

Acoustic Nozzles

Description

Data Centers and server rooms are continuously improving their efficiencies to store and process more data. Improvements in computing hardware have led to an increase in Hard Disk Drive (HDD) sensitivity to sound. Inert gas fire suppression systems, normally used to protect this type of equipment, can produce sound levels that may have adverse effects on noise sensitive equipment.

The HYGOOD® Acoustic Nozzle, designed for inert gas fire suppression systems, decreases the acoustic footprint during a discharge.

The nozzle directs agent into the hazard area and reduces the sound level compared with standard nozzles. Flow calculations are used to specify the nozzle orifice size for the correct quantity and distribution of agent.

Application

The HYGOOD Acoustic Nozzle, in combination with the INERGEN® 150/200 bar and iFLOW 300 bar Fire Suppression Systems, is particularly useful for suppressing fires in hazards where sound levels may affect sensitive electronic equipment. Typical applications for the acoustic nozzle include server rooms and data centers.

Technical Specification

- For use with INERGEN 150/200 bar and iFLOW 300 bar systems
- 360 degree discharge pattern
- Aluminum body with fiberglass and wire wool damping materials
- Steel orifice pipe assembly complete with brass orifice plate
- Available in DN40 (1.5 in.) and DN 20 (0.75 in.) National Pipe Thread (NPT) sizes
- Acoustic Nozzle weights:

<u>1 1/2 in.</u>	<u>3/4 in.</u>
– With pipe coupling: 7.4 lb (3.4 kg)	1.8 lb (0.81 kg)
– Without pipe coupling: 5.1 lb (2.3 kg)	1.4 lb (0.64 kg)
- See Figure 1 for 1 1/2 in. nozzle dimensions and Figure 2 for 3/4 in. nozzle dimensions
- Each nozzle must be ordered with corresponding orifice pipe.



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Maximum Nozzle Limitations

- Area coverage per nozzle: 32.0 ft x 32.0 ft (9.8 m x 9.8 m)
- Protected height: 20.0 ft (6.1 m)
- Installation distance from ceiling: 12 in. (305 mm)

Dimensions

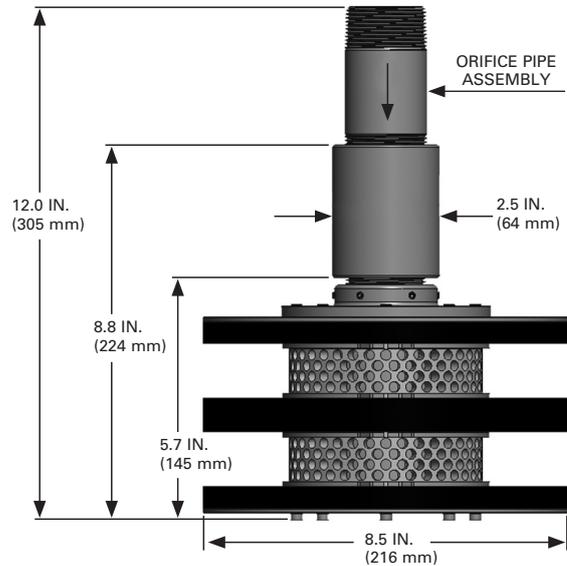


FIGURE 1
1 1/2 IN. NOZZLE DIMENSIONS
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- Notes:**
1. Use the appropriate Orifice Pipe Assembly depending on the pipe threads used in the system pipework.
 2. The Nozzle Orifice size must be specified when ordering the Orifice Pipe Assembly.

Dimensions (Continued)

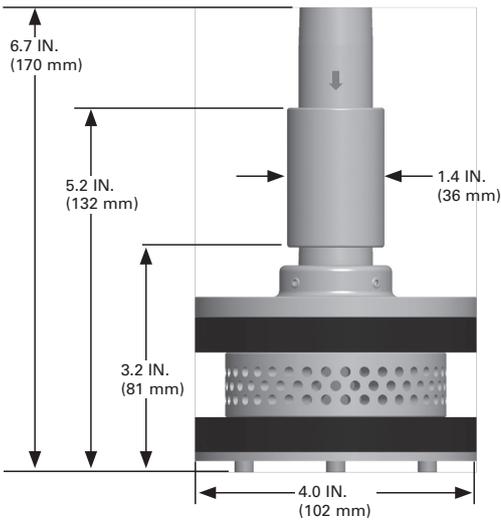


FIGURE 2
3/4 IN. NOZZLE DIMENSIONS
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Sound Performance

Sound power is the amount of sound energy produced by a noise source such as a fire suppression system discharge nozzle. The Acoustic Nozzle is designed to reduce the sound power level produced during a discharge of the INERGEN or iFLOW Fire Suppression System.

Sound pressure is the sound received at a location remote from the noise source. The remote location may include HDDs. It is sound pressure that is the critical sound energy relevant to the effects on the HDDs. The HYGGOOD Acoustic Nozzle is one of the factors that assists in reducing the sound pressure to an acceptable level and therefore, reduces the risk of HDD damage. The sound pressure level can be further improved by a number of other factors including the positioning of the nozzles, optimizing the room acoustics, use of sound absorbing room construction materials, and installation of sound absorption panels.

A summary of the estimated nozzle peak acoustic **sound power** across 500 Hz to 10k Hz frequencies at different agent flow rates is shown in Figures 3 and 4.

Note: The values stated in Figures 3 and 4 are based on actual testing performed by Johnson Controls.

Johnson Controls strongly recommends that data center operators review the room acoustics. Contact Johnson Controls for help to understand the impact of these measures and estimate the sound pressure level experienced at a given location.

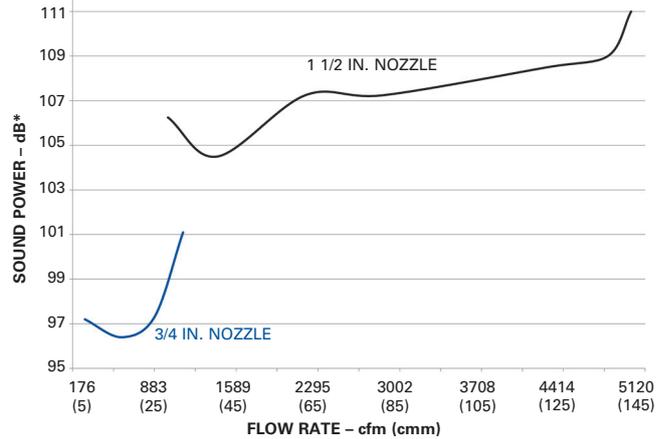
For more information, refer to the Johnson Controls White Paper: *The impact of sound on computer hard disk drives and risk mitigation measures* (Form No. T-2016367), available on www.hygood.co.uk.

Approvals, Listings, and Standards

The HYGGOOD Acoustic Nozzle is approved, listed, qualified under, or meets the requirements of the following specifications and standards:



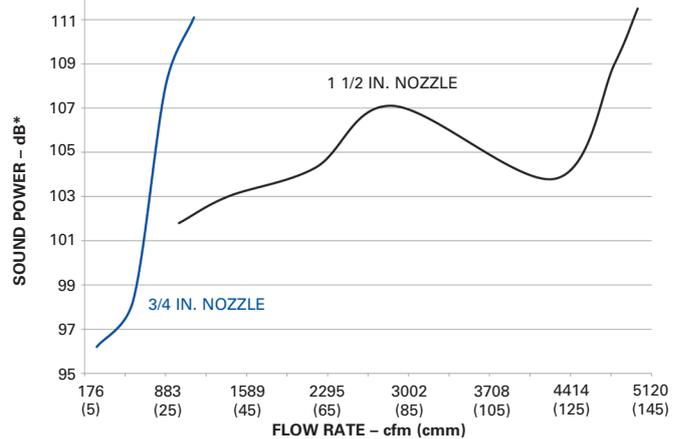
PEAK SOUND POWER VERSUS FLOW RATE FOR iFLOW TECHNOLOGY



*Sound power in dB vs. cubic feet (meters) per minute (cfm (cmm)) flow rate

FIGURE 3
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PEAK SOUND POWER LEVEL VERSUS FLOW RATE FOR ORIFICE FLOW TECHNOLOGY



*Sound power in dB re 1 piconWatt vs. cubic feet (meters) per minute (cfm (cmm)) flow rate

FIGURE 4
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Ordering Information

Part No.	Description
445710	Acoustic Nozzle, 1 1/2 in.
445715	Orifice Pipe Assembly, 1 1/2 in. NPT
27511	Orifice Pipe Assembly, 1 1/2 in. BSPT
448417	Acoustic Nozzle, 3/4 in.
448419	Orifice Pipe Assembly, 3/4 in. NPT
448416	Orifice Pipe Assembly, 3/4 in. BSPT

Note: The converted metric values in this document are for dimensional reference only and do not reflect an actual measurement.

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