

HV SERIES

Vent Silencers

HIGH-PERFORMANCE SILENCERS FOR VENTS AND BLOWDOWNS

Rugged Silencers

Our HV vent silencers effectively silence high-velocity air, steam, or gas vents and blowdowns to atmosphere where sonic or critical conditions exist in the valve. Typical applications include:

- Steam boiler relief valves
- Superheater header relief valves
- Boiler startup and purge
- High-pressure air vents
- Natural gas blowdowns
- Switch valves
- Compressor blowoffs
- Autoclaves
- Steam ejectors

Design Advantages

- Choice of overall attenuation, ranging from 15 dBA to 60 dBA.
- Unique design options, combined with the latest manufacturing techniques, ensure optimum performance and long life even under demanding conditions.

Standard Features

- Welded heavy-duty steel construction.
- Inlet plenum covered with outer acoustic wrap and heavy-gauge shell.
- Highly absorptive fiberglass acoustic fill and heavy-gauge perforated face sheets.
- Inlet nozzle and diffuser with flange drilled to 150# ANSI standards.
- Lifting lugs and bottom drain.
- Painted exterior.
- Vertical or horizontal installation.

Optional Features

- High-temperature acoustic fill.
- Special materials, for example, stainless steel, Monel Hastelloy.
- Inspection openings.
- Mounting brackets or other special supports.
- Outlet head and nozzle.
- Restrictive diffuser built to ASME Section VIII, Division I, to maintain back pressure or control blowdown time.
- Elbow, tailpipe, or weatherhood.
- Special paint.
- Side inlet.

Reliable Services

Our extensive in-house engineering, manufacturing, and testing facilities ensure optimized process, mechanical, and acoustic performance for your application.



The concentric annular ring design (*left*) and the wrapped Acousti-Tube vent silencer design (*right*) offer a choice of silencer profile and configuration to meet site-specific requirements.



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Vent and Blowdown Silencers

The HV Series comes with an inlet diffuser or orifice plate that is a critical element to the acoustic and mechanical performance of the silencer. Both the inlet nozzle and the diffuser/orifice plate are designed and constructed to withstand the thermal and impact stresses produced in high-pressure, high-temperature, continuous or intermittent vent and blowdown service.

In vent applications, critical flow will occur for most gases at valve upstream pressures greater than twice the outlet pressure. Vent and blowdown noise levels increase with increased pressure drop and are also affected by valve aerodynamic recovery characteristics. Large valve, low-pressure vents will produce relatively broadband low-frequency noise, while high-pressure vents with small valves will produce high-frequency noise.

Sub-sonic (or non-critical flow) low-pressure vent and blowdown applications do not require, nor in most cases does the valve have pressure drop available to permit, the use of an inlet diffuser. Contact Universal Silencer for silencer recommendations when a combination of both low pressure drop and acoustic requirements must be met.

The HV Series is offered in six standard acoustic ratings, as shown in Table 1. The HV05 is offered for applications where only minimum noise reduction is required, while the HV30 is offered for applications where maximum silencing is required. Acoustic ratings are offered in sizes that cover a wide range of gas flow.

HV20 and HV30 acoustic ratings are offered for standard pipe diameters from 2 to 112 inches. All other acoustic ratings are offered for standard pipe diameters of 12 to 112 inches.

TABLE 1. Silencer ratings by grade classification

MODEL	CLASSIFICATION	AVERAGE DYNAMIC INSERTION LOSS (dBA)
HV05	Industrial	15-20
HV10	Commercial	20-30
HV15	Suburban	30-40
HV20	Residential	40-50
HV25	Hospital	50-60
HV30	Critical	60-70

Easy To Specify and Order

Vent and blowdown silencers are seldom a simple catalog selection. Usually, the purchaser provides detailed specifications and a system description that allows a proposal for a silencer to be prepared and submitted for review.

When you work with Universal Silencer, you can simply send the manufacturer's valve data sheet for your vent, and our experienced sales engineering staff can recommend a silencer best suited for your application.

Application Analysis

We use the following design information from the valve data sheet for system analysis and silencer selection:

1. Type of gas
2. Molecular weight or specific gravity
3. Ratio of specific heats
4. Flow rate (lb/hr, ACFM or SCFM)
5. Pressure and temperature upstream of valve and silencer
6. Maximum allowable pressure drop (psi) for valve and silencer
7. Manufacturer's name, and valve type and size
8. Unsilenced noise levels from valve (if available)
9. Silenced noise level (required at desired distance from source)
10. Silencer inlet size and pressure rating
11. Inlet orientation, axial or side
12. Silencer orientation, vertical or horizontal
13. Piping arrangement, including schematic if available
14. Other required options

Our form 88-0063 is available if you want to specify this and other information in a standard format. Using your information, we prepare computer analyses, such as those shown in Figure 1, and a comprehensive technical proposal and price quotation. Silencer selection is based upon optimization of flow velocity, required acoustical performance, and pressure drop. We are skilled in the application of process engineering principles that are needed to meet your performance requirements successfully. A key element of a successful vent application is proper assignment of pressure drop in the piping, valve, and vent silencer. Valve performance and life can be considerably extended by appropriate distribution of pressure drop in the piping system, valve, and vent silencer. In many instances it is possible to reduce the pressure drop across the valve body to less than critical. This results in reduced valve actuator open/close force requirements. Reduced valve wear caused by cavitation damage and reduced through-valve-body noise are added benefits of this approach.

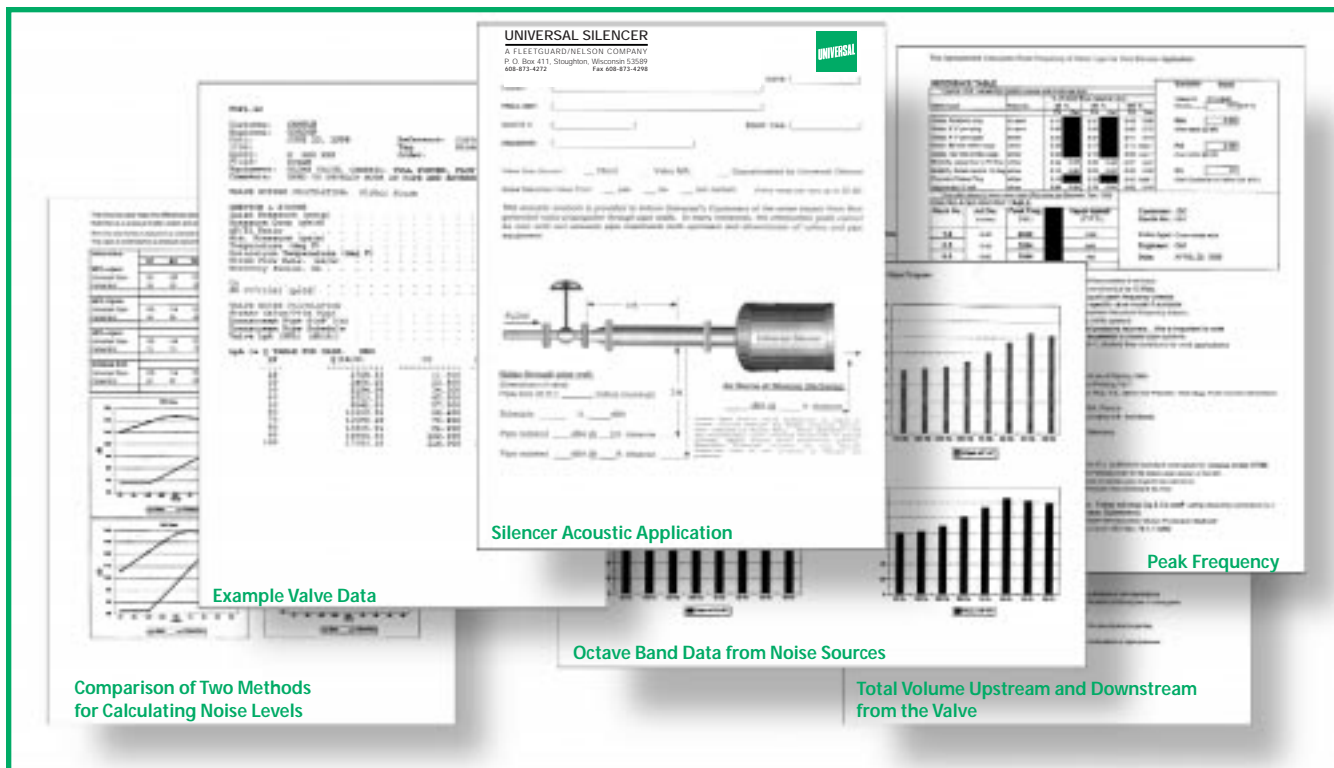


FIGURE 1. Sample printouts of Universal's vent application analyses.

We can verify the valve flow and pressure drop characteristics from your valve manufacturer's data sheet. We offer complete application engineering service, including determination of blowdown time; bottled volume calculations; and complete valve, pipe treatment, and vent discharge acoustic performance predictions.

Application Notes

Note that pipe size immediately downstream from a valve affects the octave band distribution of the noise spectrum. Universal Silencer has developed proprietary methods to predict this distribution so that we can select the appropriate balance of reactive and absorptive elements in the vent silencer design.

The annular vent silencers are assembled with structural members that provide for thermal expansion in high-temperature applications. The acoustic fill is long fiber, non-combustible, inert, vermin- and moisture-resistant fiberglass of at least four-pound-per-cubic-foot density, and is protected by both fiberglass cloth and a perforated metal face sheet. The silencer is packed with a minimum of 10% compression fill, and pack retaining rings are provided to minimize voids and settling of the fill.

The silencer will be designed so that the inlet flange and diffuser are matched to the discharge rating of the valve. We can work with you to obtain a more cost-effective valve and piping system by using a restrictive diffuser or

orifice plate to stage the system pressure drop. For conservatism, vent silencers with restrictive diffusers are designed with pressure ratings that match the PSV inlet pressure rating. Also, you should assure yourself by reviewing the valve manufacturer's data sheet that the control valve will not malfunction from the rated back pressure of the restrictive diffuser you specified.

The following cautionary statement pertains to applications in pure oxygen service: *Customers are encouraged to contact the Compressed Gas Association (CGA) for more standards related to preparation and cleaning for this type of service.*

Construction Features

These silencers are welded heavy-duty fabrications. All materials are free from rust, weld splatter, mill scale, and other contaminants. The inlet nozzle and diffuser are constructed of steel and are welded. The diffuser provides controlled pressure expansion to atmosphere and provides uniform flow distribution through the acoustic section of the silencer.

The lined inlet plenum (expansion chamber) of the silencer is provided with a double shell separated by a layer of acoustic insulation and sound-deadening material. The inner shell is solid to prevent shell-radiated noise and migration of the acoustic fill. The transmission loss across the plenum and bottom head is comparable to the silencer attenuation. ■

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Our corporate headquarters are located in Stoughton, Wisconsin, just southeast of Madison, the state capital. This new building houses administration, sales, and engineering departments. Manufacturing facilities are in Muscoda, 75 miles west of Stoughton, and Montello, 70 miles north.

Our products have been used to protect, quiet, and optimize the performance of industrial equipment for 50 years. We maintain a fully equipped facility for testing filters and silencers under actual operating conditions. We are an ISO 9001 registered firm and ASME Code certified.

*Preserving
a quiet
environment.*

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Vent and Blowdown Silencers

Contact us for more information about our complete line of industrial silencers and air filter/filter silencers:



- Vent silencer specification sheet, form 88-0063
- Air filters and filter silencers, catalog 241-A
- Cartridge air filters and filter silencers, catalog 242-B
- CB compact blower silencers, catalog 255-A
- CBF/CBFI compact blower filter-silencers, catalog 261-A
- Reciprocating engines, catalog 246-A
- Rotary positive blowers, catalog 244-D
- Axial fans, catalog 249-D
- Compressors, information provided by application
- Vacuum pumps, catalog 222-B
- Industrial fans, catalog 249-A
- Steam ejectors, pressure reduction valves, and other special applications
- Gas turbines, catalog B-249-A
- Acusti-Tube™ Silencers, catalog 260
- Acusti-Tube™ Silencer Series, technical bulletin 94-1315
- Uni-Pulse™ inlet filter systems, catalog 250



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