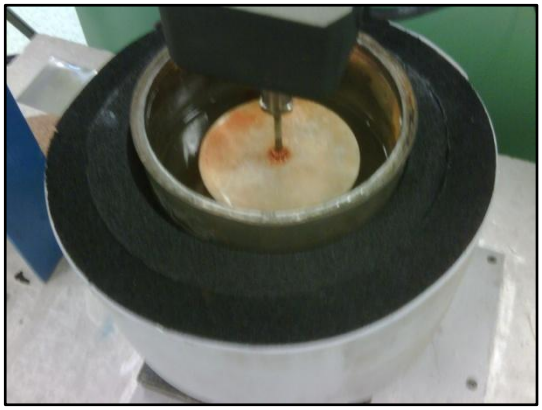
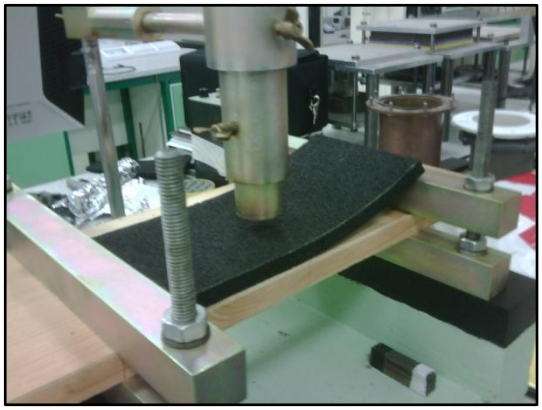
# **ECHO** Panel and Enclosure system

Noise control in industrial, commercial, or environmental system is an important element of mechanical equipment design process. Compliance to the regulation or standard or to achieve occupant comfort, designing a system to the required noise level takes competency.

**ECHO knock down panel system** offers a complete design and engineering service, including acoustic, structural, ventilation, and its inlet and outlet provision. This allows us to deliver customer, cost effective products and solutions that will fit to client's requirement.





## Industrial Applications

Worker safety has take on increasing importance for industrial facilities. It is compulsory for many countries to operating the plant to meet the noise criteria regulation. Noise reduction initiatives have become an essential goal of the industry. It is also part of the environmental and health impacts assessment (EIA and HIA). Whether it is to comply with increasingly strict OSHA regulations, or to reduce hearing loss claims against an insurer, worker safety is now in the scope of the environmental engineer, operation and maintenance to cope up with. **ECHO enclosures** are a key design element, which bring industrial, process and manufacturing facilities to safer noise levels and to help make it a better working environment.

### Applications:

- Power Generators
- In-Plant Offices
- Paint Booths
- Processes
- Vacuum Blowers
- Pumps
- Punch Presses
- Compressors
- Manufacturing Equipment
- Positive Displacement Blowers
- Test Chambers
- Ventilation Fans
- Saws

# Commercial Applications

Modern commercial buildings need the cooling and heating system, and also the generator to secure the electricity usage in the building. Mechanical equipment requires the pressurized big enclosure for noise control. It is designed with structural integrity, access for maintenance and inspection.

## Applications

- Built-up and Custom Air Handlers
- Air duct
- Fan Enclosures
- HVAC Mixing Plenums
- Mechanical Equipment
- Relief / Outside Air Plenums
- Supply / Return Plenums

# Environmental Application

Residential area, which is closed to the industrial or commercial building can be disturbed by the noise from the part of the industrial or commercial. It is common for both industrial and commercial to have the processing lines or mechanical equipment outside the building, where noise mitigate to disturb the residential. ECHO engineers design the acoustic panel and enclosure system to mitigate the noise and it is also consider for the wind load, water and weather proofing by using special materials. ECHO can provide all of the acoustic, structure, and ventilation aspects.

## Applications

- Air-Cooled Chillers
- Cooling Towers
- LNG Terminal Process Equipment
- Wastewater Treatment Plant Process Blowers
- Generators
- Fans
- Blowers

# Acoustic Performance Properties

When tested in accordance with *ASTM C423, Standard Method of Test for Sound Absorption of Acoustic Materials in Reverberant Rooms,* the panel assembly shall have the following minimum airborne sound absorption:

| Item | Construction | Sound Absorption Coefficient , α | | | | | | NRC |
|---|---|---|---|---|---|---|---|---|
| | | 125 | 250 | 500 | 1000 | 2000 | 4000 | |
| ECP100 | ArmaSound 50 mm System | 0.23 | 0.73 | 1.00 | 1.00 | 1.00 | 1.00 | 0.75 |

Noise Reduction Coefficient (NRC) is the average of coefficients at 250, 500, 1K and 2K Hz, expressed in the nearest integral multiple of 0.05.

When tested in accordance with *ASTM E90, Standard Recommended Practice for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions*, the panel assembly shall have the following minimum airborne sound transmission loss:

| Item | Construction | Sound Absorption Coefficient , α | | | | | | STC |
|---|---|---|---|---|---|---|---|---|
| | | 125 | 250 | 500 | 1000 | 2000 | 4000 | |
| ECP100 | ArmaSound 50 mm System | 23 | 26 | 29 | 36 | 47 | 50 | 35 dB |

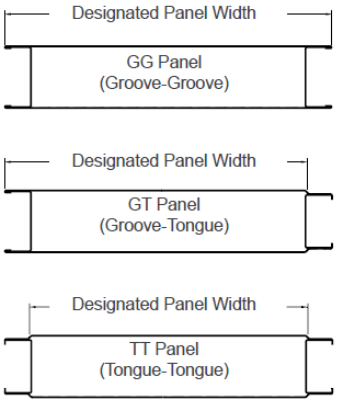
Sound Transmission Class (STC) is determined by comparing test data with a set of standard STC contours as described in *ASTM E413, Standard Classification for Determination of Sound Transmission Class*.

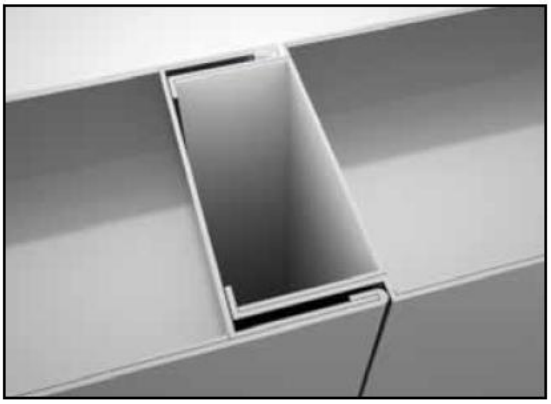
# Standard Panel Size

**ECHO** acoustic panels are available in standard designated widths of 600 mm and 1200 mm and standard lengths up to 2400 mm. Other width and lengths are available by special order. For pressurized plenum systems the maximum panel width is determined by the internal operating static pressure (positive or negative), simply supported panel span and allowable panel deflection

## Standard Joint

Tongue and groove connections are standard for 16 gage shell and lighter. Heavier gages incorporate H-joiners



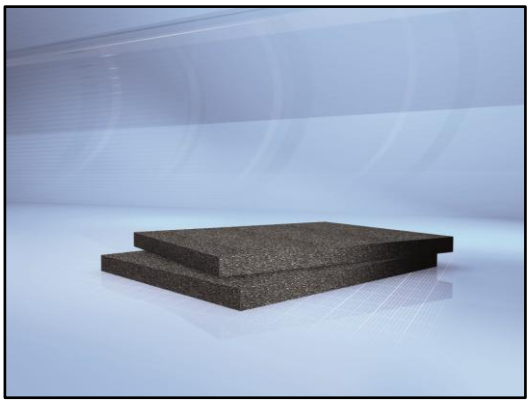



## Panel Materials

Outer and inner shell materials are available in standard galvanized steel, stainless steel, Types 304 and 316, aluminum and aluminized steel. Standard material gages for solid outer shell are 18 ga. and 16 ga., perforated (23% open area) inner shell is 22 gage. Septum panels and panels with solid outer and inner shells are available. Factory applied powder-coat finish is available as an additional option.

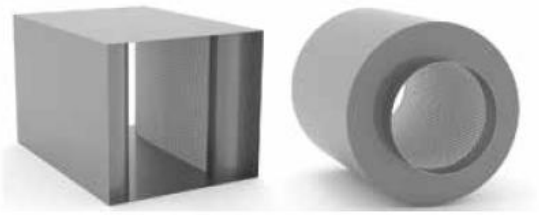
## Sound Absorber

Water proofing and Non-water proofing sound absorber provide the different in acoustic performance creep of the panel in the long term, fire performance. Sustainability of the fibrous materials like Rockwool or Fiber Glass is long lasting with the additional water barrier, however this will be compensation with the absorption coefficient of the total panel system. Whereas the open cell or elastomeric polymeric also provides better last long at the same acoustic performance. Depending on the fire regulation of each industry, the non combustible and hard combustible sound absorption material can be traded off with the cost of investment of the panel insulation.



## Ventilation Systems

**ECHO** engineers will work with you to properly design wall or roof mounted, silenced forced/passive ventilation systems. **ECHO** ensures the enclosed equipment or process is properly ventilated as to prevent overheating. **ECHO** does this by choosing from our expansive product line of circular (VCS), rectangular straight (VRS) and elbow (VES) absorptive or reactive silencers and fixed-blade acoustic louvers (VAL/VAC/VPL). All are backed by independent testing per ASTM E477 and/or ASTM E90 in NVLAP accredited laboratories.



## Accessories

ECHO panel system can provide the accessories like the rubber seal, mastic sealant, optional for knock down panel or removable box. Furthermore, the pipe line which enter or penetrate out from the panel can be cover or conceal noise leakage with the acoustic pipe insulation and flashing plate system.

## Practical Noise Reduction at the field

**ECHO** enclosure systems offer typical noise reductions of 10-35 dBA. Special custom systems incorporating heavier (thicker gage) panel shell, thicker panels or an enclosure within an enclosure are available to achieve higher levels of noise reduction.

## Thermal Performance

The insulation materials used in **ECHO** panels at 75˚F (24˚C) have maximum thermal conductance values of 0.06 BTU/hr-ft$_2$-˚F (100 mm thick) and 0.12 BTU/hr-ft$_2$-˚F (50 mm thick). Thermal resistance values are R17 (100 mm thick) and R8 (50 mm thick). Other insulation materials yielding higher thermal performance values are available.

## Doors & Windows

Windows are available as double pane, wire reinforced, or tempered safety glass. The windows are held in place with a flexible acoustic, airtight seal and separated by an airs gap of the same thickness as the **ECHO** panel. Depending on window size it can be factory installed or shipped and field installed. High STC rated windows are available were maximum noise control is required.

A complete line of single and double leaf **ECHO** access doors are available in various sizes and can be incorporated to meet a variety of needs such as personnel and machinery access. Single and double leaf access doors are available with industrial grade strap hinges (swing right/left, in/out) and panic/ passage hardware (keyed locks or sliding hardware are available as an option). The maximum single leaf door size is 1200 mm wide x 2400 mm high and the maximum double leaf door size is 3600 mm wide x 3600 mm high. Door thicknesses match adjacent panel thickness, construction, and acoustic performance.