

**SILENCERS FOR VALVES**



VÁLVULAS NACIONAL represents leading companies in the industry to complete our product line, offering complete solutions for high demanding security industrial installations.

Our silencers reduce the noise generated during atmospheric expansions of steam or gas (vents) during the activation of valves, blowdowns and ejectors.

Noise in some safety and control valves generates levels above 150 dBA / dBC, a situation that is a concern for the technical operations and maintenance of plants.

## VENT SILENCER TECHNOLOGY

There are three main components of vent silencers

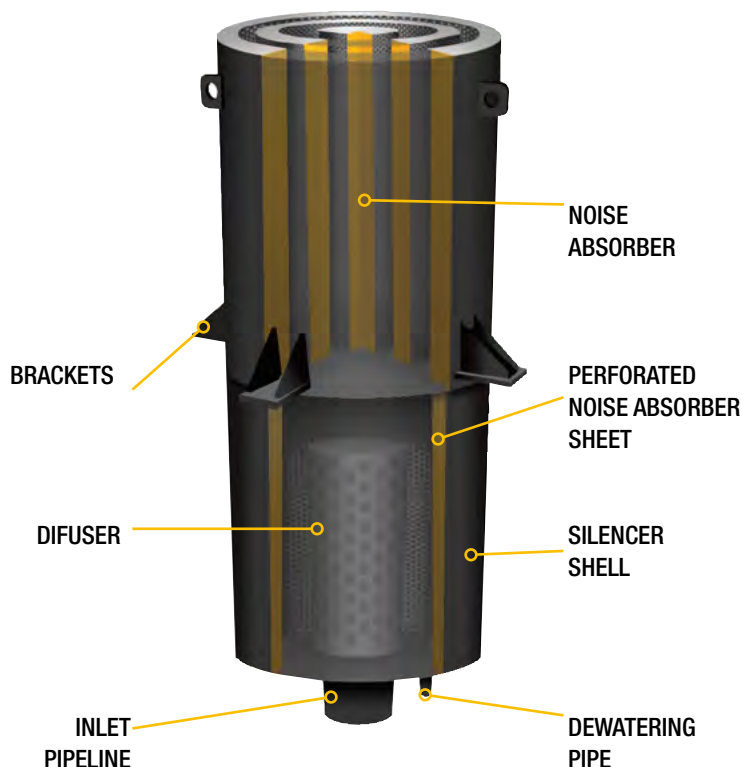
- **The inlet diffuser** reduces the noise generated and modify the sound spectrum so that it can be better controlled in the absorptive stages of the silencer. This is obtained by dividing the flow into many small jets.
- **The absorbent plenum** is an expansion chamber designed to smooth and homogenize the flow of gas prior to the reduction of acoustic energy to be obtained in the dissipative stage.
- **In the dissipative stage** the fluid passes through a system of multitube, crowns, or absorbent baffles, achieving significant reductions in noise by viscous friction depending on the design and the depth of the silencer turbulence and noise.

## Factors and effects of control valve noise

The potential for noise is dependent on some of the following factors:

- **Pressure Drop and Pressure Drop Ratio:** Greater drops in pressure and higher pressure drop ratios increase the potential for noise. The pressure drop ratio — the change in pressure divided by the inlet pressure — is an indicator used to determine the performance level required of the control valve trim.
- **Valve/Trim Geometry:** Tortuous flow paths can increase turbulence and noise, which can cause damage to the control valve trim, body, and pipeline. Other factors affecting noise include flow path size, shape, and location.
- **Valve Outlet Area:** High fluid velocity at Mach numbers at or above 0.3 through the control valve outlet or pipe can result in increased turbulence and noise.
- **Flow Rate:** Higher flow rates have a potential to increase turbulence and noise.

Noise exposure increasingly limits system and profitability productivity. Silencers are used to reduce noise in safety valves (PSV), Relief Valves (PRV), starter valves, blow valves, blowdowns, ejectors, and discharge tanks.



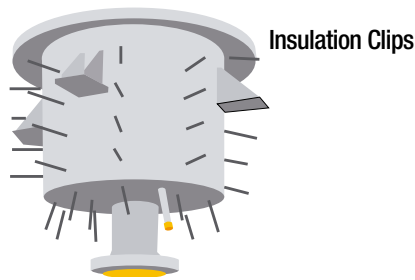
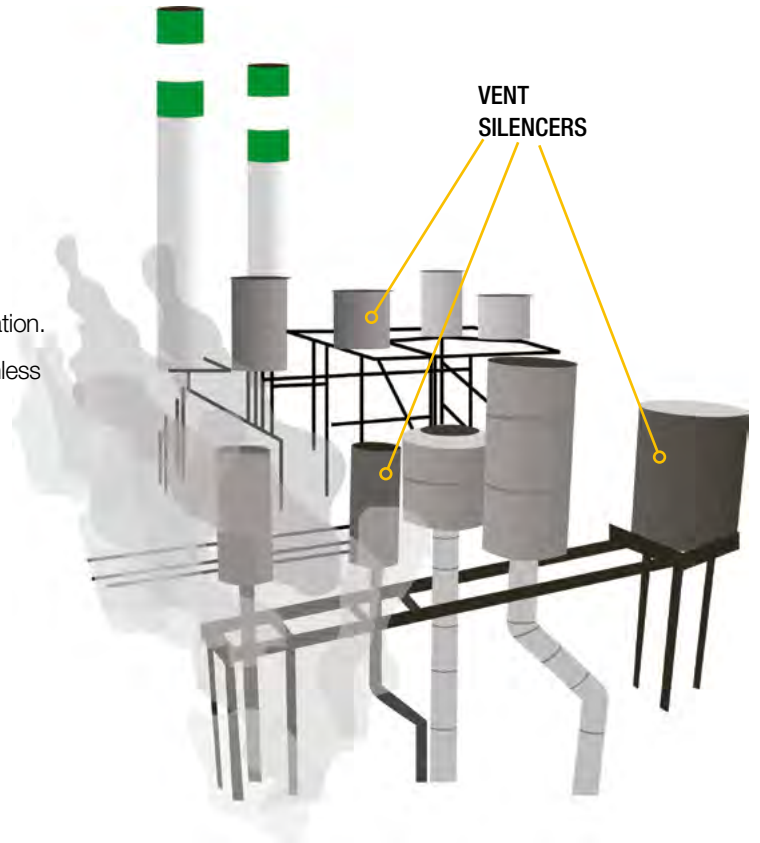
To design a vent silencer we require the following information:

- **To Understand the noise limits or target in sound pressure level:** the location of the discharge, the length of it (the time), and access to it are factors that should always be considered to optimize a silencer.
- **The Flow conditions:** fluid, density, mass flow, temperature, pressure drop available, ...
- **The Pressure conditions:** choice of materials, material thicknesses, types of flanges, types of welds, ...
- **Sizing:** physical spaces and weights available, support, structures, ...
- **Silencer Connection:** by welding or flanges. Expansion joints to allow movements generated by expansion.



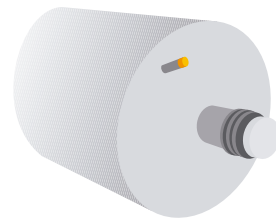
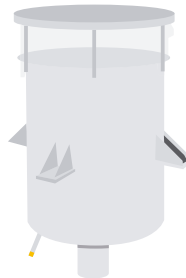
# Standard design and main features

- Quality and value: manufacturing according with ISO 9001:2008;
- Designed in accordance with the ASME Boiler and Pressure vessel Code.
- Welder performance qualifications, and welding procedure specification according to ASME Section IX.
- End connection flanges are in compliance with ASME B 16.5 and butt- welded end with ASME B 16.25.
- **Customized design:**
  - Noise control range: from 15 dBA to up to 60 dBA of noise attenuation.
  - Vent silencers are available in carbon steel, galvanized steel, stainless steel, or with numerous protective-coating systems.
  - Temperature limits to 650 °C.
  - ASME Class 150 – 2500.
  - Inlet size NPS 2 – 40.
  - Multiple inlets available.
  - Effective operating time of 10,000 hrs.
  - Dewatering pipe.
  - Lower life – cycle cost: no maintenance requirements.
  - Non-destructive testing,...
- **Accessories:** Expansion joints, brackets, stands, goose necks, weather hoods, bird screens, insulation clips.



Insulation Clips

Weather hood  
rain & snow



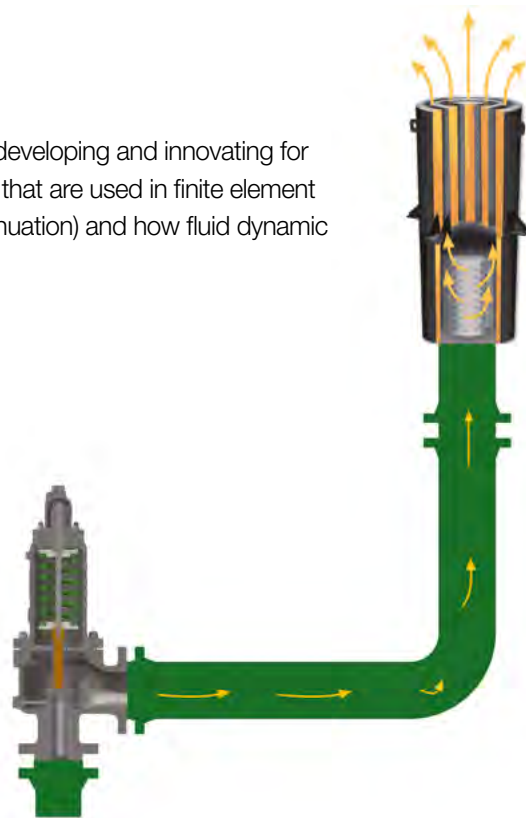
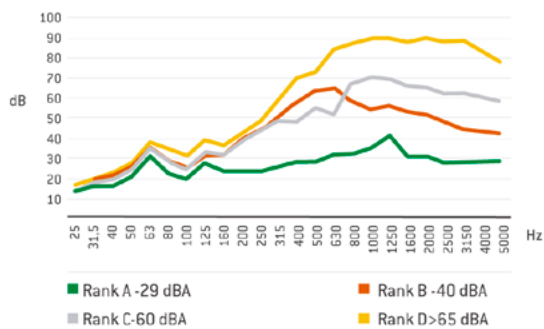
Expansion Joints



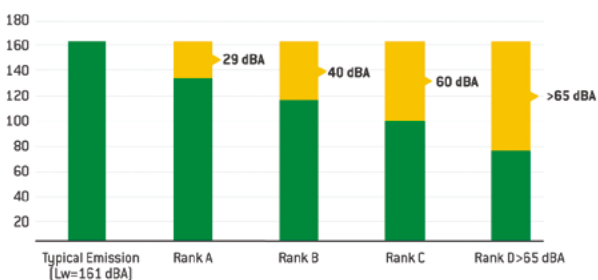
# Accurate noise prediction

VÁLVULAS NACIONAL is a company that has over 30 years researching, developing and innovating for the industry. For the development of new models, modeling vent silencers that are used in finite element techniques, that can predict the acoustic behavior of silencers (sound attenuation) and how fluid dynamic parameters (temperatures, pressures, fluid velocities, ..) and mechanics.

## SINV acoustic attenuation spectra in dB



## Expected noise levels, after placing the silencer (dBA)



## APPLICATIONS

- POWER INDUSTRY:** Coal and Combined Cycle Power Plants, Co – generation and Renewable Energy Plants (solar thermal, geothermal, Bio – mass), in the main steam, auxiliary steam, turbine by – pass, and sky vent.
- HYDROCARBON INDUSTRIES:** steam, flare gas, natural gas, hydrogen, light hydrocarbons, stripper gas,...
- PROCESS INDUSTRIES:** chemical, metals and mining, pulp and paper, and food and beverage.



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