Becker

a Baker Hughes business

Acoustic Noise Jacket (ANJ) Series

As much as 13 dBA Additive Acoustical Noise Attenuation for Your Control Valve and Regulator Applications

Acoustical Noise Jackets (ANJs) **Becker™** product line provide noise attenuation in the range of 9 to 13 dBA when applied to high noise applications that exceed 95 dBA. The ANJ offers a cost-effective solution for noise attenuation and may be applied during initial design, or retrofit to existing problem installations. The ANJ features a rugged, modular design tailored to fit your specific piping configuration. The custom fit design results in exceptionally efficient noise attenuation, as well as easier removal and reinstallation during maintenance.

Benefits

- Provides noise attenuation of 9 to 13 dBA for high noise applications
- May be combined with other Becker noise attenuation systems for additional noise level reduction
- Custom design offers exceptional fit for enhanced performance
- Modular design permits easy removal and installation during maintenance
- Allows for easy retrofit to problem installations without the need to shut down equipment
- Eliminates pressure drop issues observed with the use of in-line silencer technology
- Reduces heat loss (due to the thermal insulation provided)
- Offers a relatively low-cost solution, including labor and materials

Table 1 - Acoustical Noise Jacket Specifications

Specifications	
Color	Gray (standard)
Inner Jacketing, Outer Jacketing, & Gussets	17 oz./yard2 Teflon® impregnated fiberglass cloth
Liner	16.5 oz./ft2 mass loaded acoustical septum
Insulation (2 Layer)	2.0 in. THK/11 lb. density "E" type material mechanically bound
Decoupler	1.0 in. (3.0 in. uncompressed), LD fiberglass
Thread	Teflon® coated fiberglass thread
Attachments	Teflon® impregnated Fiberglass cloth straps with 316SS Double-D rings Hook & Loop seam fasteners
ID Tags	ATC Type 304SS with embossed lettering
Other	Circumferential belts on ends of cover and on bonnet
Dimensions	Custom specific to application
Installation	Outdoor/indoor
Flammability	Class 1 flame spread and smoke develop rating per ASTM
Mildew and Rot	Full resistance
Abrasion Resistance	Excellent
Temperature Limits	-40°F to +500°F (-40°C to +260°C)
Chemical Resistance	Resists oils, grease moisture, mild acids, alkalis, dirt, dust, and salt atmospheres
Cleanability	Outer/inner jacket may be cleaned with standard industrial cleaners
Performance	9 to 13 dBA passive noise attenuation at high noise applications (>95 dBA)

Before and After Comparison: Installation of a Becker control valve at the Russian Natural Gas Pipeline

Figure 1 - Control valve installation BEFORE installing ANJ

This application incorporates a Becker QTCV-T2 *T-Ball™* Quiet Trim control valve from Baker Hughes. Although the QTCV-T2 valve can provide as much as 15 dBA noise attenuation on its own, control valve installations in buildings can provide additional operational challenges related to reflective noise phenomenon. Prior to installing the ANJ system, the noise level was measured at 100 dBA. ANJ installation significantly reduced the measured noise levels -- to 88 dBA.

Figure 2 - Control valve installation AFTER installing ANJ

The ANJ system was custom designed to ensure an exceptionally well-fit piping system and control valve components. The system's rugged, modular, and easily replaceable design can be effectively implemented by operating technicians. The ANJ system's custom fit piping components significantly reduce noise leakage, providing 9 to 13 dBA in noise attenuation for high noise applications (unattenuated noise greater than 95 dBA).

Acoustical Noise Jackets (ANJ) from Baker Hughes Becker Products Feature Rugged, Cost-Effective Design with Easy Serviceability

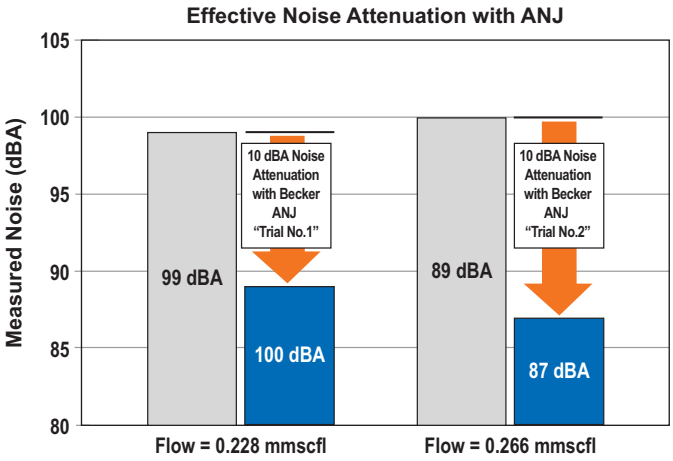

Figure 3 - ANJ Demonstrates 10-13 dBA Noise Attenuation

The ANJ system from the Becker product line demonstrates an effective noise attenuation ranging from 10 dBA to 13 dBA in the two cases above. Trial conditions are as follows: 4-inch model QTCV-T3; P1=417 psig (2,875 kPa); P2=57 psig (939 kPa); T=75°F (24°C). The above empirical data was taken during a case study of a natural gas distribution utility located in the Midwestern United States.

Table 1 - Acoustical Noise Jacket Specifications (cont.)

Specifications	
Valves:	4" T3 300 ASME
Conditions:	P1=417 psig (2,875 kPa), P2=57 psig (939 kPa), T= 75°F (24°C)

Products

- ANJ for Natural Gas Control Valves
- ANJ for Natural Gas Regulators
- ANJ for Natural Gas Piping Systems
- Other Custom ANJ systems for unique applications

Other Becker Noise Attenuation Solutions

- QTCV Series Quiet Trim control valves (T-Ball)
- CVET Series globe control valves with noise trim
- CVS control valve silencers
- CVD control valve diffusers
- Becker Below Ground ball valve regulator solution

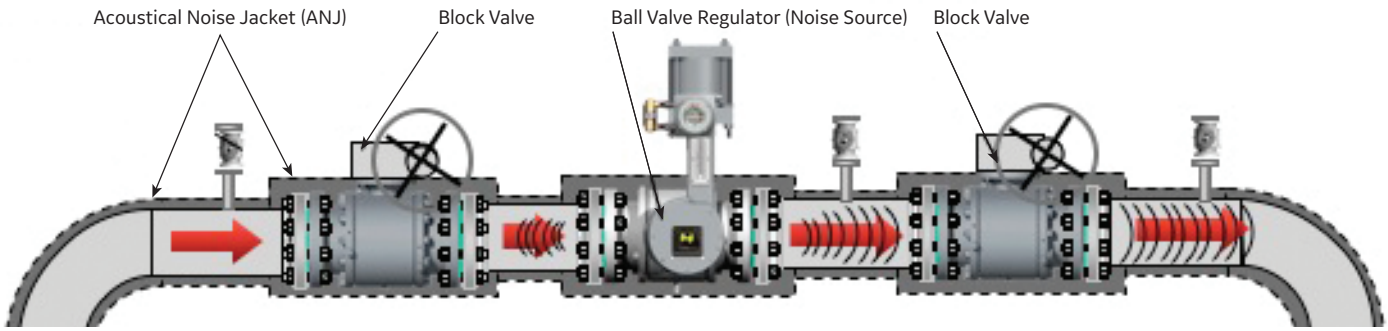

Figure 4 - Typical Ball Valve Regulator Installation with ANJ

The image above represents a typical ball valve regulator installation with a custom ANJ system. The ANJ system provides noise attenuation ranging from 9 to 13 dBA. The ANJ noise attenuation is additive to other noise attenuating technologies which have been implemented.

For example, if a Model QTCV-T2 Quiet Trim control valve providing 12 dBA noise attenuation is combined with an ANJ system providing and additional 10 dBA of noise attenuation, the cumulative noise attenuation would be 22 dBA.

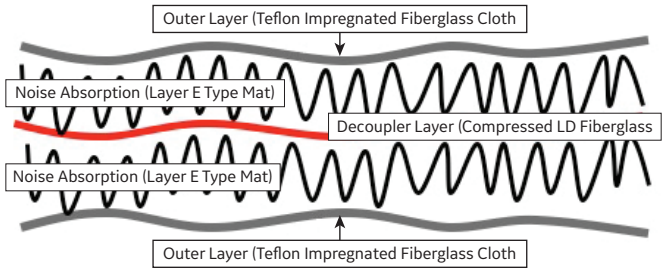

Figure 5 - Cross Section of ANJ System

The ANJ system consists of multiple layers of porous insulating materials, an acoustic decoupling layer, and inner/outer protective jacketing. The porous insulation provides absorption of the airborne sound, and it structurally decouples the outer jacketing layer from the radiating pipe wall. The Teflon-impregnated fiberglass cloth jacketing provides additional mass for reduction of sound transmission. The composite of the multiple materials laminated together dampens vibratory energy while providing a modular, easily installed and easily serviceable noise attenuation solution.

Baker Hughes