



## ASVIN MULTI-STAGE RESTRICTION ORIFICE ASSEMBLY For Process Industries



**ASIAN INDUSTRIAL VALVES AND INSTRUMENTS** make ASVIN MULTI-STAGE RESTRICTION ORIFICE ASSEMBLY (several Orifice Plates in series), is used if the desired pressure drop could not be achieved with a single plate. Each Orifice Plate or stage enables reducing the pressure to its maximum while avoiding the phenomena of cavitation and critical flow.

The calculation of the number of plates or stages is therefore a function of the data of the application. **ASVIN** have software from RW MILLER as per ISO 5167 that allows to design the bore diameter and number of stages required according to process data.

### **GENERAL DATA:**

When the differential pressure is too high, when in gaseous fluid sonic flow occurs and generate noise upper than limit of standard (85 dB).

- Standards: Element based on ISO 5167, ASME MFC-3M or R.W. MILLER.
- Solder (BW) or flanged connection
- Material: Standard: 304L / 316L stainless steel, others according to your application.
- Fluid: liquid, gas, Vapour, steam.



**Orifice Plates:** mounted in series - optimized plate spacing for each unit from 1D to 5D (D, pipe internal diameter). The number of stages can vary from 1 to more than 10 if required.

**Number of Orifice Plates:** calculation of the number of stages optimized for the application specifications, designed to reduce the maximum pressure while avoiding cavitation and critical flow phenomena.

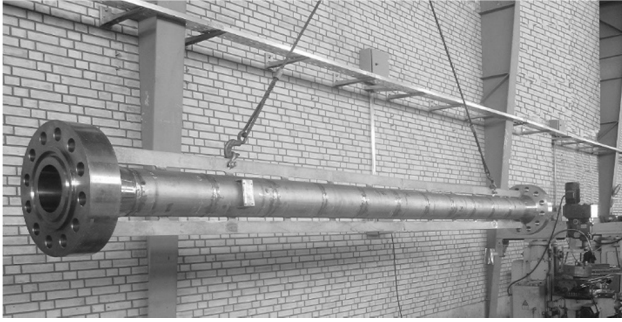
**Noise Level:** our software check of the noise level of the complete unit. Multi- holes orifice plates reduce the noise level per stage. The thermodynamic properties of the fluid are taken into account for the calculation of each stage. The design parameters include, change of state, temperature, composition and density of the mixture, viscosity, compressibility factor.

#### **TECHNICAL SPECIFICATION**

- 1) Two welding neck flanges at ends, according to ANSI B16.5 standards.
- 2) The proper quantity of perforated plate. This quantity and the number of stages is specified after flow calculations.
- 3) The proper quantity of pipe pieces.

#### **Pros and Cons**

Multistage orifices help to eliminate noise, vibration in piping due to cavitation and choked flow. Multistage restriction orifices application in depressurization service imposes potential blockage in any of the stages due to hydrate formation and draining of residual fluid from the assembly considering its complex geometry.



## DESIGN CONSIDERATION

Orifice Plate Thickness is in decreasing order from first stage to last stage.

Maximum Thickness of Orifice Plate shall be at the first stage and minimum thickness of orifice plate shall be of last stage. The minimum thickness of orifice plate at the outlet shall be 10mm. However, the thickness shall be as per design requirement.

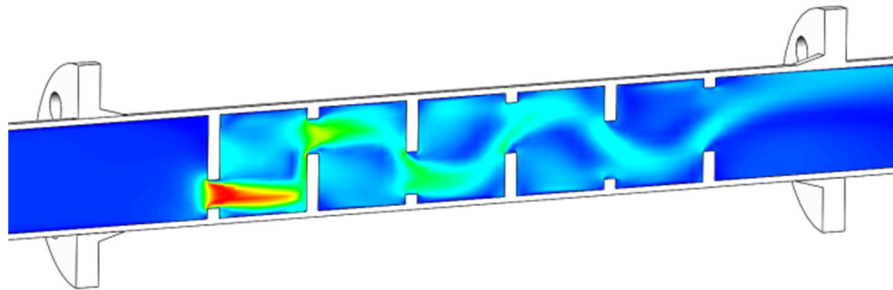
Dimensions standard for end Process Connection flanges shall be ASME/ ANSI B16.5 for size up to 24" (150# to 1500#) & up to 12" (2500#). For 26" and above (150# to 1500#) – ANSI B16.47 SERIES-B shall be applicable unless otherwise specified. But Weld Pipe connection is also optional.

## NDT Tests

**Intergranular Corrosion** test can be conducted for all austenitic stainless-steel flanges as per ASTM A262 Practice 'B' / ASTM A262 Practice 'E'

**Impact Test**-For all carbon steels and alloy steels with wall thickness over 19mm, Charpy-V Notch impact testing - in accordance with paragraph UG-84 of ASME Section VIII, Div-1 per heat of material and per heat treating batch.

**NACE**-Flanges shall meet the requirements given in NACE MR-0103-2007.



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