VeCTor™ Trim

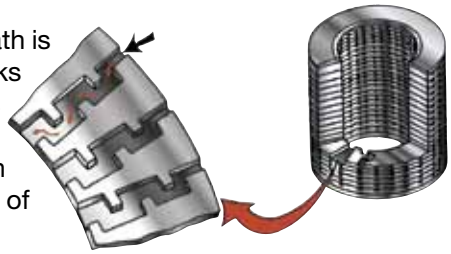
VELOCITY CONTROL TRIM FOR KOSO HAMMEL DAHL VALVES

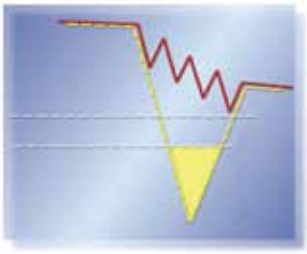
VeCTor™ - Velocity Control Trim

VeCTor™ trim is a radial flow multi-stage stacked disk trim designed with constant area ratios that provide a torturous path controlled pressure drop at each stage. Use of this design totally precludes the high velocity in compressible flow that creates noise or the critical pressure drops in liquid flow that creates cavitation. This product is offered as a linear, modified linear and modified equal percent flow characteristics.

Principle of Velocity Control

VeCTor™ trim is based on the principles of velocity control. The tortuous fluid path is formed by channels machined into one side of a flat cylindrical disk. These disks are then positioned, one on top of another, to form the 'stack' which functions like a cage in more conventional designs. The disks are firmly connected by brazing, eliminating external leakage, or short circuiting. As fluid passes through each channel, the pressure reduction and velocity is 'controlled' by the number of levels (turns or stages) and the expansion of the flow path.



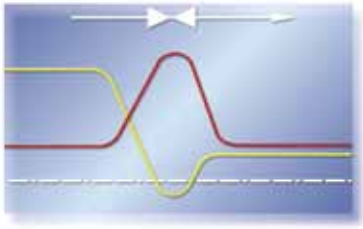


Preventing Cavitation

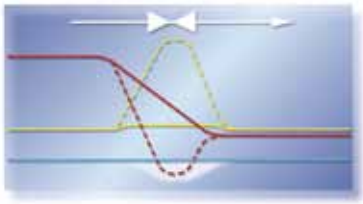
When fluid flows through a constriction, such as a valve, there is a reduction, followed by a recovery, of system pressure. If at any time the fluid pressure drops below its vapor pressure, the fluid will vaporize or 'flash'. A flashing fluid which subsequently recovers to a pressure greater than the vapor pressure causes the vapor bubble to collapse. This 2-stage process is known as cavitation. Through proper sizing and selection of velocity control trim, the system drop is broken up with discrete parts, preventing it from dropping below the vapor pressure and eliminating cavitation and its damaging effects.

Preventing Erosion

Cavitation is not the only potentially destructive influence on a valve. Erosion due to entrained particles or fluid droplets can be just as damaging. According to the Laws of Continuity, as fluid flows though a restriction in a pipeline, such as a valve, its velocity will increase exponentially in order to pass an equal amount of flow through the smaller restriction.



VeCTor™ trims separate fluid flow into numerous paths with multiple turns or restrictions which stage the total pressure drop. Together the number of stages or turns and the expansion ratio of the channel, work to prevent the generation of elevated fluid velocity and its damaging effects.



Body Style

Available in the G110 Series and V510/V520 Series valves (Globe and Angle). See respective brochures, as well as the *Severe Service Handbook*, for additional information.

Flow Coefficient

The *VeCTor*™ trim design allows for a number of variables that will determine rated C_V and valve performance including; valve size, plug size, number of paths, number of turns, disk thickness and disk stack height. An application engineer will select the proper trim based on your specific application.

Trim Material Selection

The trim material code specifies the balance seal ring, in addition to the plug, seat ring and disk stack. Codes are specific to body materials based on thermal expansion coefficients. The Table below provides the codes for each trim material combination and shows the applicable temperature range and body material for each trim code.

Table 1

Plug	Seat Ring	Disk Stack	Balance Seal	LCB	WCB	C5 / C6 / C9	CF8*	CF8M
416 SS/HT	316 SS/PTFE	410 SS/HT	PTFE/316 SS	-50 °F ~ +400 °F (-46 °C ~ +204 °C)	+20 °F ~ +400 °F (-7 °C ~ +204 °C)	+20 °F ~ +400 °F (-7 °C ~ +204 °C)	–	–
416 SS/HT+CP	416 SS/HT	410 SS/HT	PTFE/316 SS	-50 °F ~ +450 °F (-46 °C ~ +232 °C)	+20 °F ~ +450 °F (-7 °C ~ +232 °C)	+20 °F ~ +450 °F (-7 °C ~ +232 °C)	–	–
416 SS/HT+CP	416 SS/HT	410 SS/HT	Grafoil	-50 °F ~ +660 °F (-46 °C ~ +349 °C)	+20 °F ~ +800 °F (-7 °C ~ +427 °C)	+20 °F ~ +800 °F (-7 °C ~ +427 °C)	–	–
316 SS/HCP	316 SS/PTFE	316 SS	PTFE/316 SS	–	–	–	-100 °F ~ +400 °F (-73 °C ~ +204 °C)	-100 °F ~ +400 °F (-73 °C ~ +204 °C)
316 SS/HFS+CP	316 SS/HFS	316 SS	PTFE/316 SS	–	–	–	-320 °F ~ +450 °F (-196 °C ~ +232 °C)	-320 °F ~ +450 °F (-196 °C ~ +232 °C)
316 SS/HFS+CP	316 SS/HFS	316 SS	Grafoil	–	–	–	–	-320 °F ~ +1000 °F (-196 °C ~ +538°C)
316 SS/HFS+G	316 SS/HFS+F	316 SS	Grafoil	–	–	–	-320 °F ~ +400 °F (-196 °C ~ +204 °C)	-320 °F ~ +400 °F (-196 °C ~ +204 °C)
A182-F11/HFS+G	A182-F11/HFS	INCONEL®/HT	Grafoil	-50 °F ~ +660 °F (-46 °C ~ +349 °C)	+20 °F ~ +800 °F (-7 °C ~ +427 °C)	+20 °F ~ +800 °F (-7 °C ~ +427 °C)	–	–
630 SS/HT	316 SS/HFS	INCONEL®/HT	Grafoil	–	–	–	-50 °F ~ +1000 °F (-46 °C ~ +538 °C)	–

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**For temperatures below -100 °F (-73 °C), a Flouroloy G balance seal shall be used.*