



INERCO

Acoustic Technology

Silencers for valves
Vent & Blowdown Silencers



INERCO Acoustic Technology designs and manufactures silencers to reduce noise generated during atmospheric expansion of gases during valve discharges, blowdowns and ejections.

Noises generated in some safety and control valves may be higher than 150 dB(A), which can result in important issues for plant operations and maintenance. Noise exposure decreases and limits system performance and productivity.

Silencers are used to reduce noise produced in safety valves (PSV), relief valves, starter valves, blowdowns, ejectors, boilers, and tank discharges.

VENT SILENCER TECHNOLOGY

INERCO Acoustic Technology vent silencers have three main components:

- » **Inlet diffuser** reduces the noise generated and modifies the sound spectrum so it can be better controlled in the absorptive stages of the silencer. This is obtained by dividing the flow into hundred of small jets;
- » **Absorbent plenum** is an expansion chamber designed to homogenize the gas flow before the reduction of acoustic energy that is obtained in the dissipative stage;
- » **Dissipative stage** makes the fluid going through a system of crowns (cylindrical design), or absorbent baffles (prismatic design). Significant noise reductions are achieved by viscous friction depending on the design of the silencer as well as the properties of the fluid;

Valve noise effects and factors

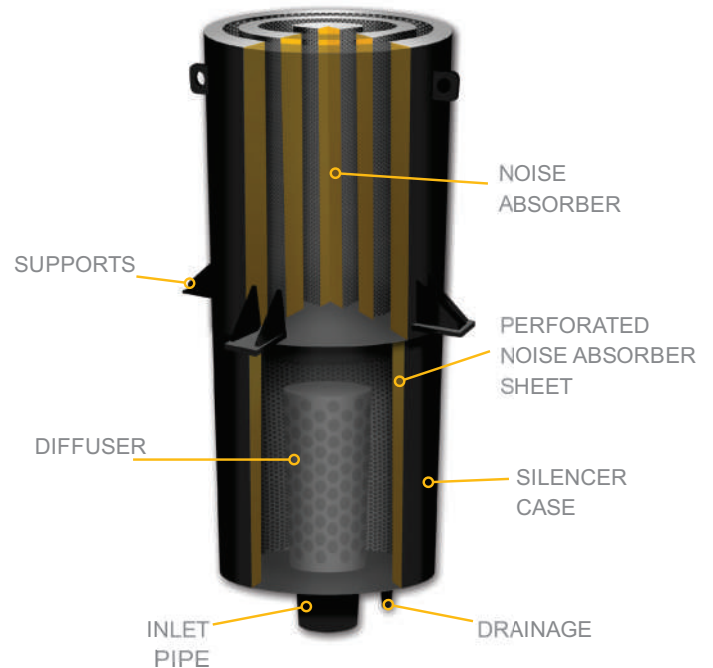
There are several factors that may affect noise generation:

- » **Pressure drop and pressure drop ratio:** Drops in pressure and high 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 to 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;

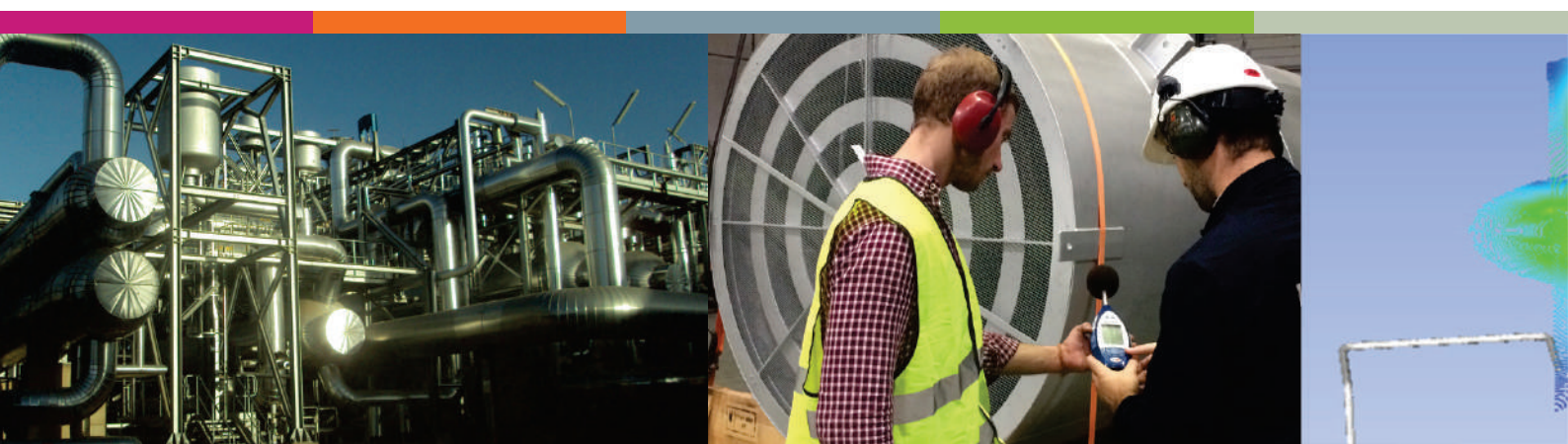
» **Flow rate:** High flow rates have a potential to increase turbulence and noise;

» **Noise calculation:** There are several methods to estimate noise produced by discharge valves (API 521, VDI 2713, ISO 4126).



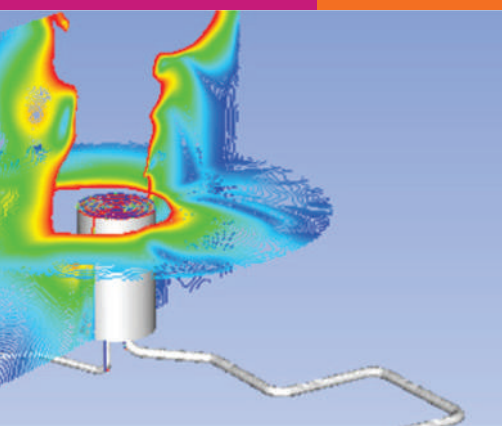
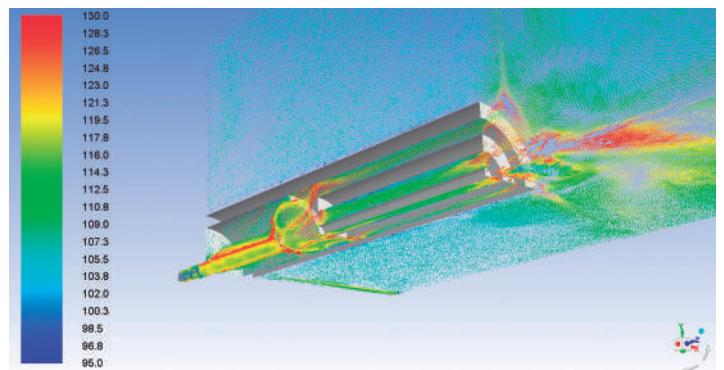
Designing a vent silencer requires the following information:

- » **Noise limits and sound pressure levels:** location and duration of the discharges are considered;
- » **Flow conditions:** fluid, density, mass flow, temperature, pressure drop available;
- » **Pressure conditions:** choice of materials, material thicknesses, types of flanges, types of welds;
- » **Sizing:** physical space and weight available, description of support structures;
- » **Silencer Connection:** welded or flanged. Expansion joints to allow movements produced by expansion.



Standard design and main features

- » Quality and value: manufacturing according to ISO 9001:2008;
Designed according to the ASME Boiler and Pressure vessel code;
- » Welder performance qualifications, and welding procedure specifications according to ASME Section IX;
- » End connection flanges compliant 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 different materials: carbon steel, stainless steel, alloyed steel;
 - Protective coating and surface treatment;
 - Temperature limits up to 650 °C;
 - ASME Class 150 – 2500;
 - Inlet size NPS 2 – 40;
 - Multiple inlets available;
 - Effective operating time of 10,000 hrs;
 - Drainage;
 - Lower life – cycle cost: no maintenance requirements;
 - Non-destructive test (dye penetrant inspection, X-ray...);
 - Engineering: mechanical calculation and fluid dynamic piping design;
 - Pressurizing discs up to 20 bar back pressure;
 - International shipping;
 - Accessories: Expansion joints, brackets, stands, goose necks, weather hoods, bird screens, insulation clips.

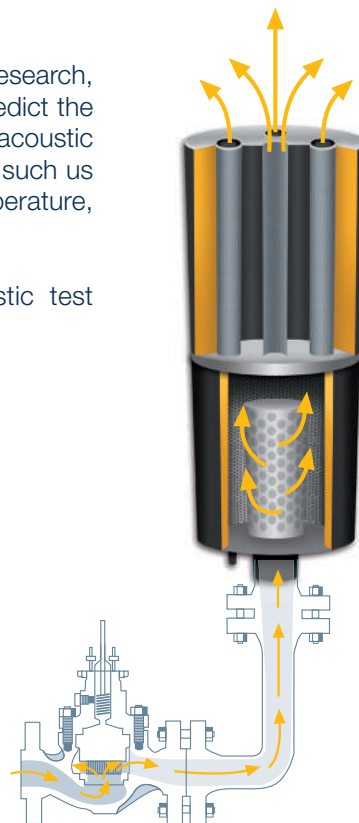
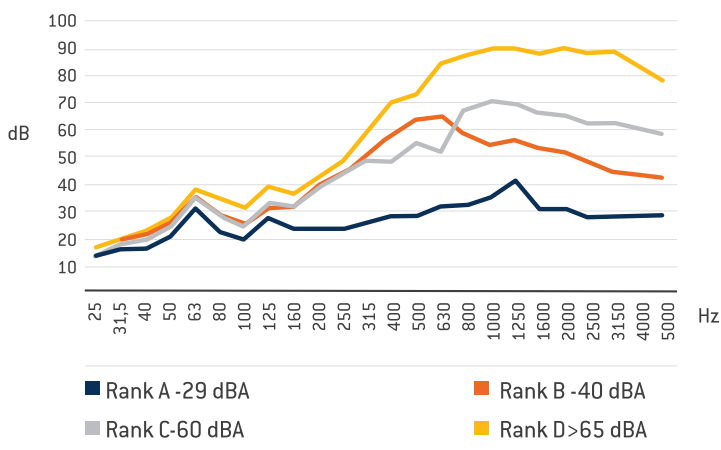


Accurate noise prediction

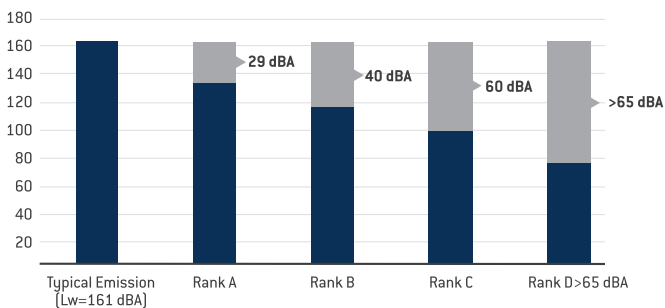
INERCO Acoustic Technology has over 30 years of experience in the research, development and innovation of noise reduction technologies. In order to predict the acoustic behavior of our equipment (sound attenuation) we have developed acoustic models to study all the parameters involved in the design of vent silencers, such as mechanical and structural design and fluid dynamic parameters (temperature, pressure, fluid velocity).

INERCO Acoustic Technology has an acoustic laboratory and acoustic test chambers in Seville (SPAIN), where client prototypes are tested

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;

» **PROCESS INDUSTRIES:** chemical, metals and mining, pulp and paper, and food and beverage.

KLINGER Advantage - About us

KLINGER Advantage provides fluid control equipment and services to operators in the chemical and petro-chemical sectors in the Gulf Coast area as well as the rest of the U.S. market. Product Lines Include: Ball, Butterfly, Plug and Piston Valves, plus Accessories Valve Repair Services, Valve Control Solutions and Devices Actuators, Solenoids, Limit Switches, Positioners, and more.

The company was founded as Advantage Technical Services in 2002 as a specialty valve distribution company in Baton Rouge, LA. In 2013 KLINGER International GmbH acquired the company and KLINGER Advantage was created. KLINGER was founded in 1886 by Austrian engineer Richard Klinger.

The company employs over 2,000 people in 60+ locations around the world. KLINGER remains family owned and is headquartered near Vienna, Austria.