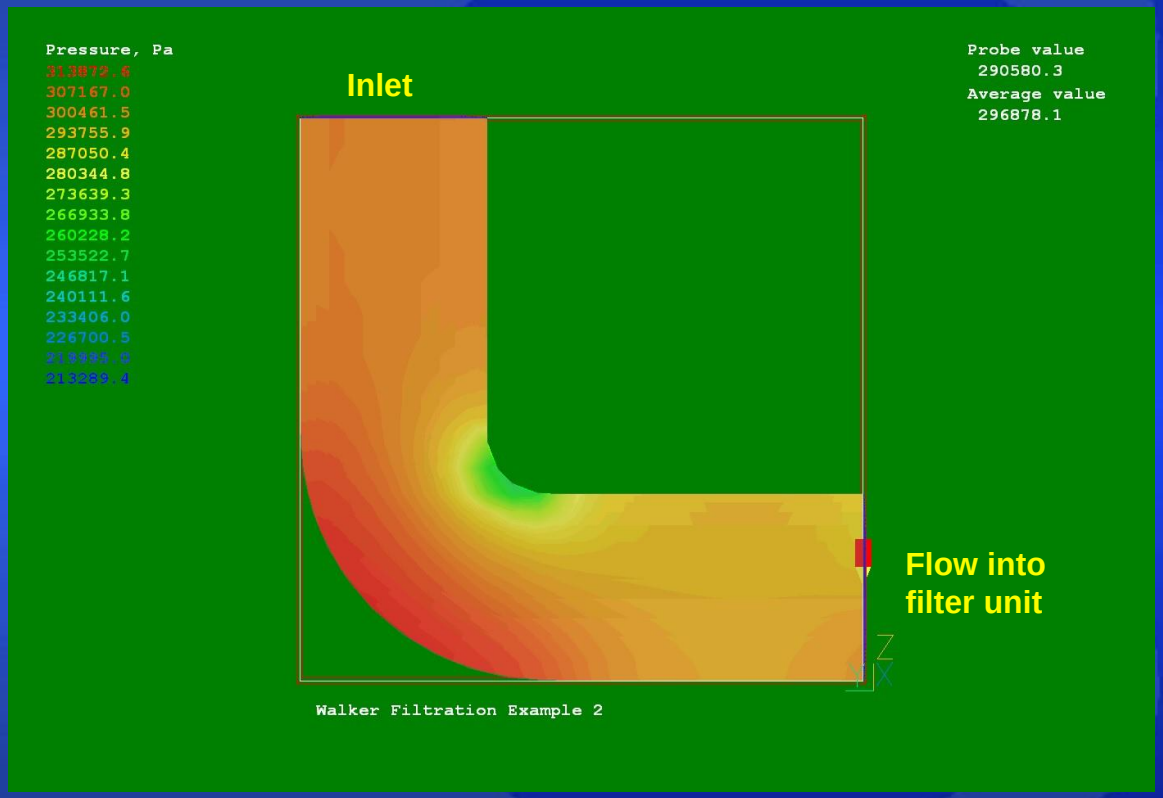
Results – Example 1



Pressure Drop = 23,353Pa.

Large drop due to the poor flow characteristics of the port.

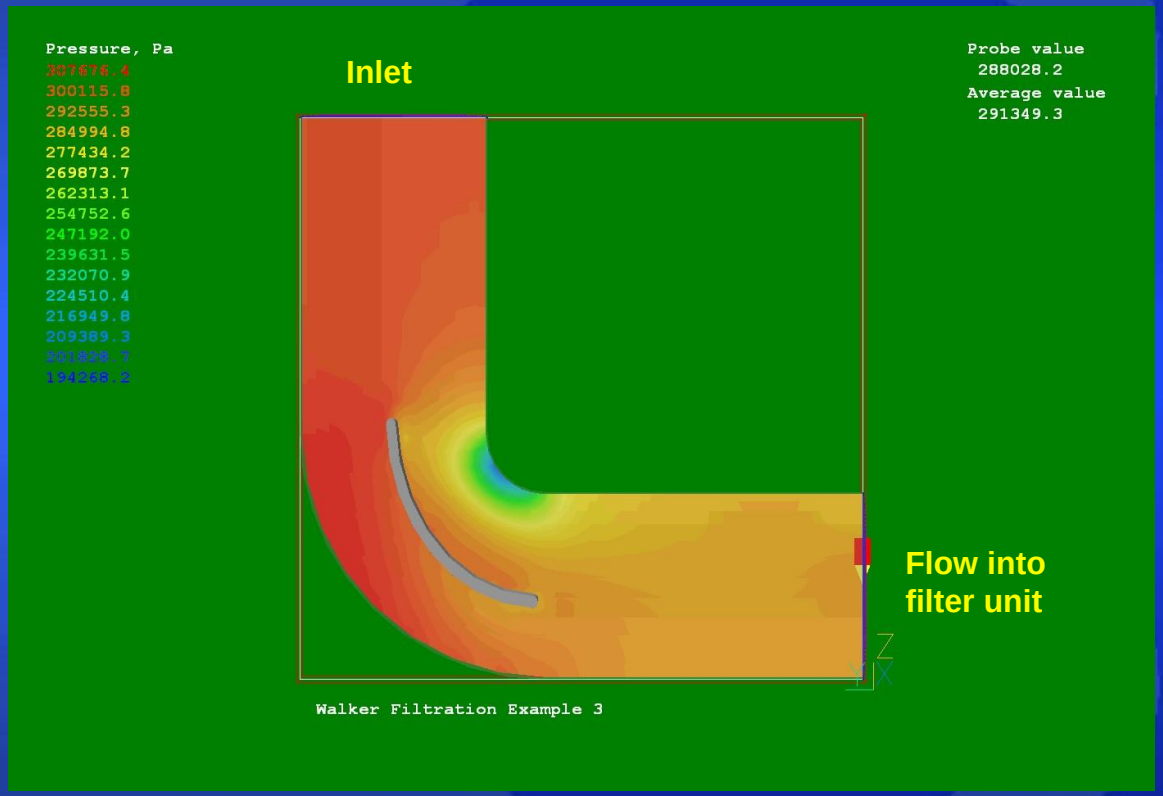
Results – Example 2



Pressure Drop = 7,494Pa.

The smoother geometry of the port results in a reduced pressure drop.

Results – Example 3



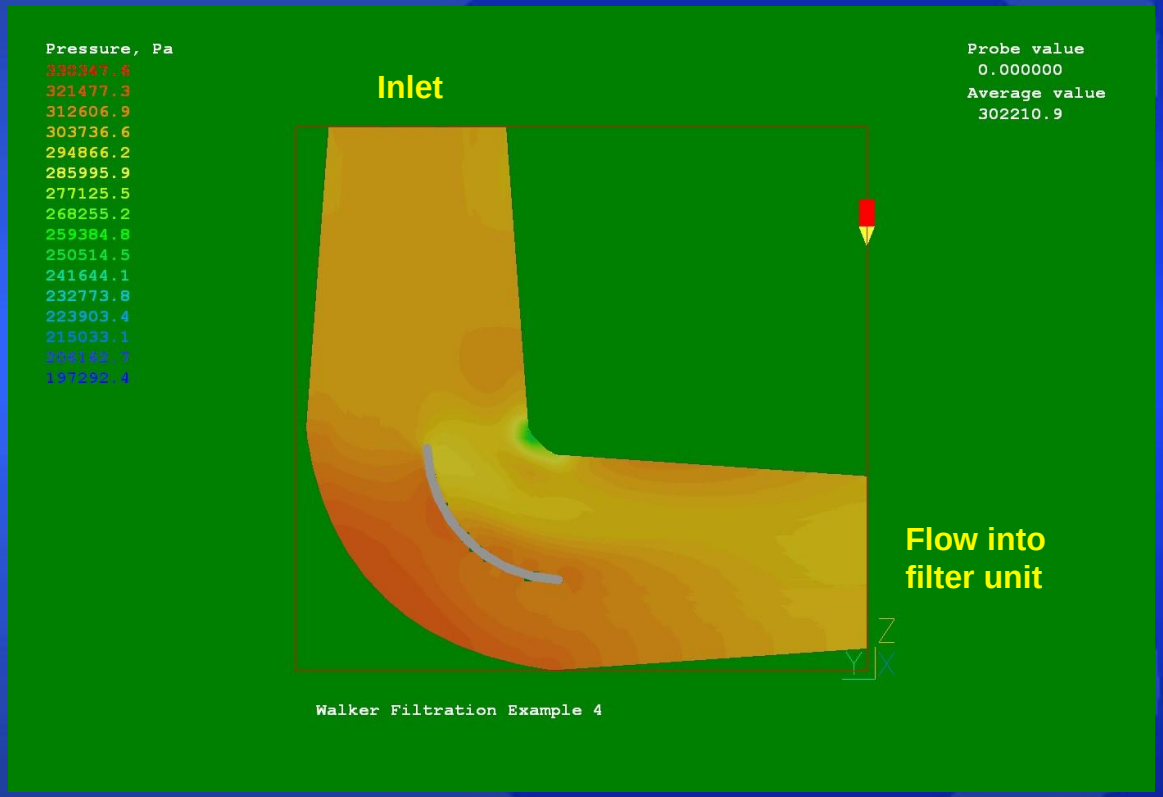
on turbulence.

Pressure Drop = 14,065Pa.

Although still an improvement on Example 1, the introduction of the vane has increased the pressure drop when compared to Example 2. This is probably due to the reduction in swept volume of the port due to the presence of the vane.

The position and profile of the vane(s) will also influence the flow rate, together with its effect

Results – Example 4



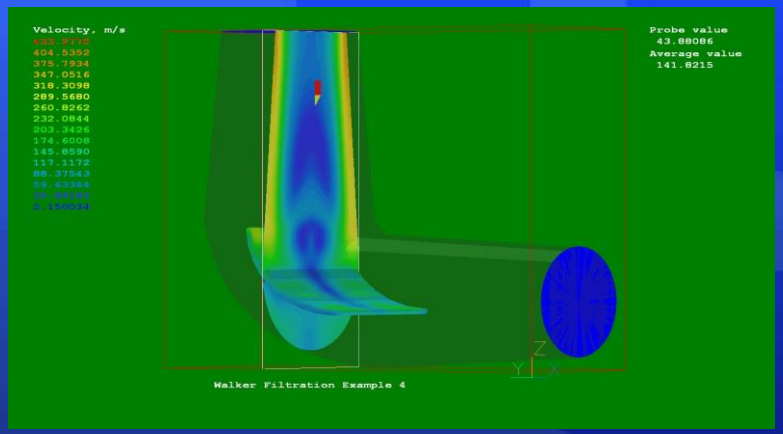
Pressure Drop = 7,558Pa.

An attempt has been made to compensate for the presence of the vane by increasing the port size. This has improved the pressure drop and is close to that of Example 2.

This suggests that care is needed if the introduction of a turning vane(s) is to have a real benefit. Additional analysis is required to assess the effect on turbulence reduction, number of vanes, vane size, and position.

Results – Example 4

Various views of velocity data based on Example 4.



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