

Powerwave[®] Acoustic Cleaners for SCR Systems

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GE Energy



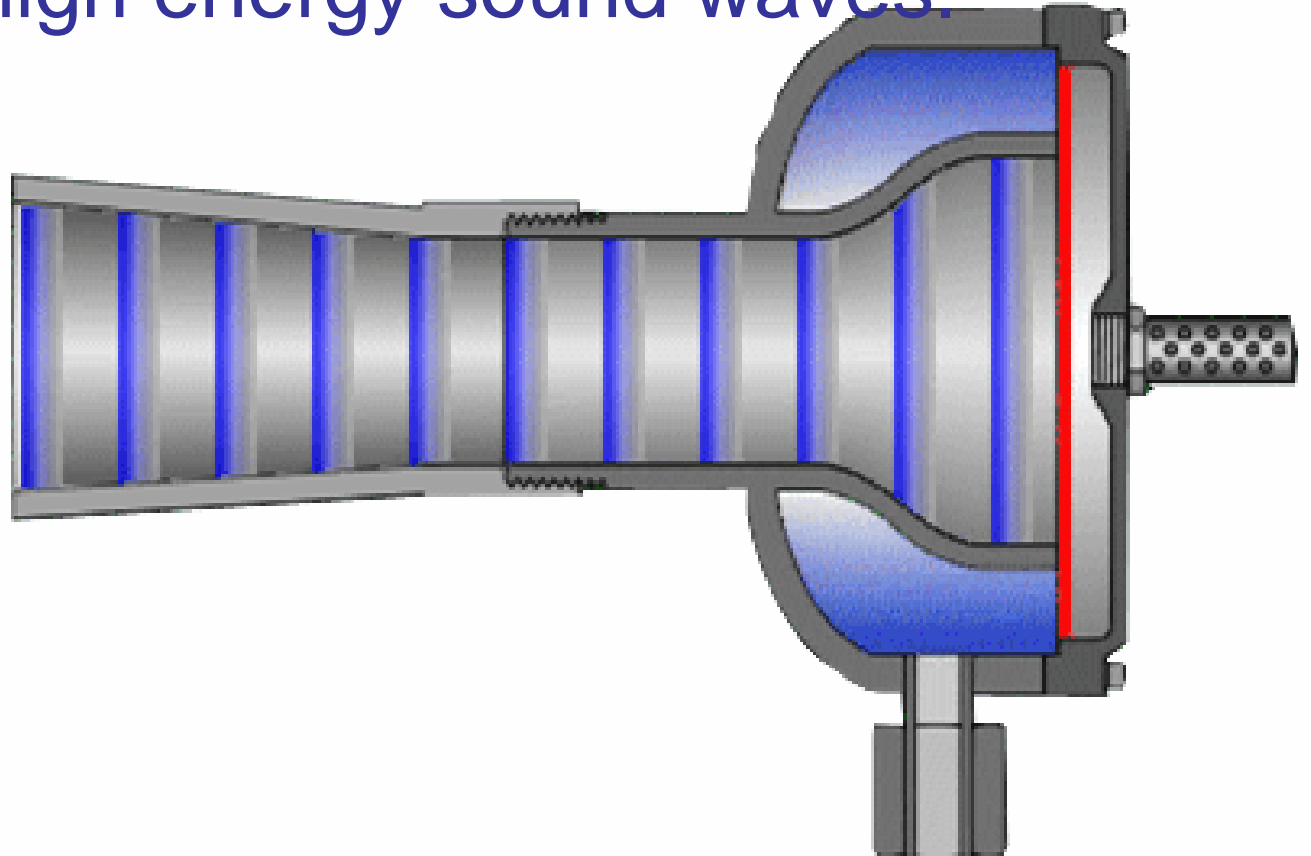
Powerwave® Acoustic Cleaners

Installations dating
back to 1983



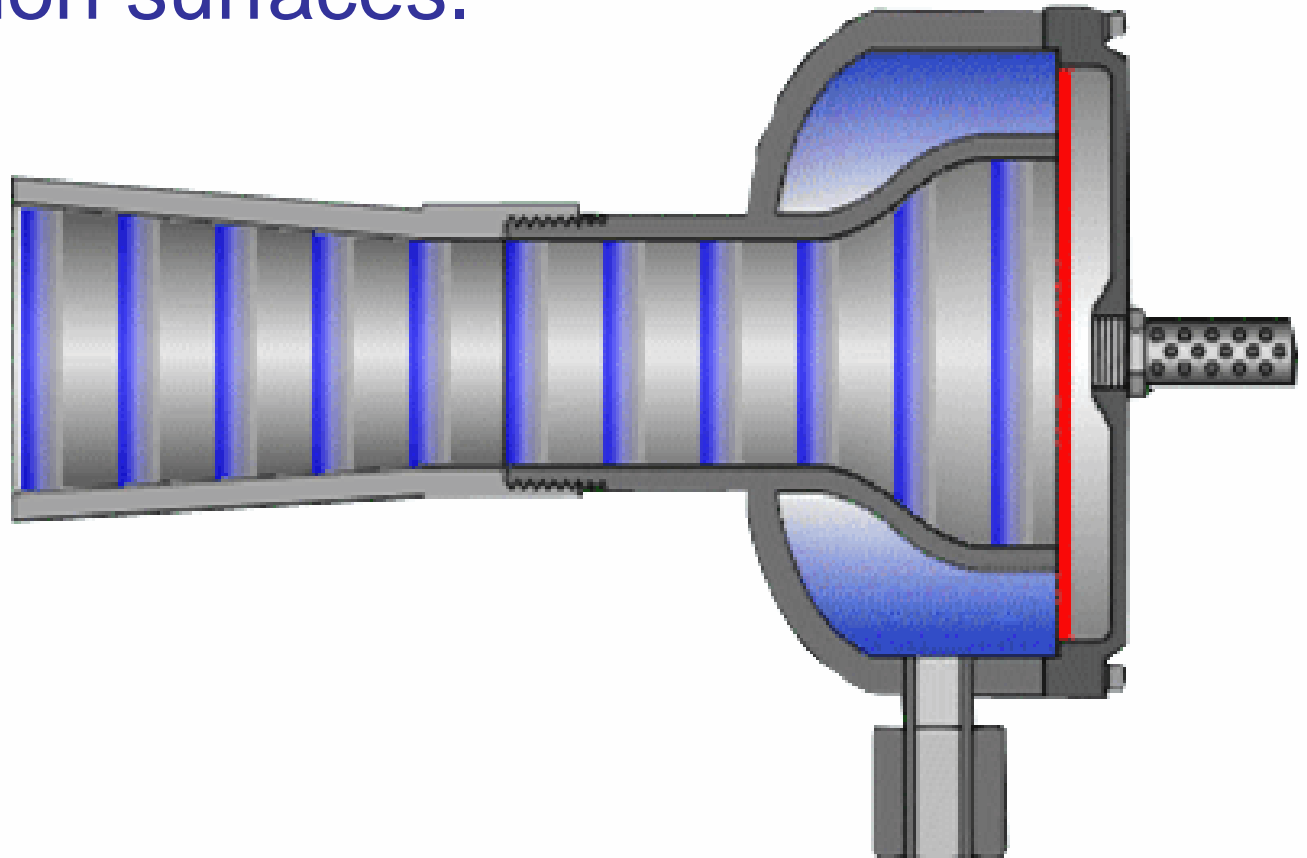
Acoustic Cleaners

Air operated horns that produce low frequency, high energy sound waves.

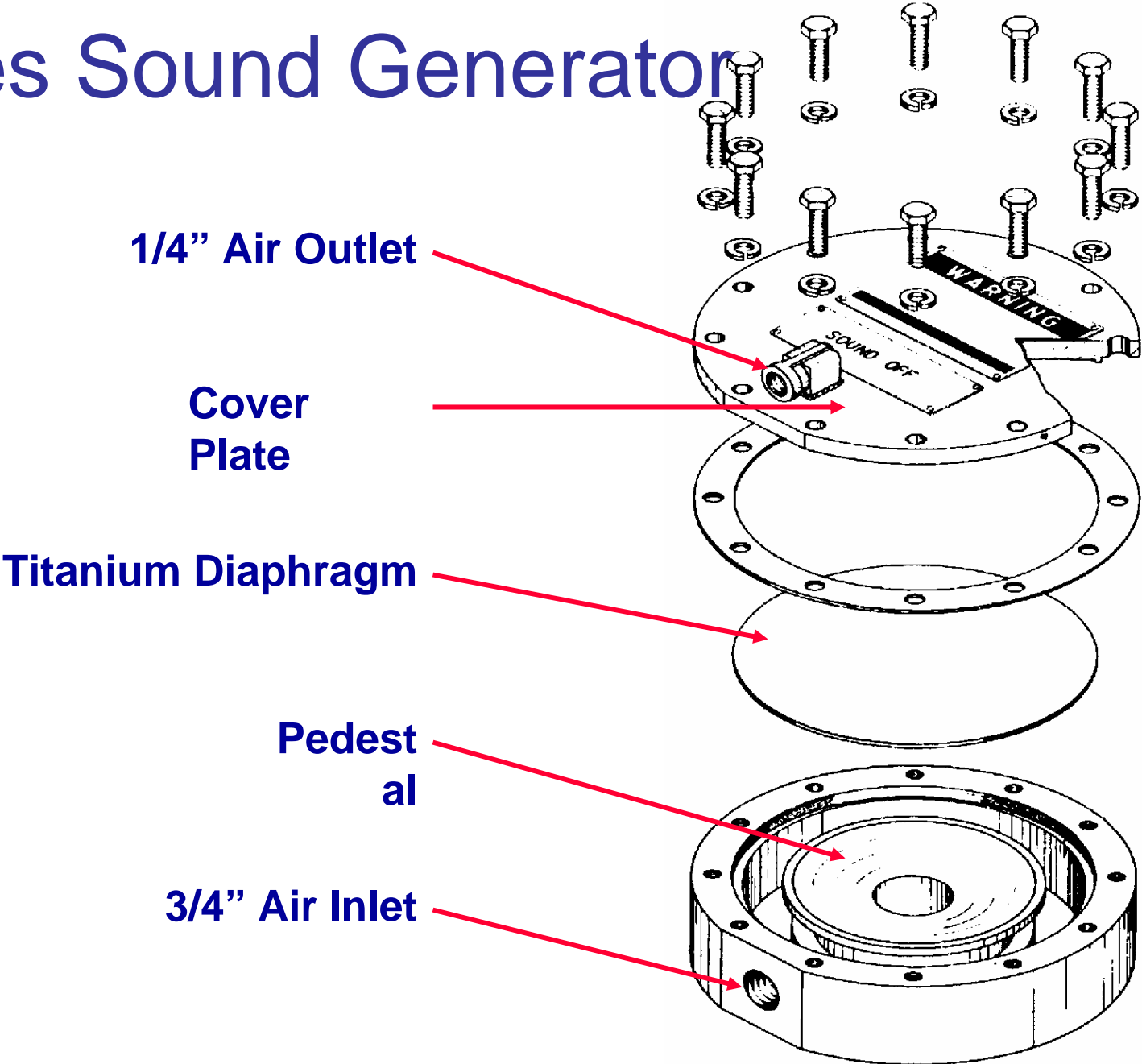


Acoustic Cleaners

The sound waves cause particulate deposits to resonate and dislodge from structural and dust collection surfaces.



D Series Sound Generator



PowerWave Air Requirements

> Air Pressure:

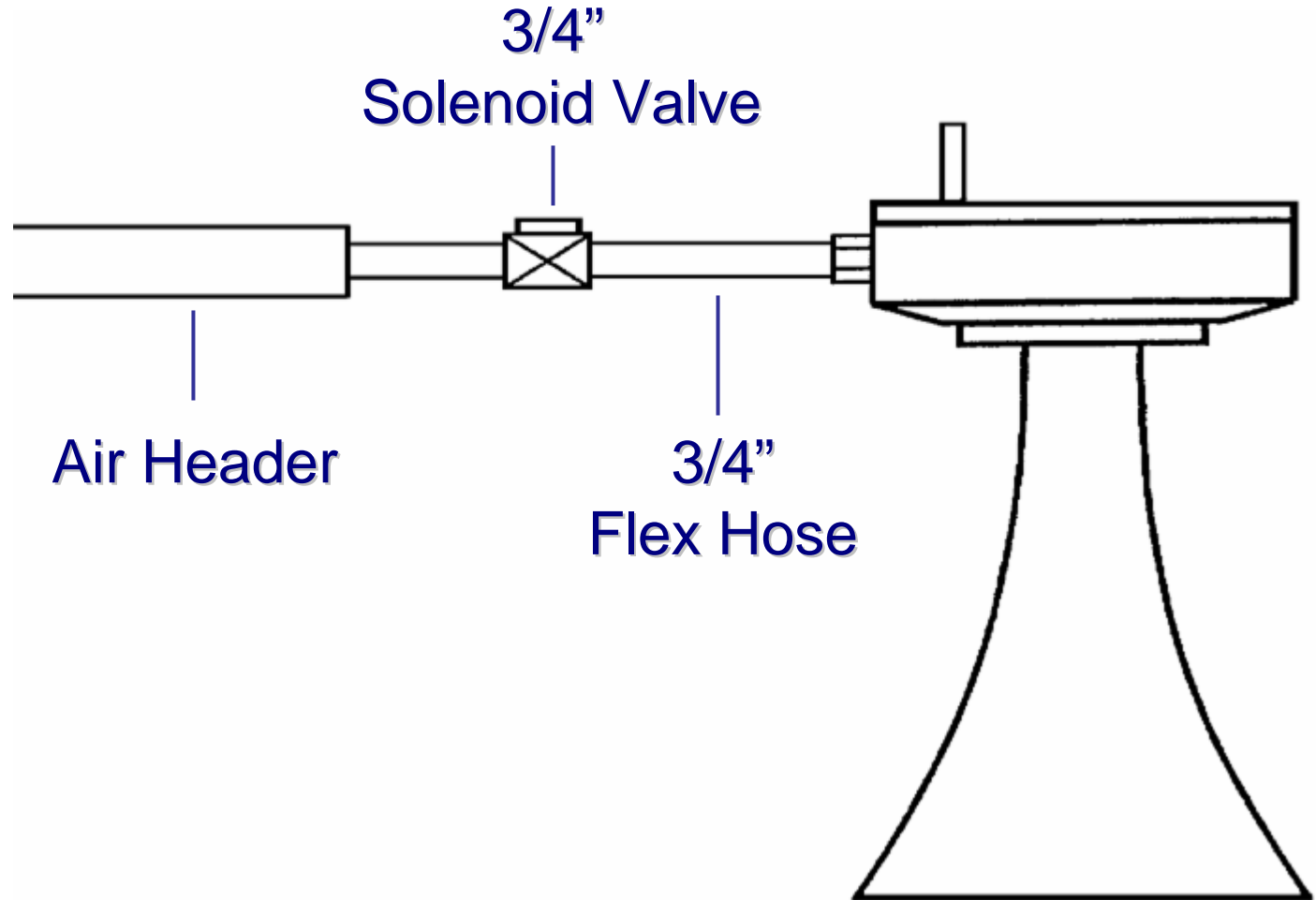
- 70 – 90 PSI
- 4.83 – 6.21 bar

> Air Consumption:

- 60 – 80 SCFM
- 19 – 38 l/s



General Piping Arrangement



PowerWave[®] Acoustic Cleaners

Frequencies from 360 Hz to 75 Hz

AH-10

AH-15

AH-25

AG-20-B

Acoustic

Lance

ESP-75

D-75

DC-75

D-230

D-360

D-Fluidizer



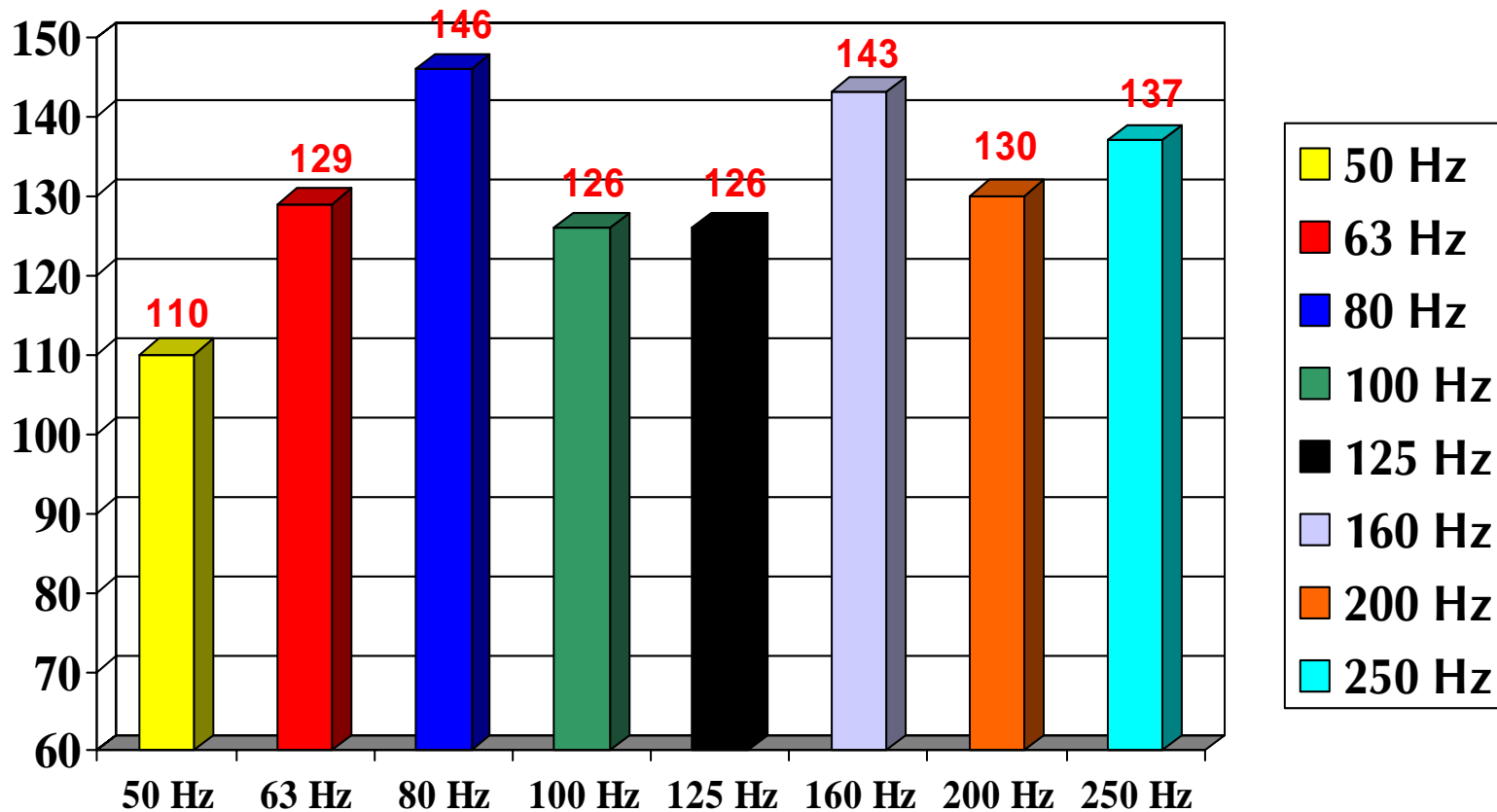
Lower Frequency = Great Effective Cleaning Area

- > The wave length of an acoustic cleaner with a fundamental frequency of 75 Hz is 3 times greater than the wave length emitted from an acoustic cleaner with a fundamental frequency of 230 Hz.
- > An acoustic cleaner with a fundamental frequency of 75 Hz does not require as high of dB output to be effective in resonating fly ash deposits as an acoustic cleaner with a fundamental frequency of 230 Hz.

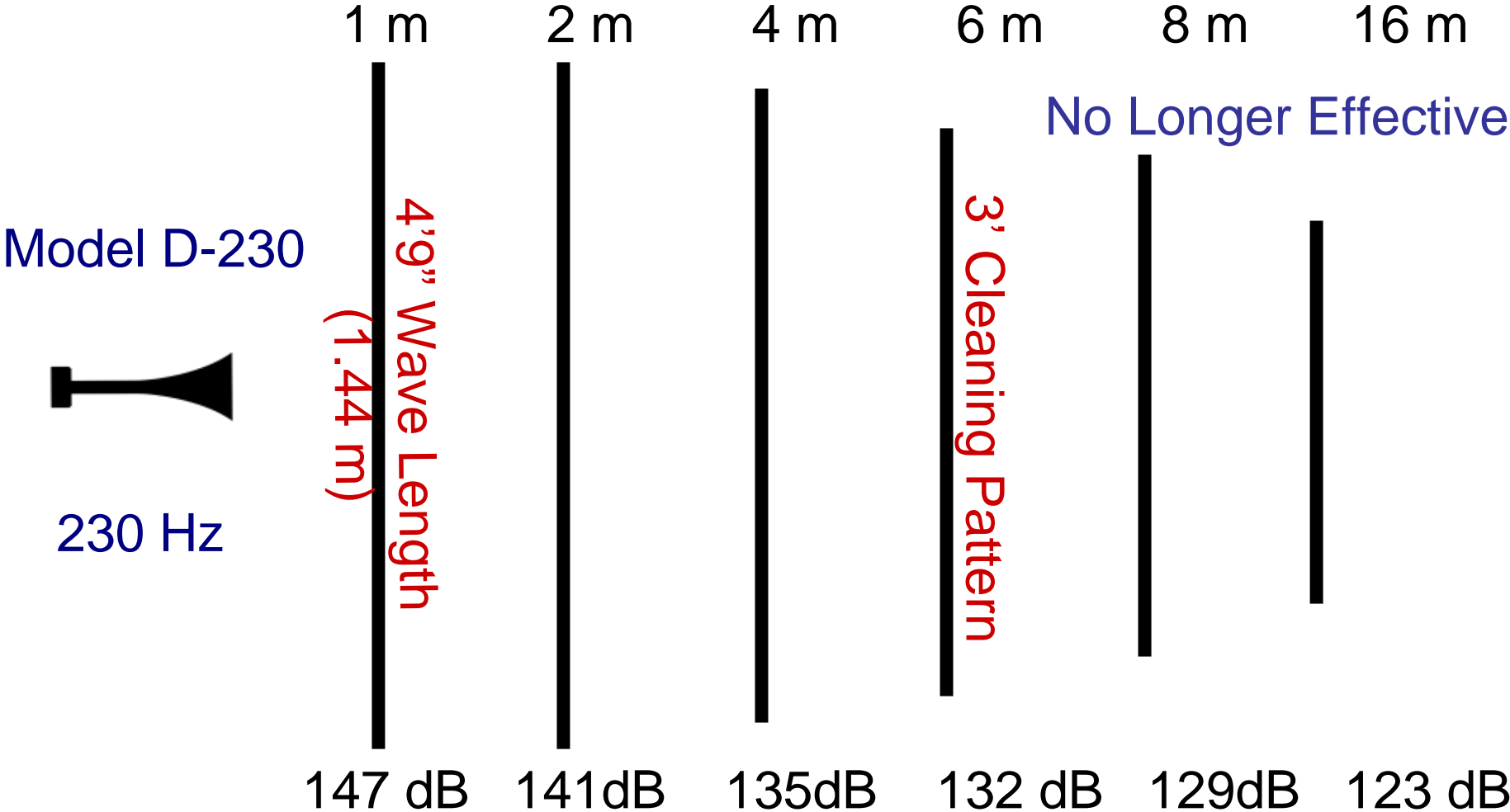
Model DC-75

Fundamental Frequency -- 75 Hz

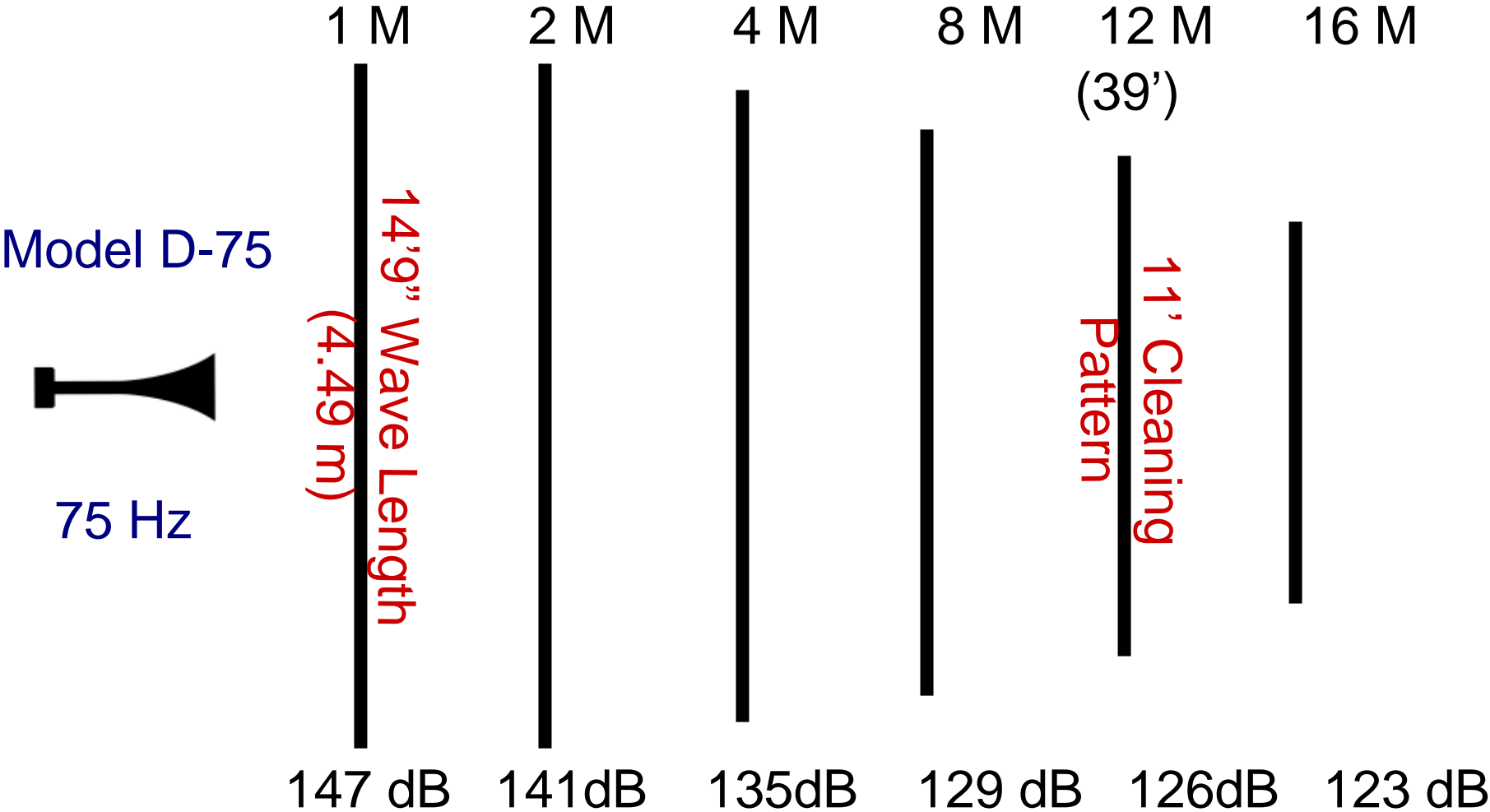
PWMF -- 107 Hz



Effective Cleaning Area



Effective Cleaning Area



Acoustic Cleaner Applications on Boilers

- > Air Preheaters
- > Baghouses
- > Ductwork
- > Economizers
- > Fans
- > Precipitators
- > SCR Reactors



Advantages of Using the Model D-75

Low Initial Investment:

- > A Model D-75 cost less than 25% of the cost of a rake style steam sootblower

Advantages of Using the Model D-75

Low Installation Cost:

- > The majority of the installation cost for the Model D-75 is running a 2" or less air line to each acoustic cleaner as compared to running high pressure steam lines to each sootblower.

Rake Style Steam Sootblowers

Outside
Support
Steel

Insulated Steam Lines

Blocked
Walkway





Model D-75s

1" Air Line

No Walkway
Obstructions

Advantages of Using the Model D-75s:

No Damage to the Catalyst

Lab & Field Tested

The acoustic energy emitted
by the Model D-75 does not
harm catalyst.



Advantages of Using the Model D-75s

Low Operational Cost

- > The cost of operating one (1) acoustic cleaner that is sounded for 10 seconds every 10 minutes is \$0.47 per day.
- > This is based on the US industry standard of \$0.25 per 1000 cubic feet of air.

Advantages of Using the Model D-75s

Low Maintenance Cost

- > The Model D-75 has only 1 moving part, a titanium diaphragm.
- > The diaphragm has a life expectancy of over 5 years.

SCR Installation Experience

- Installations on more than 100 SCR Reactors following coal-fired boilers.
- Installations on more than 20 SCR Reactors designed by Babcock Power.
- The first installation on a SCR Reactor designed by Babcock Power took place in 2001. Since that time, all of the SCR Reactors designed by Babcock Power have used GE Energy's acoustic cleaners as the catalyst cleaning system.
- Installations on numerous SCR Reactors fitted with plate style catalyst as supplied by Hitachi.

SCR Installation Experience

GE Energy has installations on SCR reactors in low dust and high dust arrangements.



Low Dust Reactor



High Dust Reactor

SCR Installation Experience

Numerous installations on SCR reactors
using a variety of catalyst designs



Honeycomb



Plate



Corrugated

Acoustic Cleaners vs. Sootblowers

PG&E Generating Co.
Indiantown Station

Duke Energy
Belews Creek Steam Station

Mirant
Birchwood Power Facility

and Others

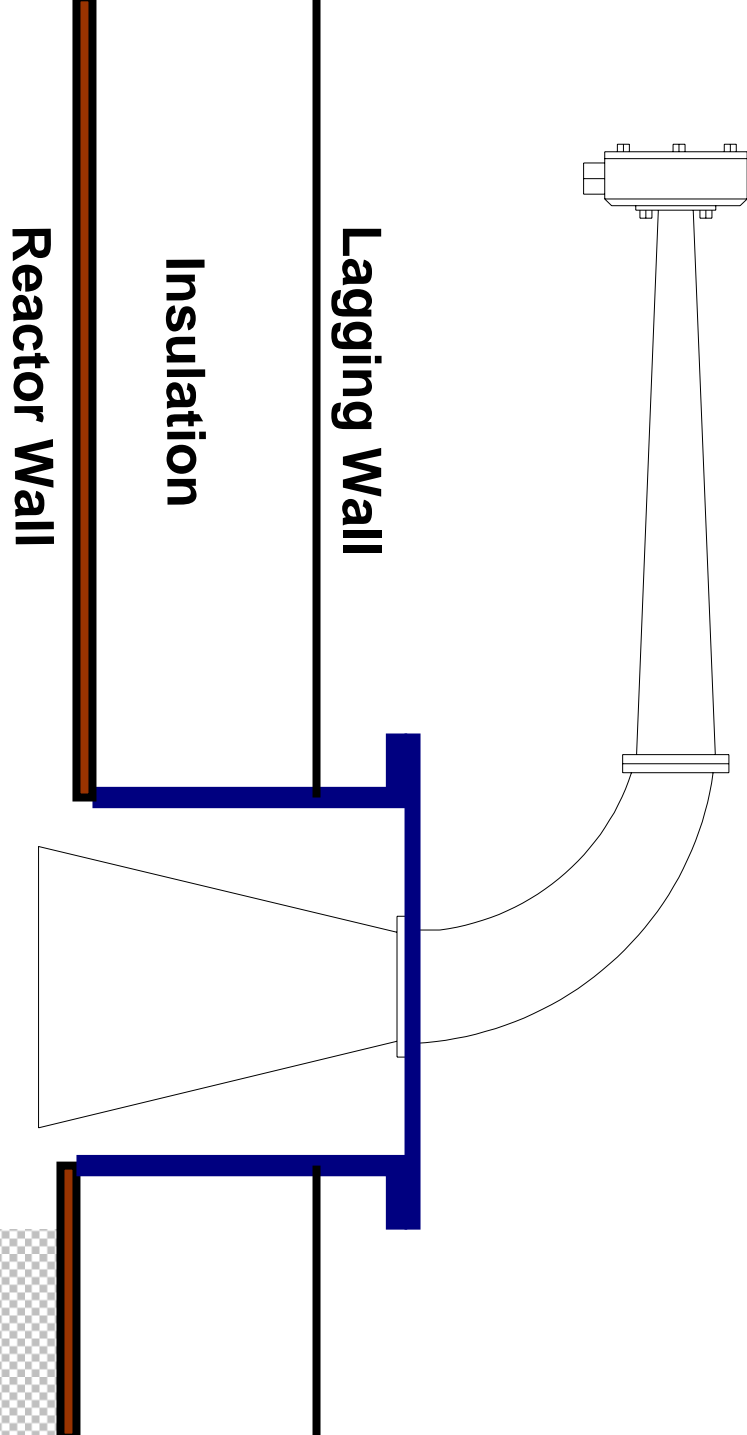


Model DC-75

Frequency: 75 Hz
Sound Pressure Level: 147 dB
Length: 94 3/4 inches
Mouth of Bell: 15 1/2 inches



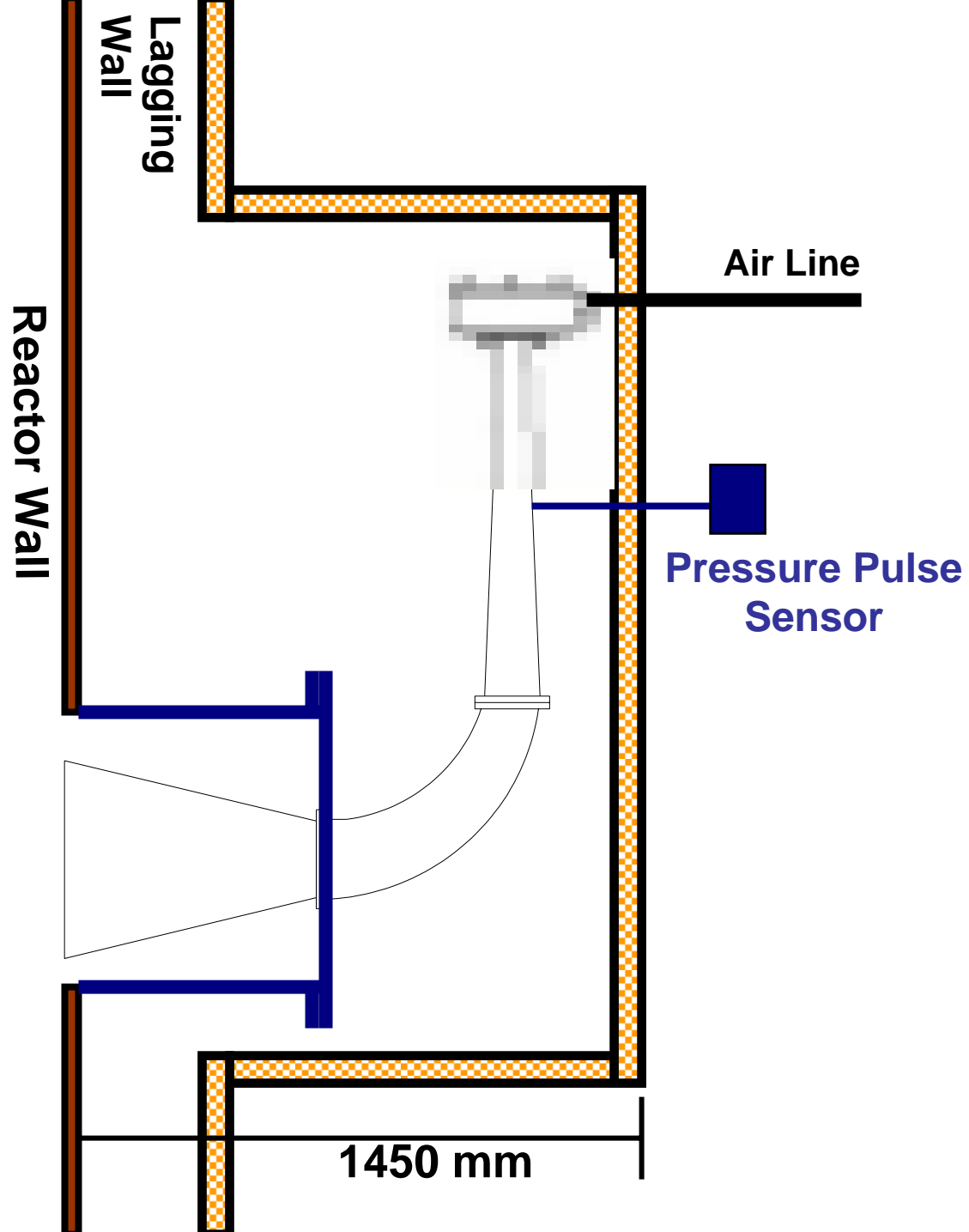
Model DC-75 Tube Mount



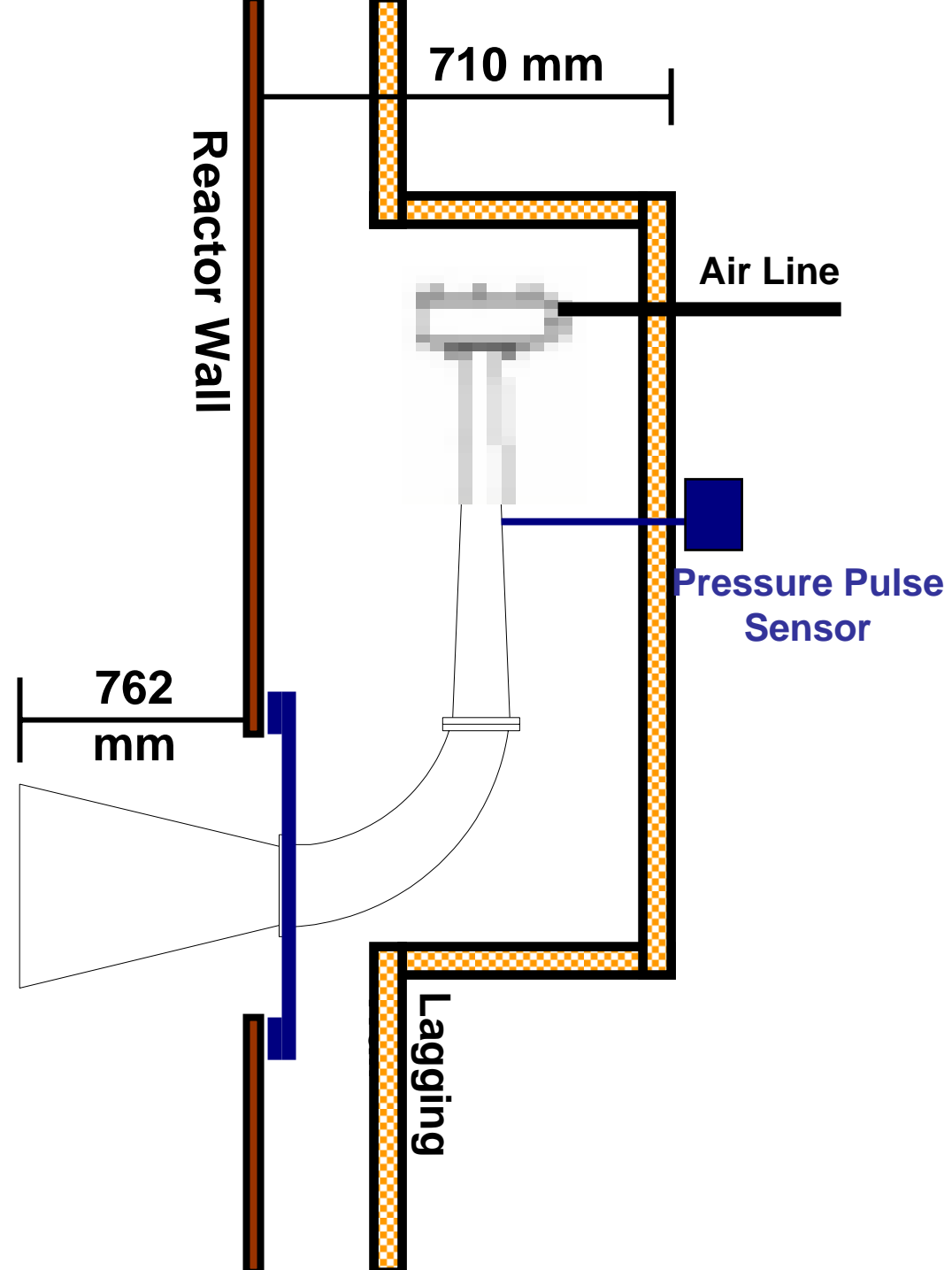
Catalyst

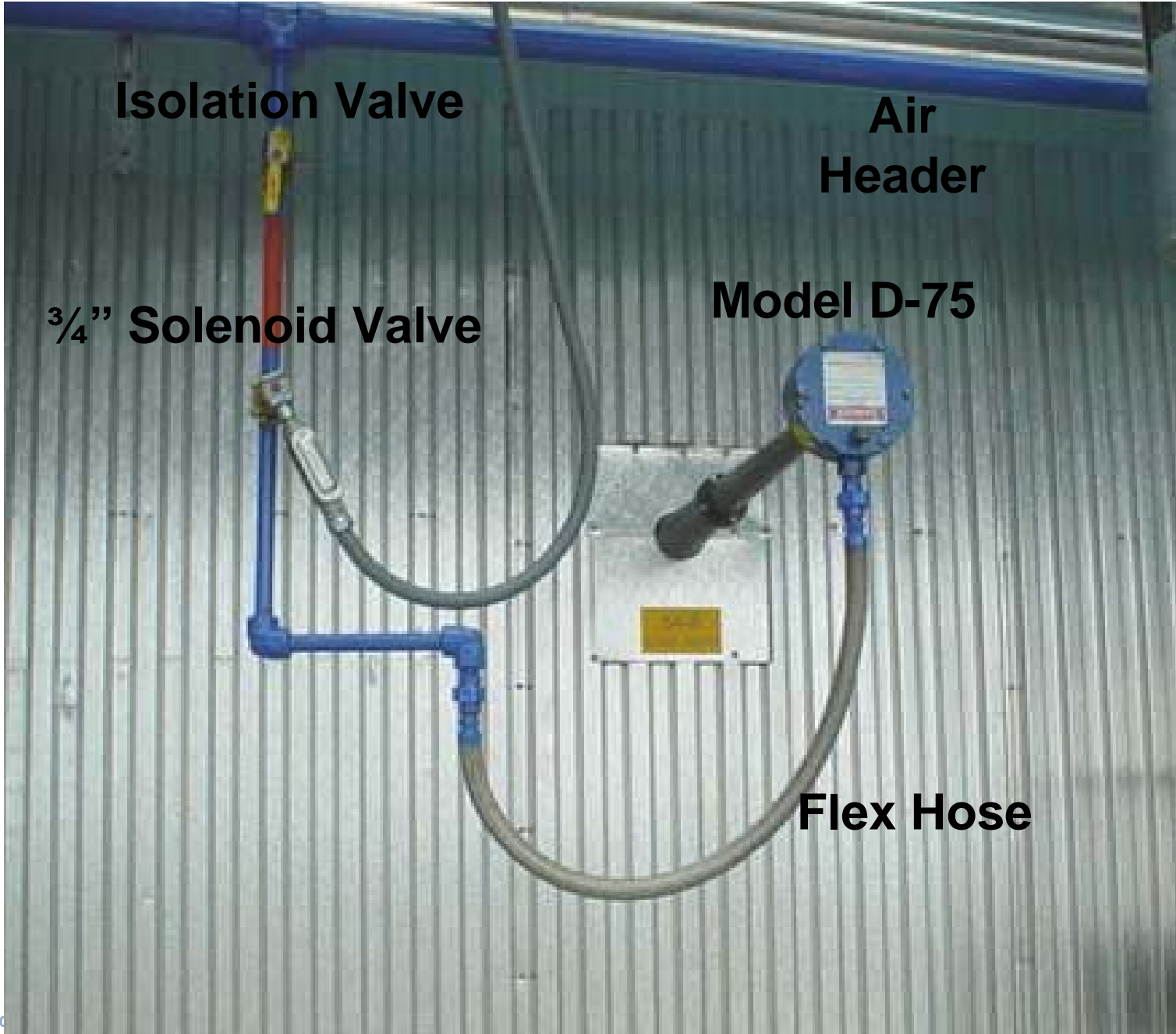


Model DC-75 Tube Mount



Model DC-75 Insertion Mount





Isolation Valve

**Air
Header**

3/4" Solenoid Valve

Model D-75

Flex Hose

Solenoid Valve Location

Easy Access



Difficult Access



Powerwave ThermalWraps

Removable Insulating Blankets



Insulated Model DC-75



Insulated Model D-75

Model D-75s that have been insulated by the plant.



Ambient Noise



Continuous Noise Level -- 72.2 dB
Acoustic Cleaner Sounding – 88.6 dB

Acoustic Enclosures



A properly designed acoustic enclosure can reduce the ambient noise by as much as 10 dB.

Model D-75s being installed on a SCR Reactor.



Installation Completed -
The Model D-75s have
been covered with
Acoustic Enclosures.

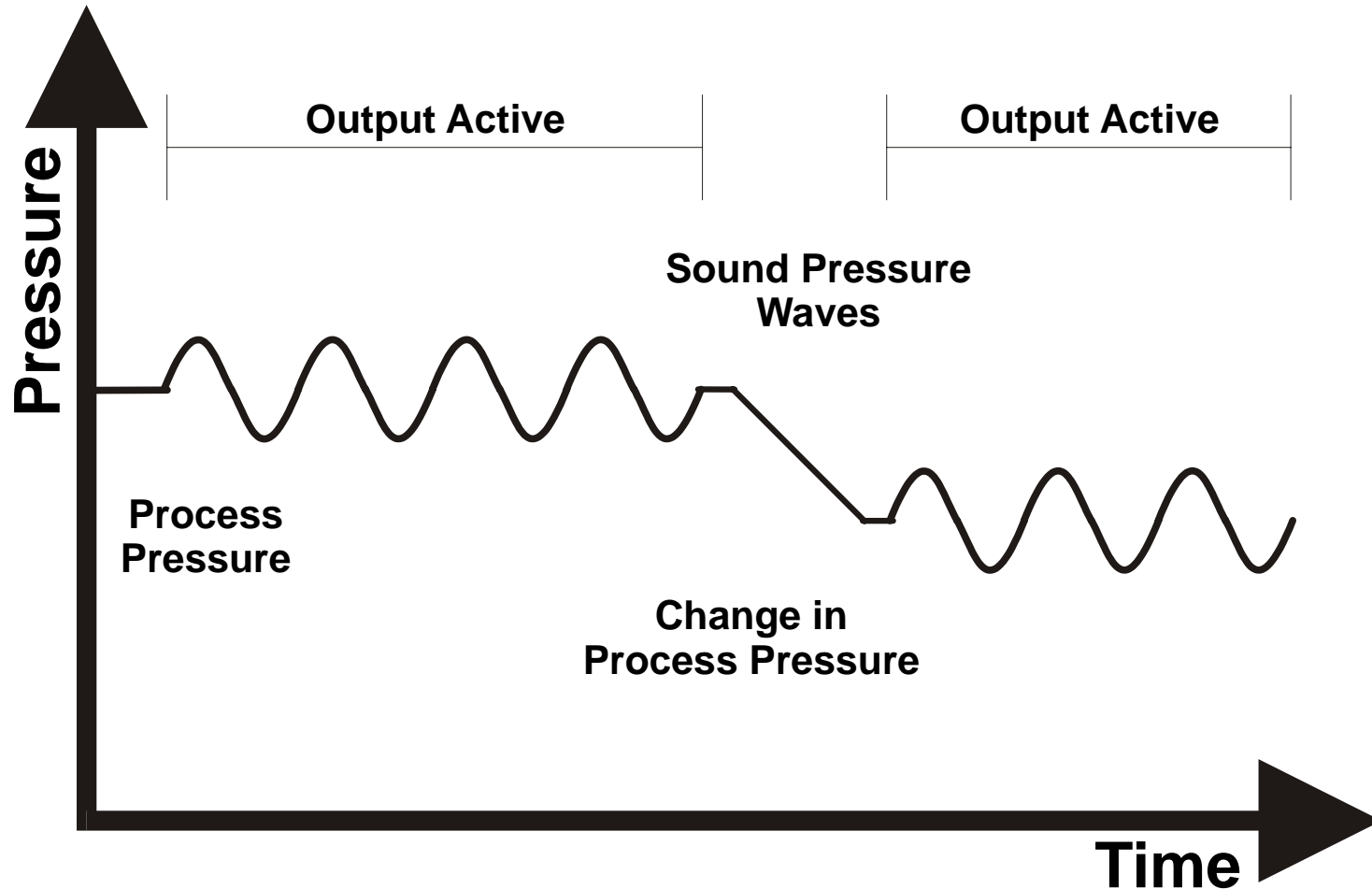


Acoustic Cleaner Verification System

What it does...

The Acoustic Cleaner Verification Sensor monitors the pressure inside the horn. When the horn operates, the device senses the pressure waves as they travel down the bell sections, and triggers the output when the pressure waves reach a preset level. The Acoustic Cleaner Verification Sensor detects only the rapidly changing pressure caused by the sound pressure waves, so normal process pressure changes do not trigger the device.

Acoustic Cleaner Verification System

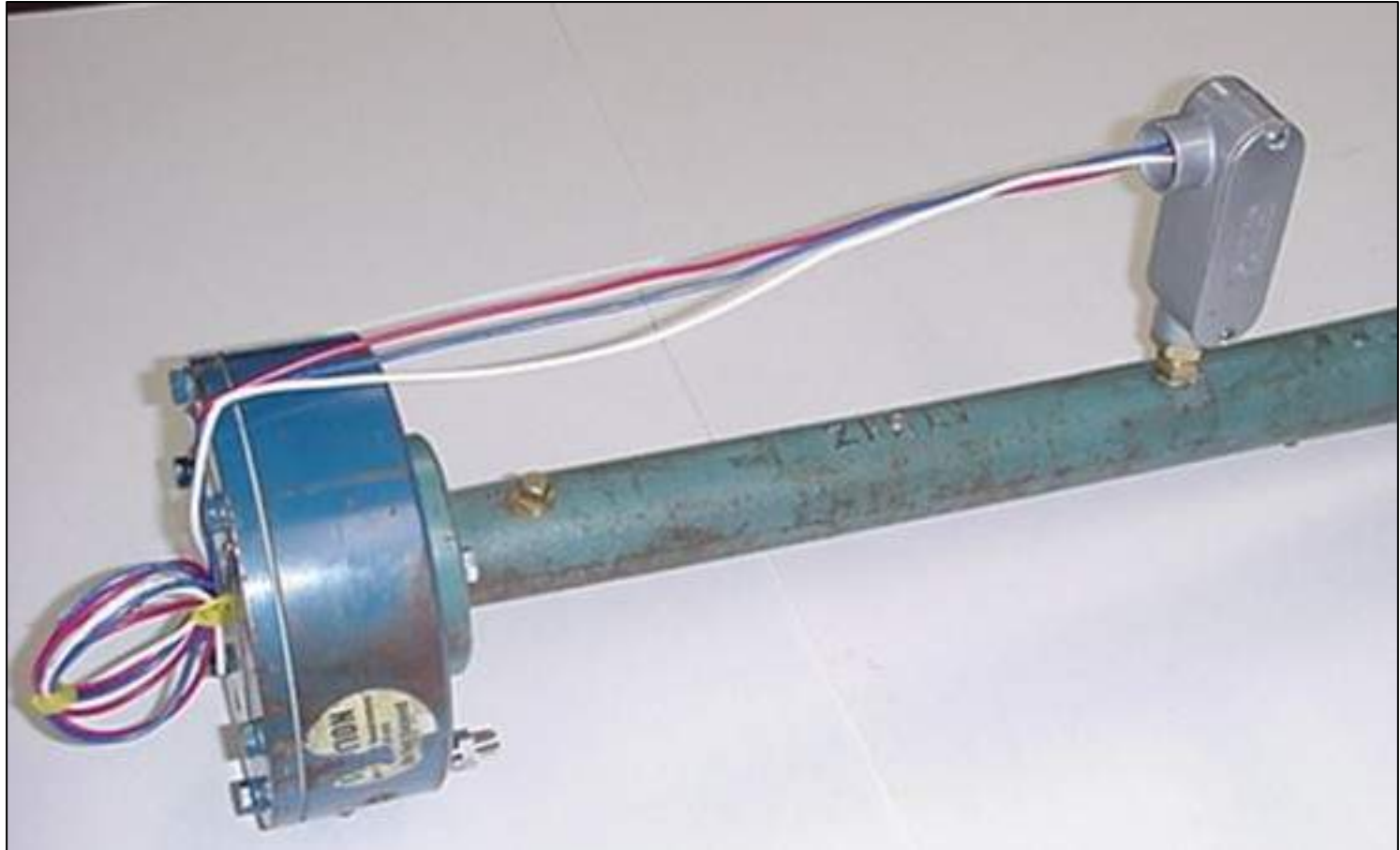


Acoustic Cleaner Verification System Specifications...

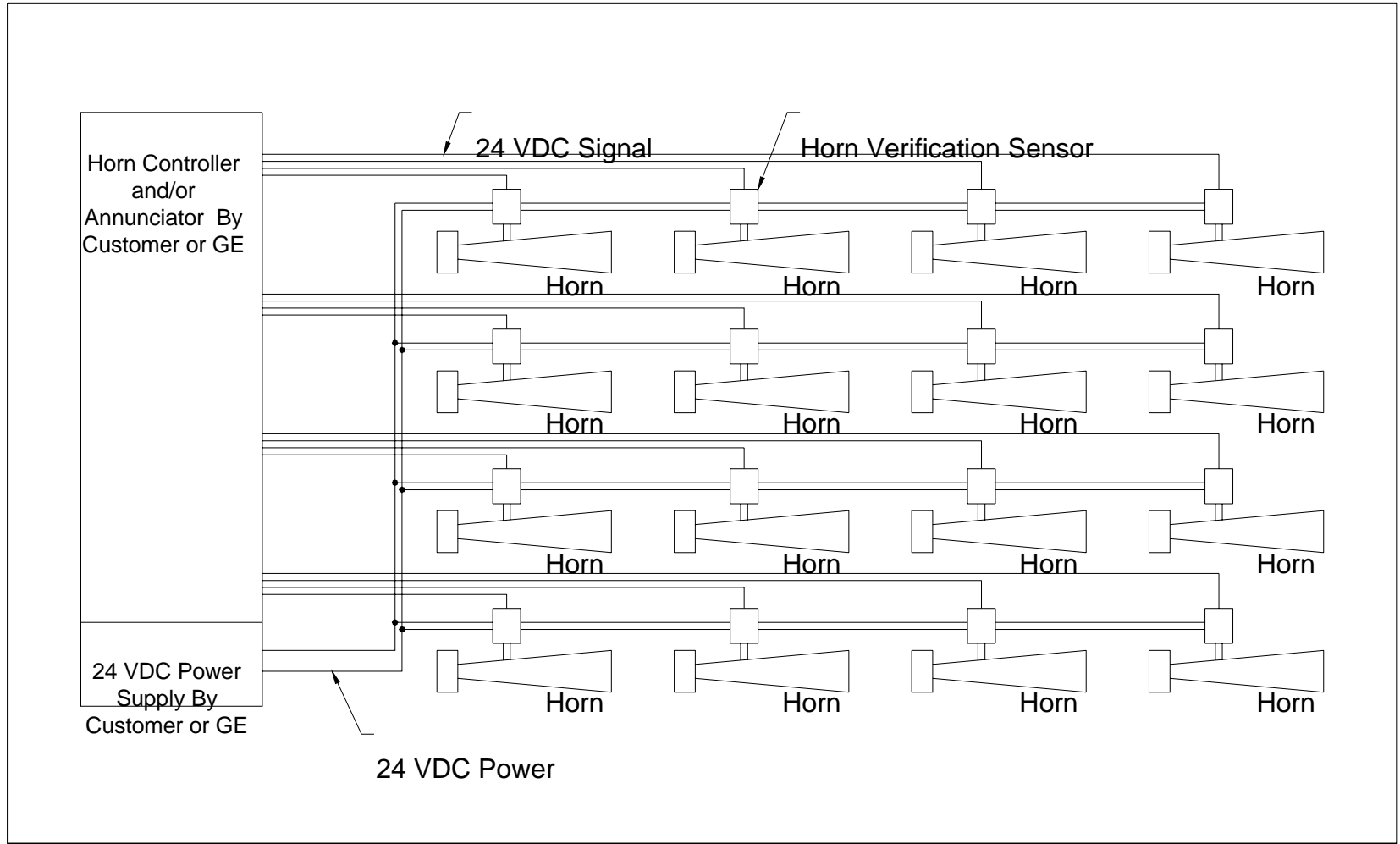
Temperature Range	-25°C to 85°C (-77°F to 185°F)
Power Supply	24 VDC \pm 10%
Output	24 VDC @ 3A *
Sensor Port	1/4" NPT
Static Pressure Range	-75" H ₂ O to 75" H ₂ O

* Output current may be limited by external power supply.

Horn Verification System



System Wiring



Any questions...

The End