REINHOLD ENVIRONMENTAL Ltd.

2011 NOx-Combustion Round Table & Expo Presentation

February 7-8, 2011, in Birmingham, AL / Hosted by Southern Company

Acoustic Cleaners on SCRs

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Presented by: Vince Barreto
GE Energy

Agenda

- SCR Basics
- Acoustic Cleaner Basics
  - Air Supply
  - Sound Generator
  - Bell Sections and Insulation
- Troubleshooting
- Spare Parts
- Q&A

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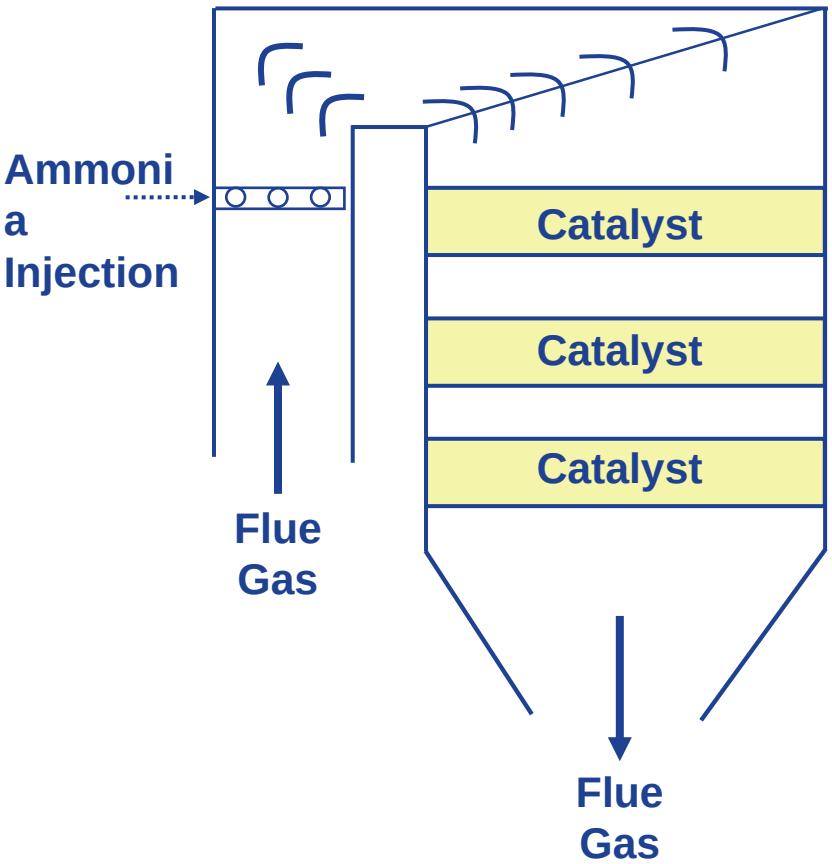
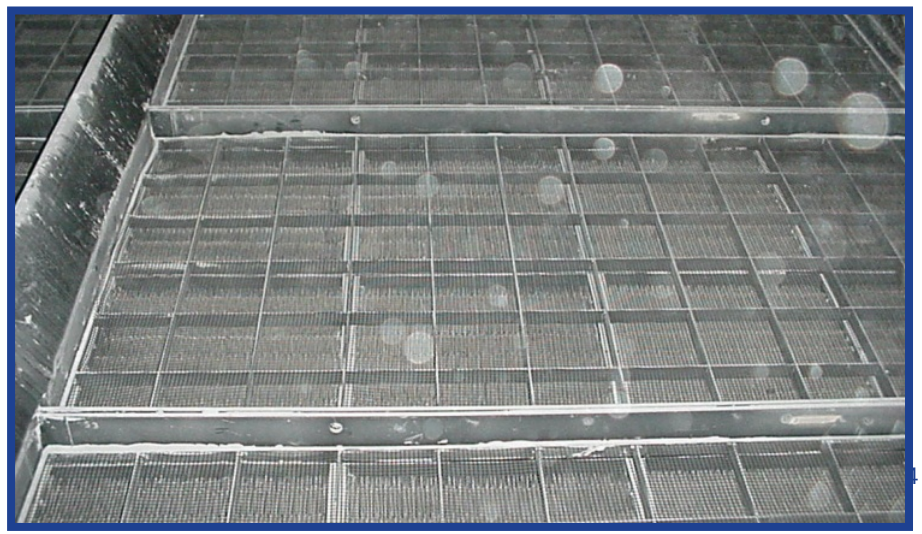
SCR Cleaning Basics

SCR Acoustic Cleaning Basics



- Proactive cleaning cycles that maximize contact of the flue gas to the catalyst surface
- Acoustic horns produce a change in air pressure (displacement) that dislodges particulate without eroding the catalyst
- Flat surfaces and areas of low or no velocity are not conducive to efficient acoustic cleaning



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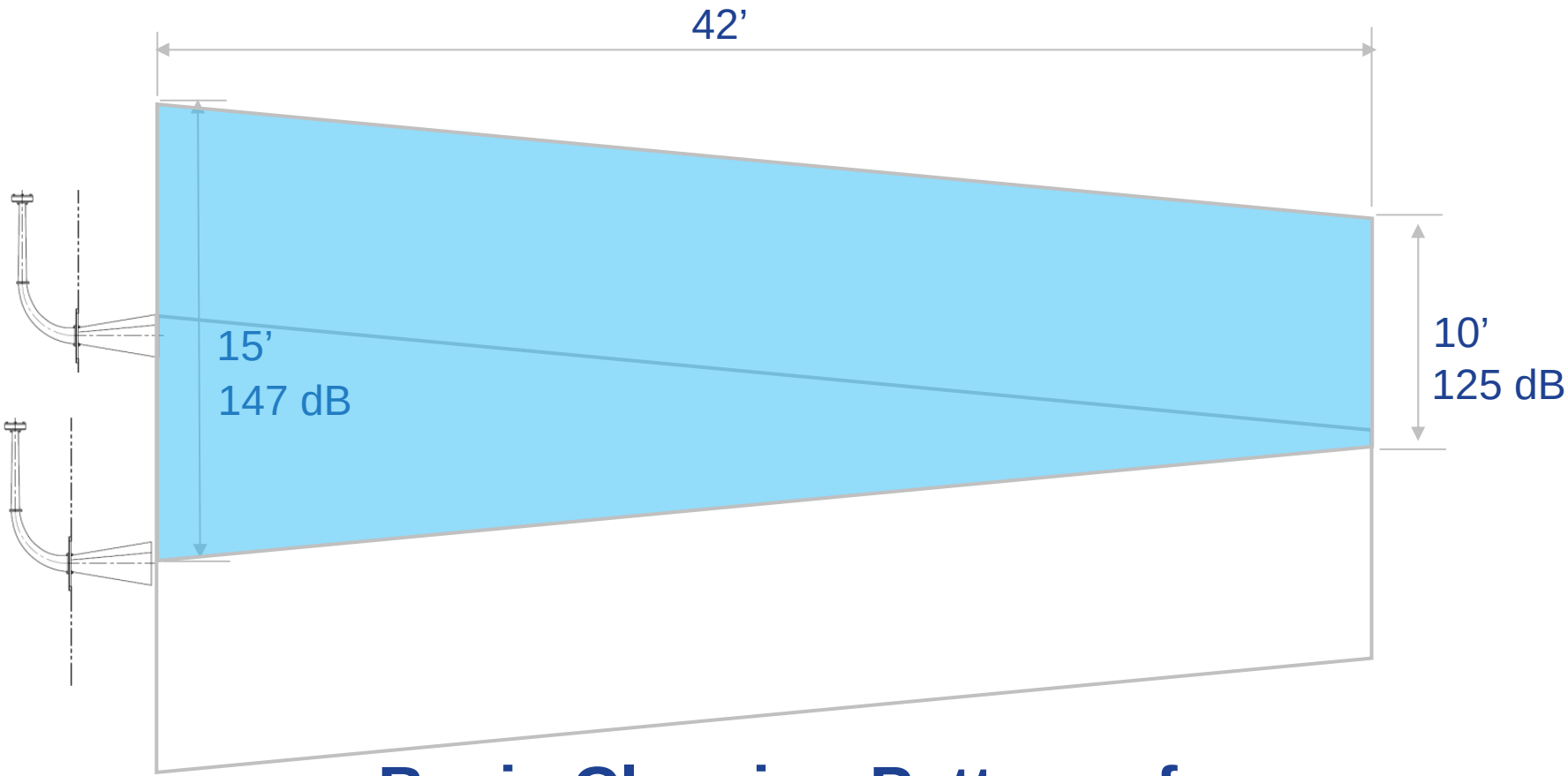
SCR Acoustic Cleaner Models

Model DC-75

Model D-75

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

SCR Acoustic Cleaning Basics



Basic Cleaning Pattern of
75 Hz Powerwave Acoustic Cleaners

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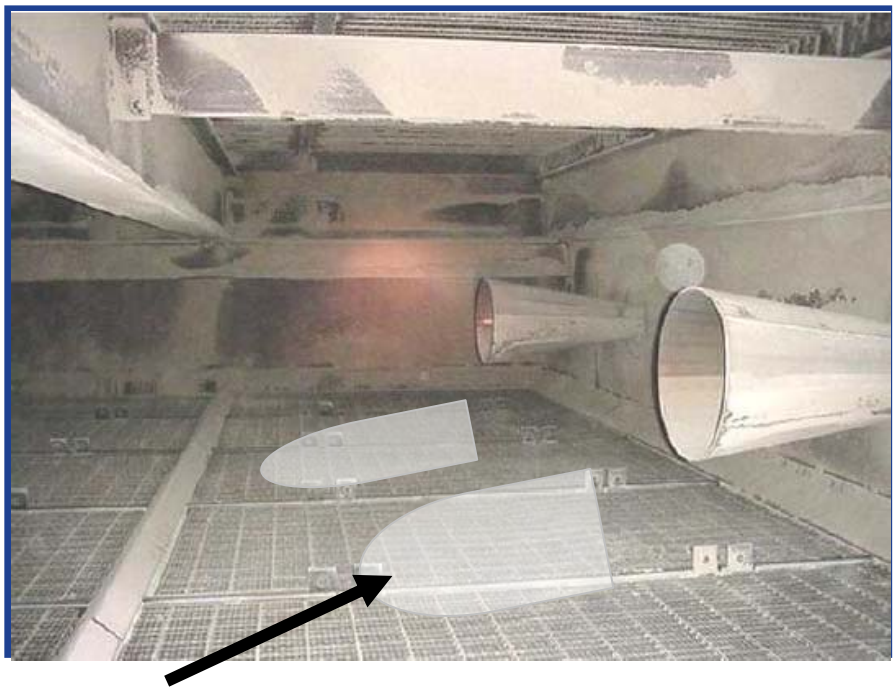
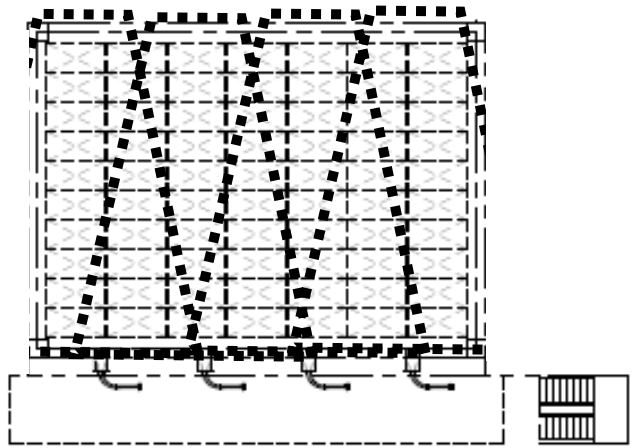
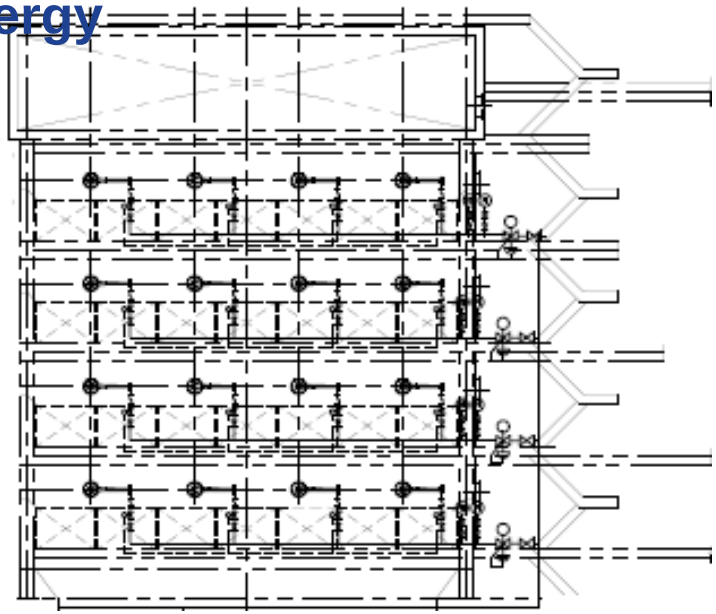
SCR Acoustic Cleaning Basics



Localized turbulence introduced during operation, NOT indicative of cleaning energy



“Overlapping” cleaning energy



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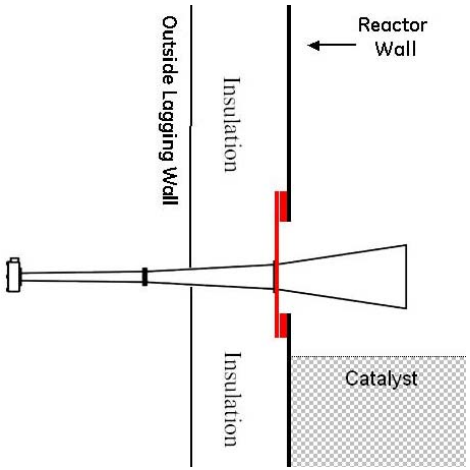
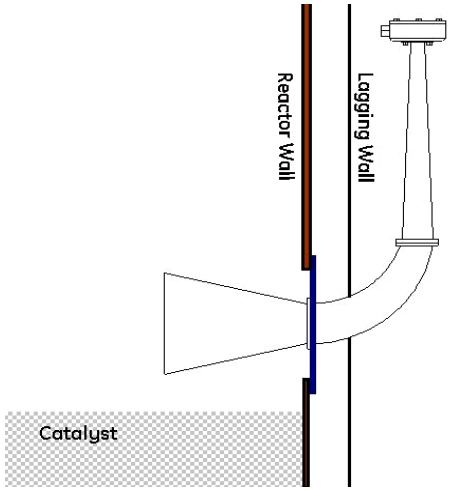
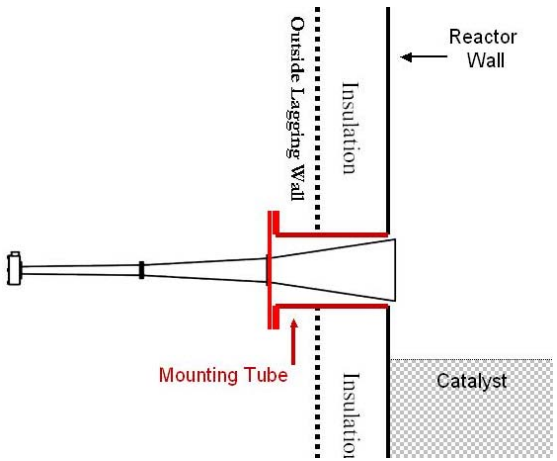
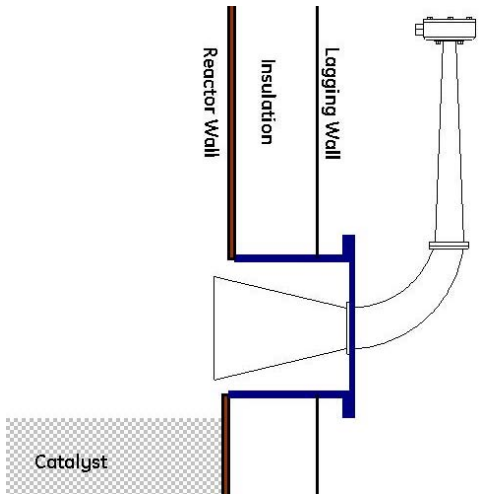
Acoustic Cleaner Installation and Placement

Typical SCR Reactor Installation Arrangements









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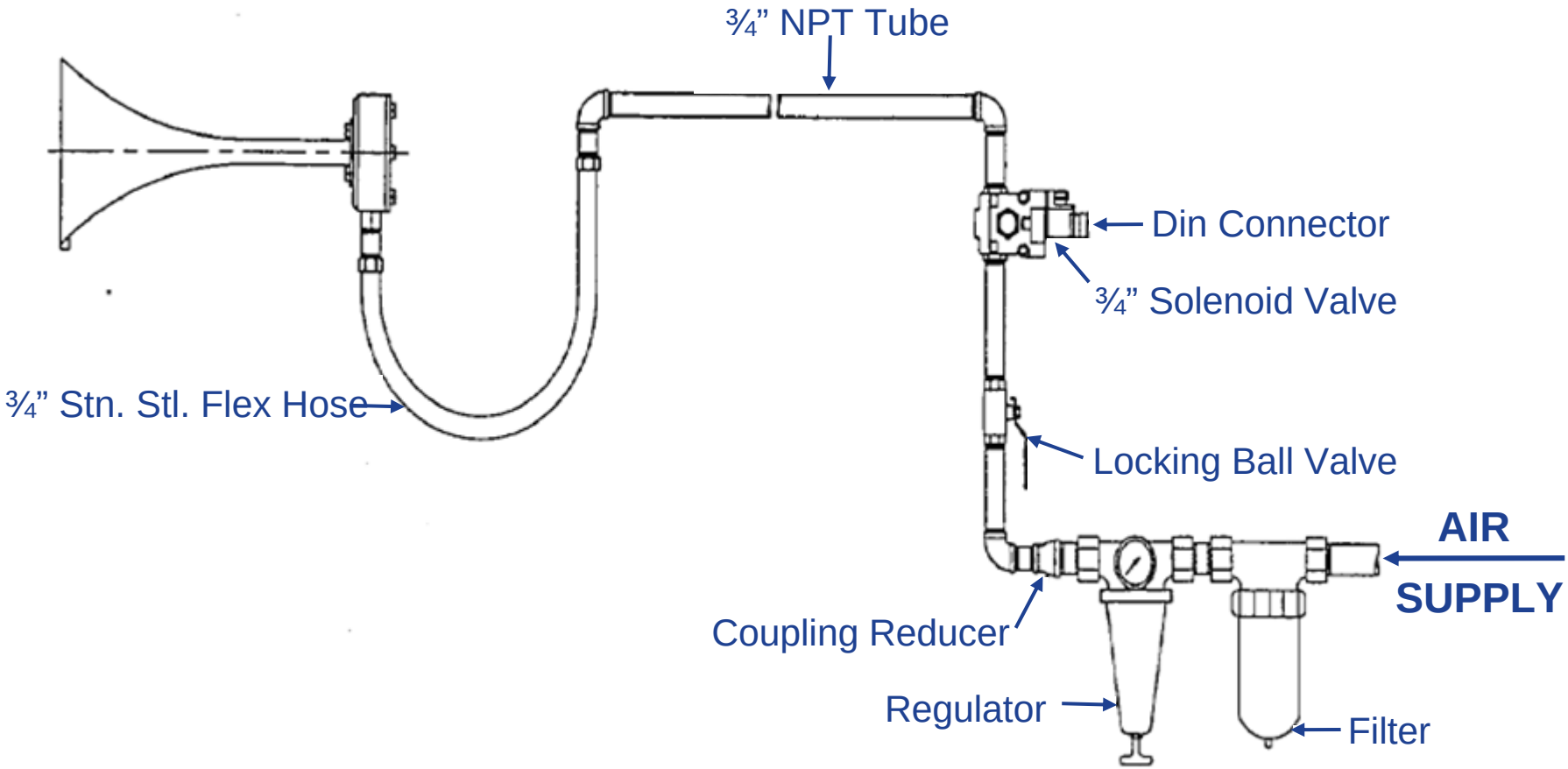
Placement

Model DC-75s

Model D-75s

General Piping Arrangement



Acoustic Cleaners

SCR Reactor Installation

There are three (3) main components that need to be maintained for proper operation of the catalyst cleaning system

- Air Supply
- Sound Generator
- Bell Sections

Air Supply

Powerwave Air Requirements

Air Pressure

- 70 – 90 PSI
- 4.83 – 6.21 bar

Air Consumption

- 60 – 80 SCFM
- 19 – 38 l/s

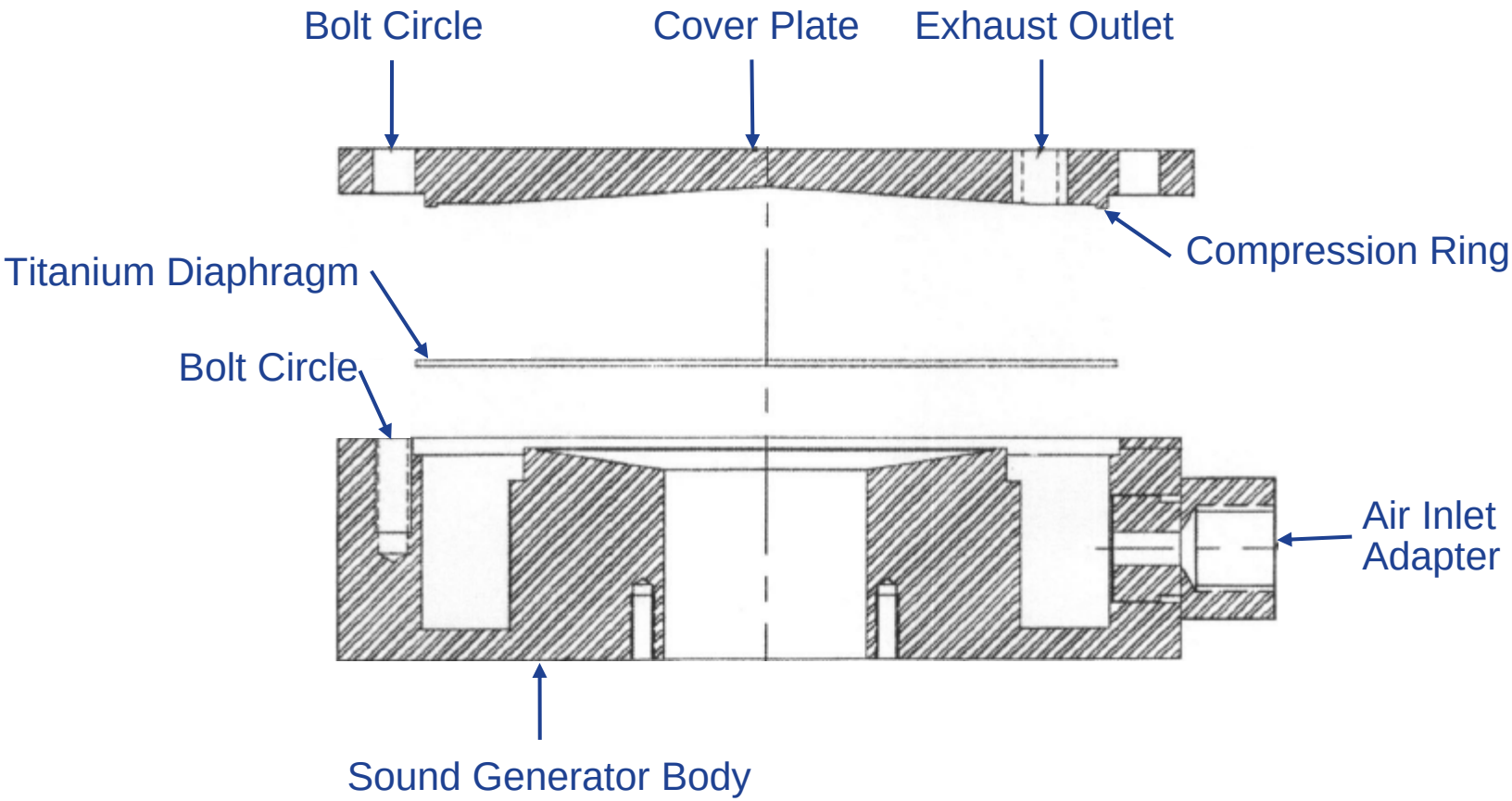
Powerwave Air Supply
Recommended Up Keep

#1: The air filtering system should be maintained.

#2: The air supply should be blown down before putting the acoustic cleaners back into operation after all extended reactor outages. This needs to be done to remove all moisture that may have developed in the air lines while the system was static.

Sound Generator

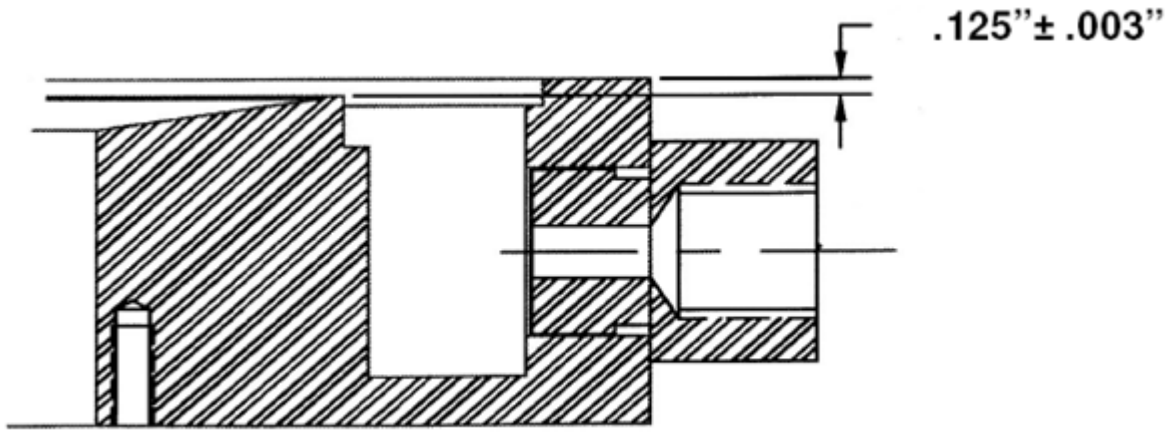
Sound Generator



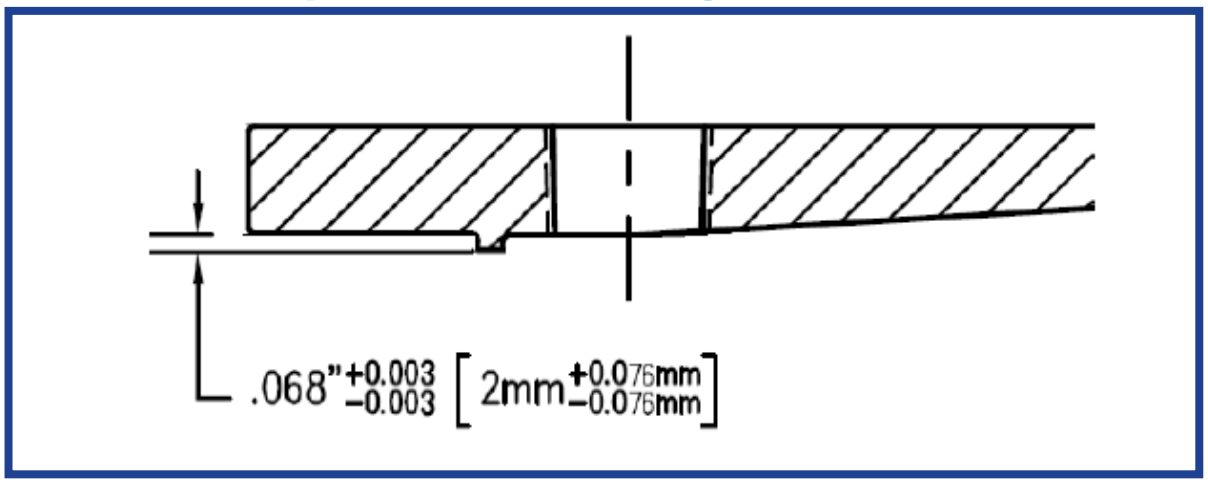
Inspection Points

- The height and condition of the compression ring and pedestal are critical to the operation of the acoustic cleaner
- Typically,the diaphragm does not need to be replaced unless broken/ cracked

Pedestal Tolerance



Compression Ring Tolerance



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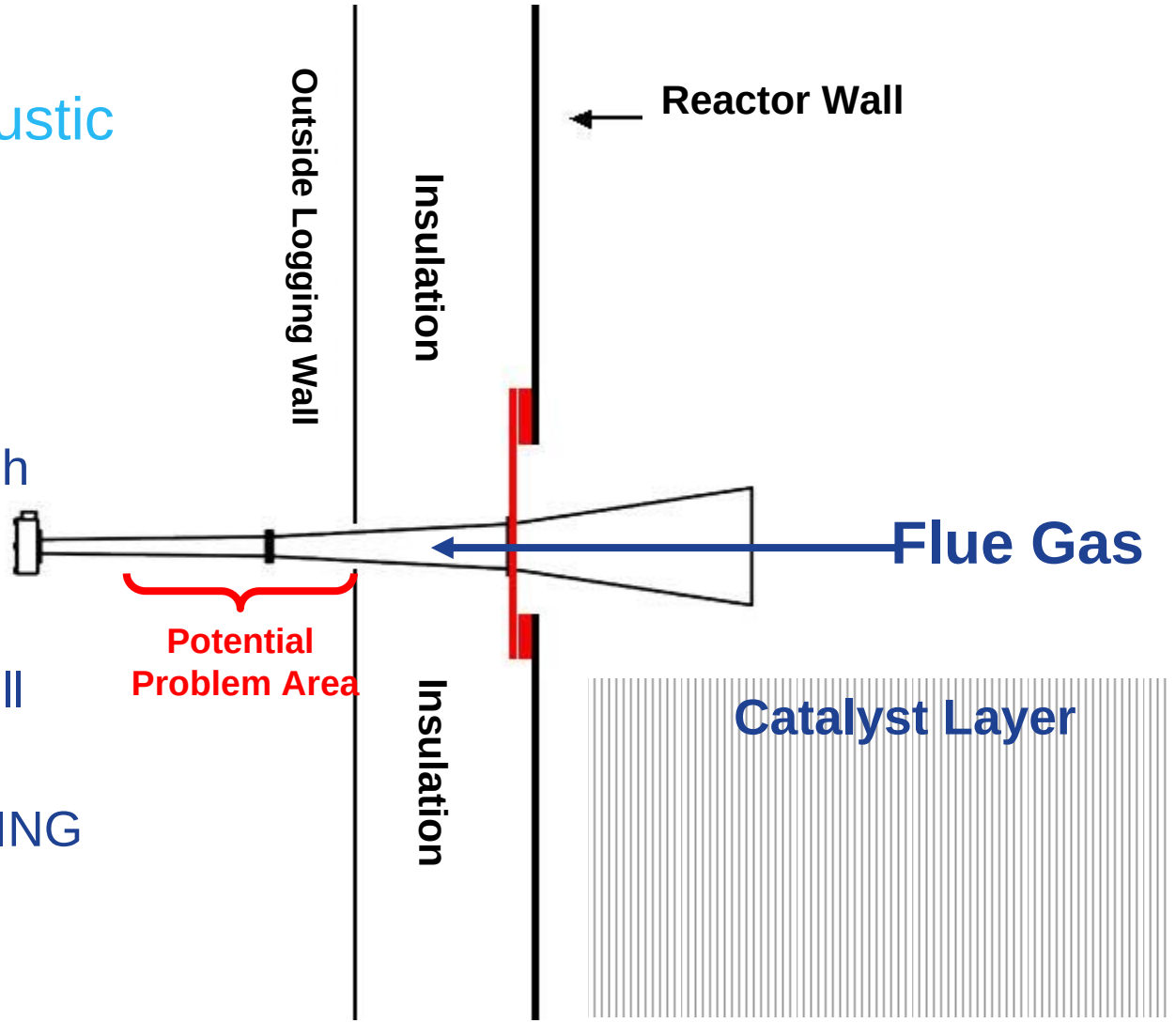
Bell Sections

Insulation Needs

Under insulated Acoustic Cleaners result in:

- Flue gas condensation inside the bell sections between soundings
- Moisture mixes with ash
- Hard buildup on inside surface of bells
- Eventual choking of bell sections
- High-pitched SQUEELING



Effects

- These deposits need to be removed from the ID of the bell sections if seen during SCR reactor inspections
- Just a little bit of buildup can cause squealing
- A squealing horn is not an effective horn

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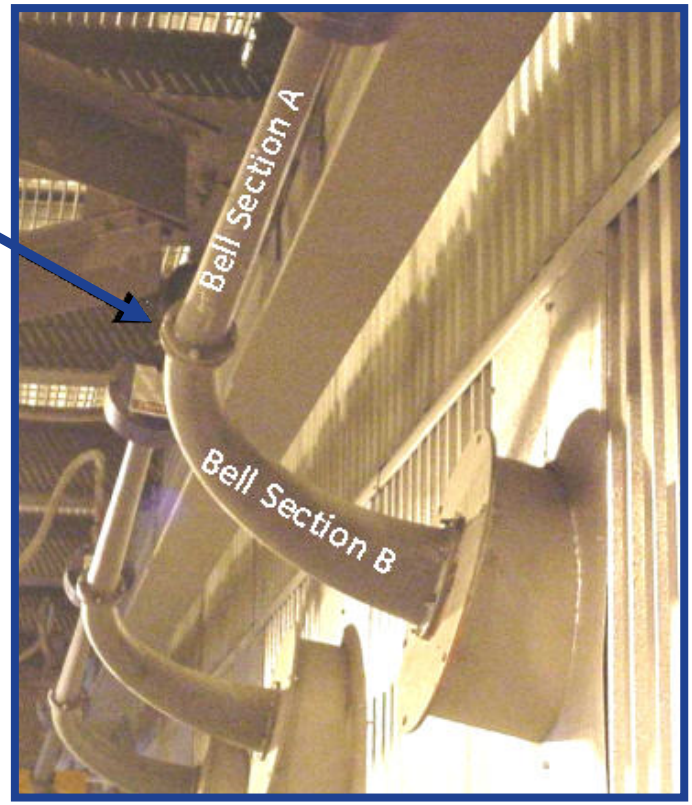
Inspection

Unbolt the acoustic cleaner at this flange!



The best way to inspect and clean the bell sections of the Model D-75 & Model DC-75 is disassemble the acoustic cleaner at the flange between Bell Section A & B

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Proper Insulation of Cleaners

Removable Insulation Blankets

Model DC-75 – Insertion Mount Buried into SCR Lagging

Model D-75s and Model DC-75s

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

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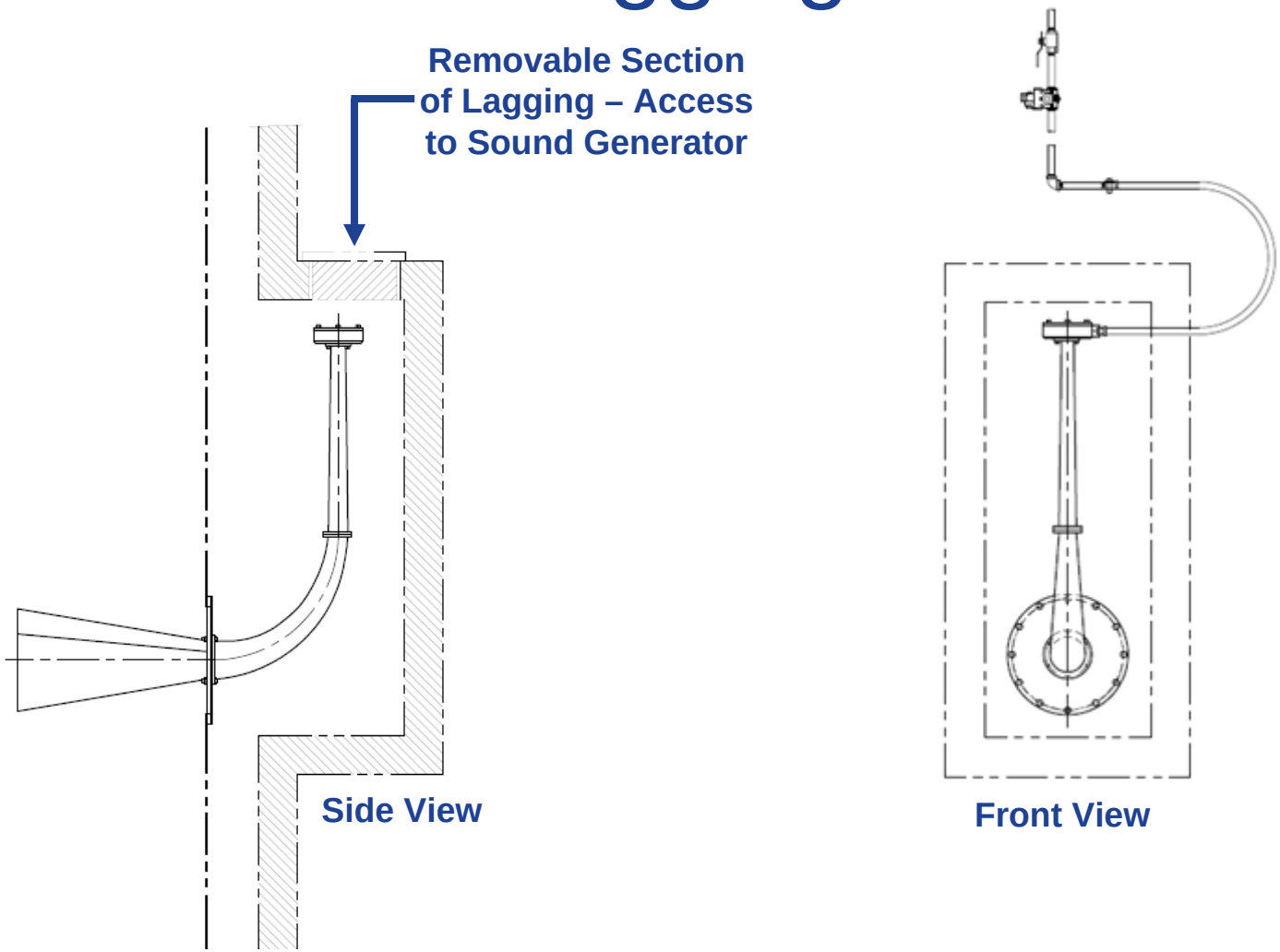
Model DC-75 – Insertion Mount Buried into SCR Lagging



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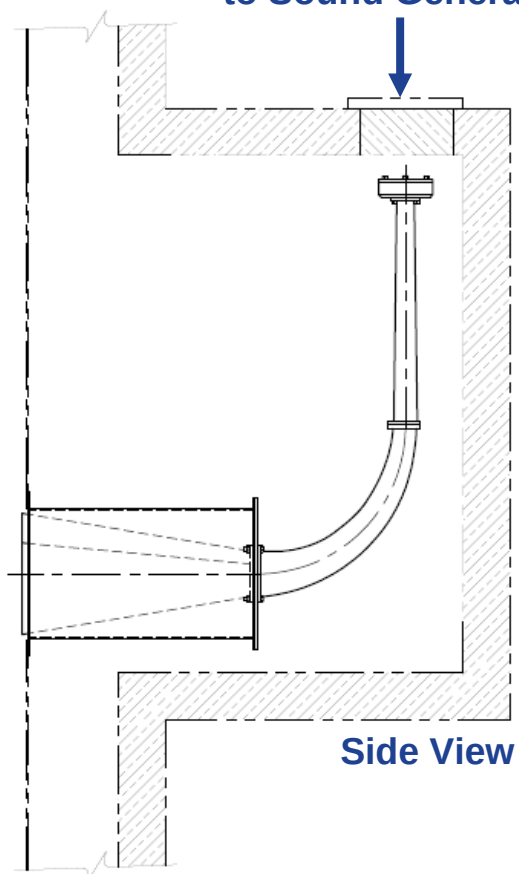
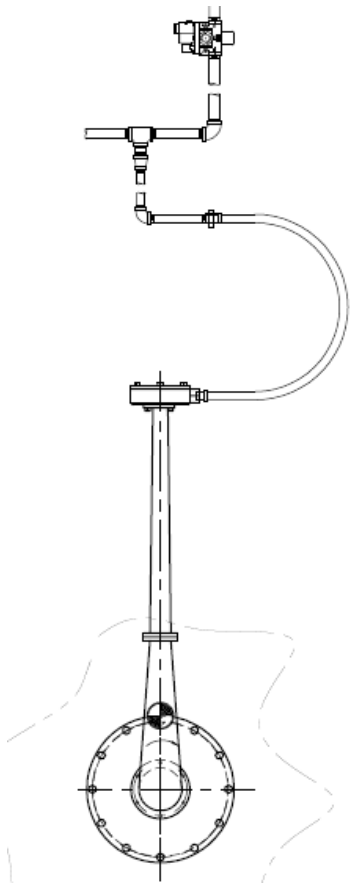
Model DC-75 – Tube Mount Buried into SCR Lagging

Removable Section of Lagging – Access to Sound Generator



Side View



Front View

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Proper Insulation Option

Proper Insulation Option

Proper Insulation Option

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Troubleshooting

Simple Design – Simple Troubleshoot

Horn does not sound at all

Possible Cause:

- Inadequate air supply
- Airline plugged
- Solenoid valve malfunction
- Cracked diaphragm
- Seats on driver are worn
- Build-up in the bell of the horn

Horn sounds, but not at full output, or with screeching sound

Possible Cause:

- Inadequate air supply
- Build-up inside horn (makes high-pitched sound)
- Insufficient crown in diaphragm or worn out diaphragm
- Moisture in air supply

Spare Parts

Part Number	Description	
823-0036 Or 0D101054	DC – 75 or D-75 Fundamental Frequency (Hertz): Average Total Output Power Level (decibels): Material: Maximum Operating Temperature: Weight: Air Consumption:	75 Hz 147 dB Cast Iron Bells, A & B Fabricated Stainless Steel Cone Carbon Steel Driver (Plated) 1,200°F (649°C) 130 lbs. 60-80 scfm @ 70-90 psi
B101051	Replacement Titanium Diaphragm Kit, DH, 5.88” with Gasket, For Use With All Cast Iron (Blue) and SS Drivers Sold Prior to 12/04 Which Included Gasket	
B100187	Replacement Diaphragm, TI, 5.88” For Plated Drivers Sold After 12/04	
823-0252	Replacement Carbon Steel Driver	
822-0362	Replacement Back Cap Exhaust Vent	
823-0251	Replacement Driver Air Inlet Adapter	
822-0848	¾” (19mm) Flex Hose, SS, Braided, 49” (1,245 mm) (one per horn)	

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