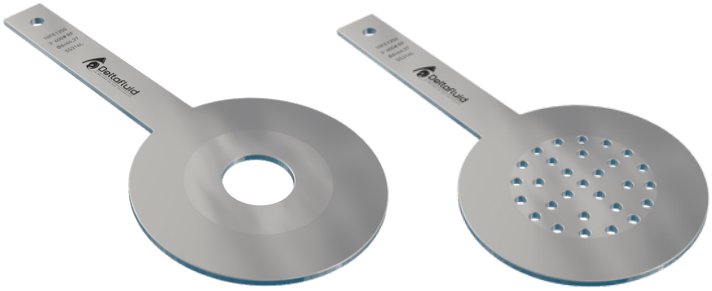
Datasheet

RESTRICTION ORIFICE
(simple plate)

FLOW LIMITATION

KEY DATA

- Design according to R.W. MILLER or ISO 5167 standards
- Study and consideration of specific phenomena: cavitation, critical flow, noise level
- Two plate types: simple hole or multi-hole if the application required a reduction in noise level
- For all types of fluids and all pipe sizes



Simple and multi-hole restriction orifices

BENEFITS

- Simple and reliable system: calculation based on proven standards
- Flow limitation / pressure reduction system more cost-saving and robust than a valve, maintenance-free
- Very long life-time of the product
- Suitable for all types of valves

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MEASURING UP TO YOUR EXPECTATIONS

A restriction orifice is the most used element to reduce the pressure in a pipe or to limit a flow.
It is a calibrated device which is sized according to the technical specifications of the installation in order to achieve the desired pressure or flow rate while preserving the integrity of the plate.

OPERATING PRINCIPLE

- As passing through the restriction, the fluid pressure decreases as shown in the image below.
  It reaches its minimum value shortly after passing the orifice (P_{min}) then increases again to a stable value (P_2). Thanks to the permanent pressure loss (P_1 - P_2) generated by turbulence, it is possible to reduce the pressure in a pipe and/or limit a flow rate.

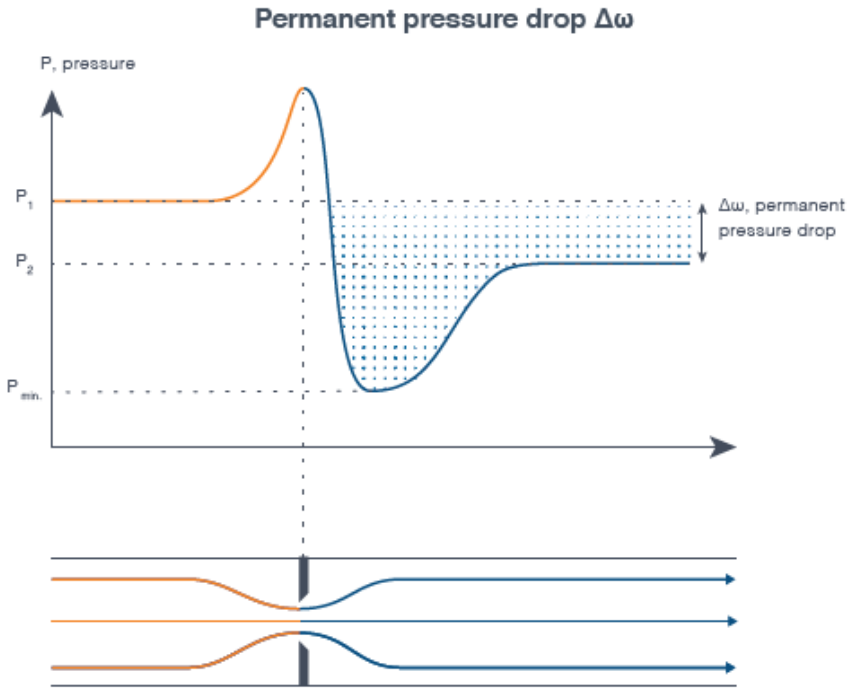

Illustration of the fluid pressure drop when passing the restriction

- **Cavitation** (see illustration on page 3/5) : in a liquid, cavitation corresponds to the formation of gas bubbles due to a too low local pressure (lower than the vaporization pressure), which can happen when the pressure is droping as the fluid is passing through the restriction (in P_{min}). The implosion of these gas bubbles generates important energy levels and therefore significant noise levels and damages nearby orifices and piping elements.

  This is the reason why the restriction orifices are sized to the cavitation limit: we avoid damaging the elements while guaranteeing the maximum pressure drop.

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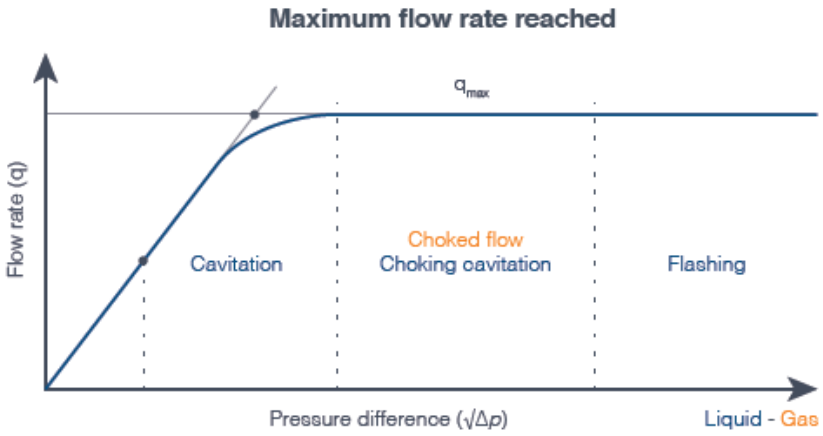

Illustration of cavitation and critical regime of a liquid or gas

- **Critical regime** (see illustration above): in the vicinity of the restriction, the fluid is accelerated until it reaches its maximum speed at the level of the restriction
  For a gas, sonic conditions can be reached (**choked flow**) : the maximum flow rate is reached, it can no longer increase.
  For a liquid, cavitation can be too important (**choking cavitation**, if pressure loss is too great) and can damage the elements.

  This is the reason why the restriction orifices are sized to limit choked flow or cavitation: we avoid damaging the elements while guaranteeing the maximum pressure drop.

Note: these choked flow conditions are sought in the case of flow limitation.

- Our study takes into account the essential operating conditions as well as the particular behaviors of your installation such as **sonic conditions, cavitation or noise level**.
  Premature erosion of the pipe and the plate, excessive noise and vibration levels due to these particular phenomena can thus be avoided

  Depending on the calculations, several proposals can be made from single or multi-orifice restriction orifices to multi-stage restriction orifices.

STANDARDS

- R.W. MILLER or ISO 5167
- Design according to Idel'cik for holes with rounded or bevelled adges possible on request

TECHNICAL CHARACTERISTICS

- Fluid remperature: according to specifications (high temperature possible)
- Fluid type: gas, steam, liquid
- Maximum operating pressure: limited by the flange rating
- Nominal diameters: all pipe sizes
- Materials : carbon steel, stainless steel, monel, hastelloy, inconel, duplex, super duplex, titanium, tantalum, PVC, PTFE...
- Mounting types:
  - RF model to be mounted between flanges with flat or spiral gaskets
  - RTJ model male or female version (with or without orifice holder) to be mounted between corresponding flanges
  - male/female or tongue/groove models according to EN 1092-1 and EN 1759-1 to be mounted between corresponding flanges
  - restriction orifice in the form of a spool, weld-on mounting or screw-on mounting on the pipe
- Plate thickness: calculated based on the permanent pressure loss generated and the internal diameter of the piping to avoid deformation of the plate during operation
- Noise level: noise level control estimated at 1 m.
  If necessary, multi-orifice plate in order to attenuate noise - generally < 85dB(A) in continuous operation - contact us
- Cavitation (1) : for liquids, the cavitation level is checked for each plate and, in the case of the multi-hole device, all orifices are calculated to avoid cavitation.
  If this cannot be avoided with a single plate, an alternative in a multi-stage restriction orifice will be proposed.
- Critical regime (1): the orifices are sized at the critical flow limit for a maximum pressure drop. If the desired pressure drop cannot be achieved with a single plate, a multi-stage restriction orifice alternative will be offered.

(1) see illustration of cavitation and critical regime on page 3/5

ITEM CODES

- Restriction orifice : DRO-ND-NP-Face type-Material

DRO	ND (2)	NP	Face type (4)	Material
Nominal diameter - ASME	1/2'' to 24''	150# to 2500#	RF RTJ SEM (3) SEF (3) DEM (3) DEF (3)	304L 316L Others
OU				
Nominal diameter - ISO	DN15 to 600	PN2,5 to 400		

- Examples restriction orifcies codes:

  - DRO-2-300-RF-316
  - DRO-3-600-RF-MONEL
  - DRO-34-1500-RTJF-316

(2) ND standards - beyond, on request

(3) Specify large or small male/female face if flanges according to ASME B16-5 / EN 1092-1 / EN 1759-1 standards

(4) Possibility of mounting in the form of a welded spool (SW) or screwed

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LA MESURE DE VOS EXIGENCES

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