

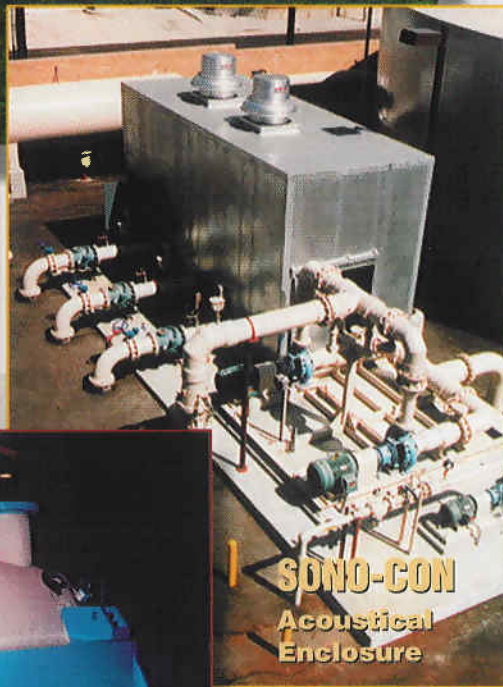


# phoenix-E

*"Creating the Better Workplace"*



**SONO-CON**  
Acoustical Barrier



**SONO-CON**  
Acoustical  
Enclosure



**SONO-CON**  
GLASS "S" ACOUSTICAL JACKET



**SONO-CON**  
Stack Silencer

**NOISE CONTROL**  
MANUFACTURING ■ POWER GENERATION  
PROCESSING



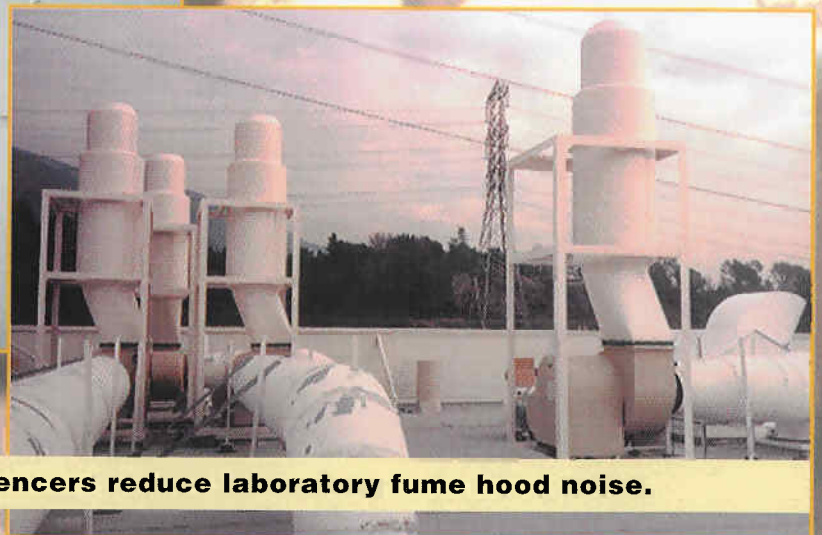
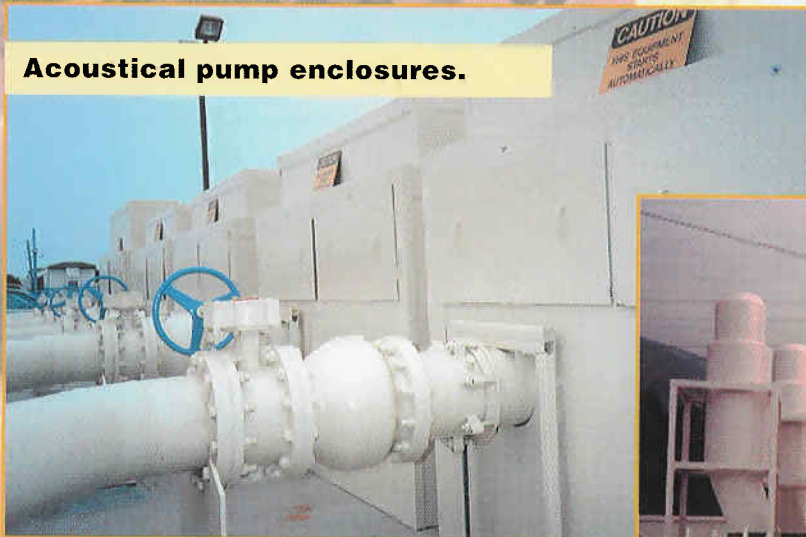
# SONO-CON SYSTEMS OSHA - COMMUNITY COMPLIANCE

**Acoustical enclosure with "single pass" silenced ventilation system.**



**Soundwalls reduce community cooling tower noise.**

**Acoustical pump enclosures.**



**Silencers reduce laboratory fume hood noise.**



**SONO-CON ENCLOSURES PROVIDE QUIET WORK AREAS. CONTROL ROOMS LOCATED CLOSE TO NOISY EQUIPMENT PROTECT AGAINST EXCESSIVE NOISE LEVELS.**

## **ACCESSIBILITY FOR OPERATION AND MAINTENANCE**

- One piece removable design.
- Quick removable panels.
- Automatic, Swing or Sliding doors.
- Removable roof sections.

## **PROCESS VISIBILITY**

- Fixed or sliding windows.
- Single or double glazed.
- Thermopane.
- Bullet-proof glass.
- Polycarbonate.

## **PRODUCT IN/OUT**

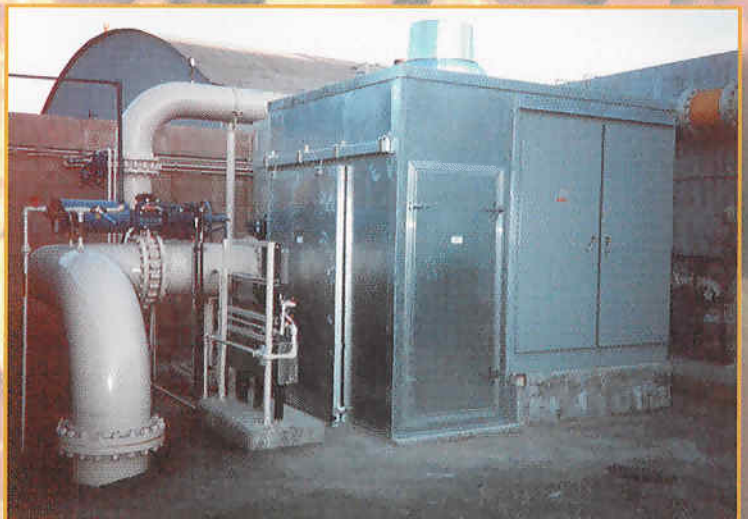
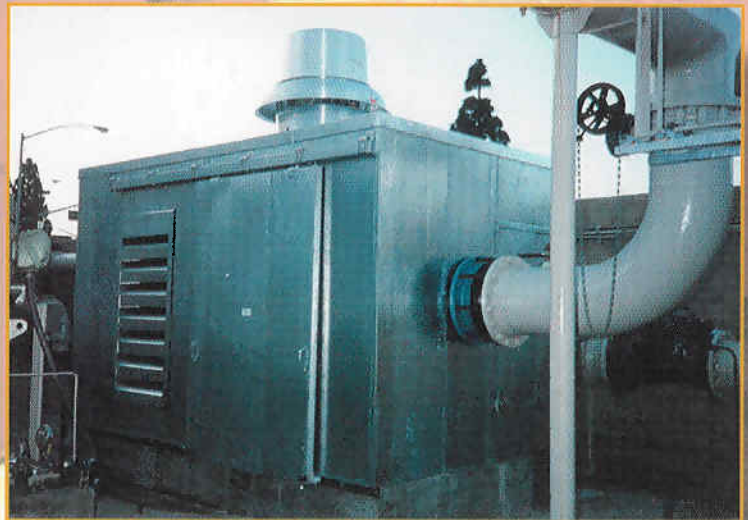
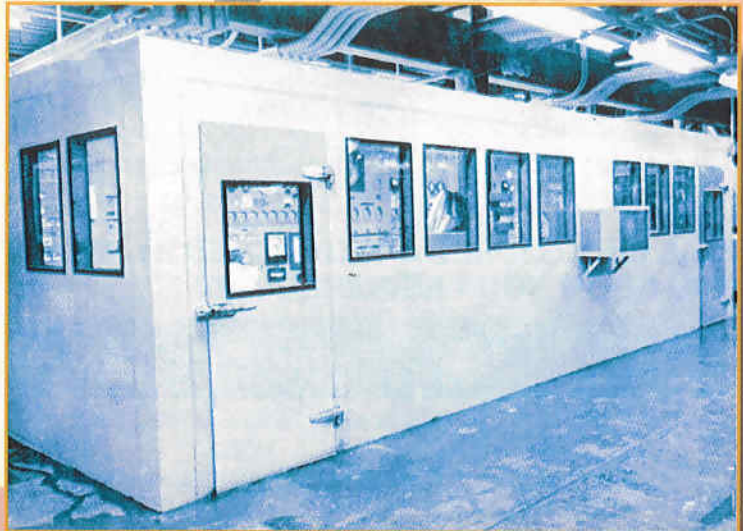
- Operable or automated access.
- Sound Tunnels.

## **COOLING**

- Silenced air-conditioning or ventilation systems.

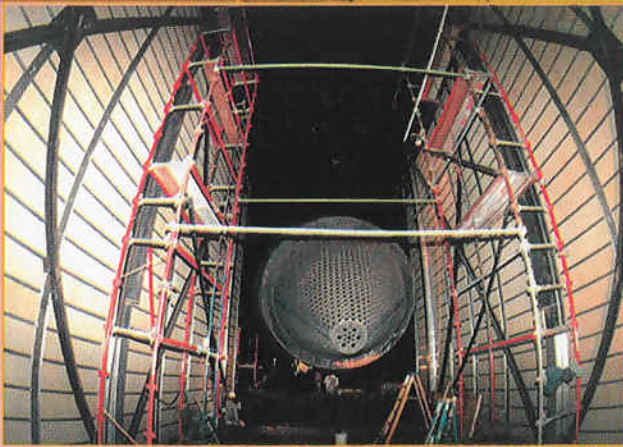
## **SAFETY**

- Doors and access panels interlocking with controls to prevent accidental activation of equipment.





**Aircraft Jet Engine  
Test Cell**

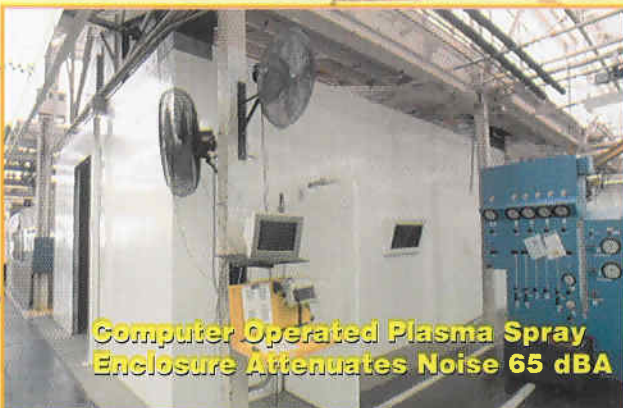


**Sound Absorption Panels  
Reduce Noise  
and Structural Vibration**

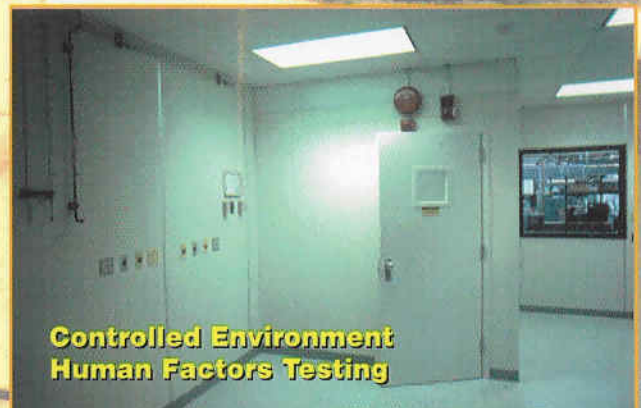
Sono-Con A-Ceramic Series acoustical panel system developed for harsh operating conditions. A-ceramic acoustical panels have a service temperature range of -400 F to 2000 F (-240 C to 1093 C), has the compressive and flexural strength similar to concrete, and resists attack by most acids, alkaline and water solutions. In addition to reducing the noise levels, the panels provide a protective membrane to the existing construction.



**Acoustical Test Laboratory  
Climate Controlled**



**Computer Operated Plasma Spray  
Enclosure Attenuates Noise 65 dBA**



**Controlled Environment  
Human Factors Testing**



# CONTROLLED ACOUSTICAL ENVIRONMENTS

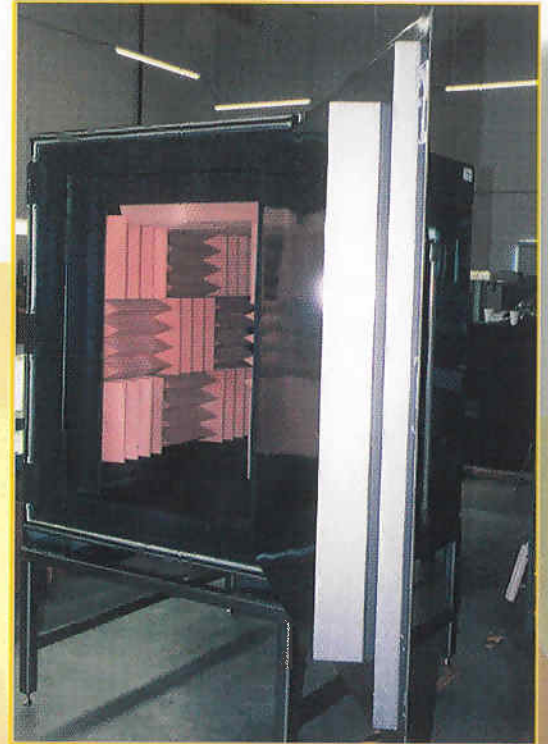
## PRODUCT TEST - QUALITY ASSURANCE

Noise control buildings and enclosure systems provide safe environments for aircraft engine testing and rebuilding parts to OEM's tolerances with high noise processes.

Controlled ambient sound levels are maintained for accurate measurement of product sound levels, physiological diagnostics, and quiet-space laboratories and cleanrooms.



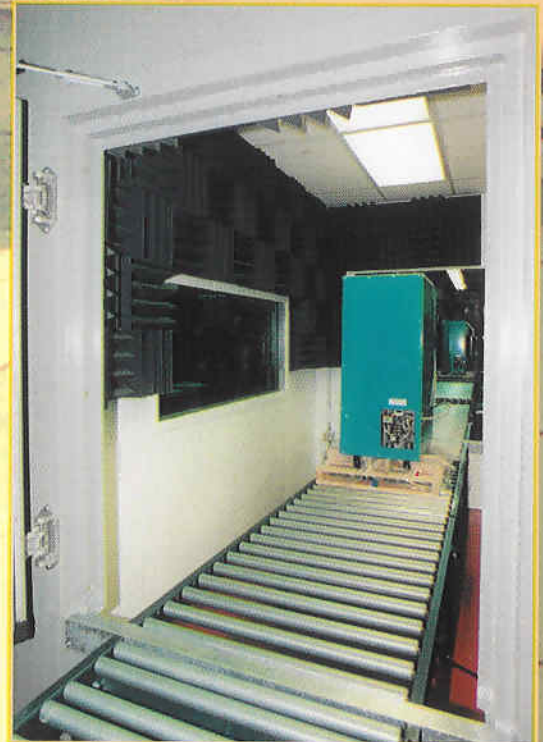
**PLC Controlled Acoustic Test Chambers  
Automate Sound Level Testing**



**Acoustical Test Chamber  
Product Research & Development**



**Manufacturing Standards Verification  
Allowable Noise Levels**



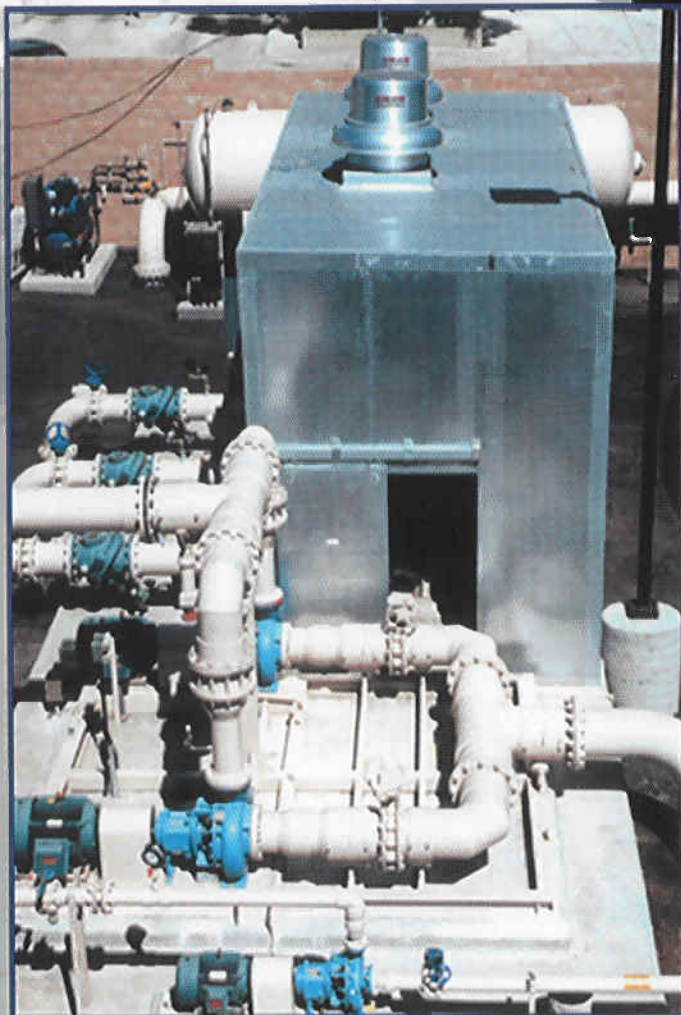
**Semi-Automated Sound Measurement  
Product Acceptance Testing**



# SONO-CON ACOUSTICAL SYSTEMS

## NOISE CONTROL ENCLOSURES AND BARRIERS

Soundwalls and enclosures providing noise reduction performance from 8 to 40 dBA are shipped and installed as Sono-Con Panel Systems to match customer requirements for viable and cost effective solutions.

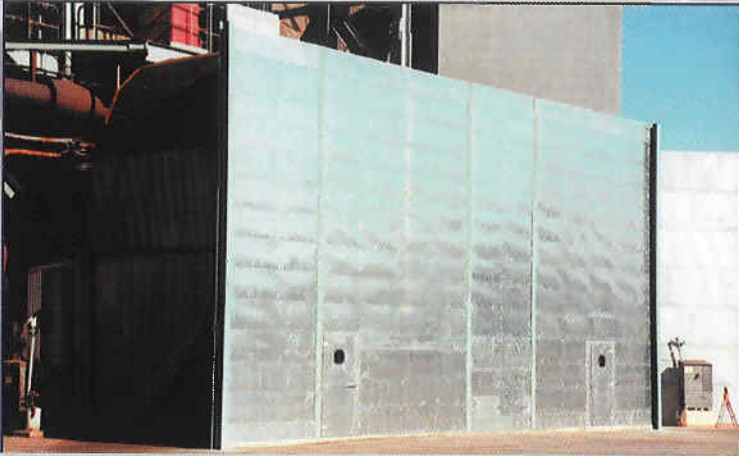


Sono-Con panels are fabricated for installation in lengths to 40'-0", widths to 8'-0" and to 18" in thickness.

The completed structures offer a clean, contemporary appearance compatible and complimentary to most architecture. Panels are non-combustible; materials are Class A rated by Underwriters Laboratory.

Sono-Con panel systems are available to match most site or plant conditions. Engineered as self-framing structures or to be integrated into structural grids, Sono-Con panel systems comply with the seismic and lateral loads imposed by building and safety codes.



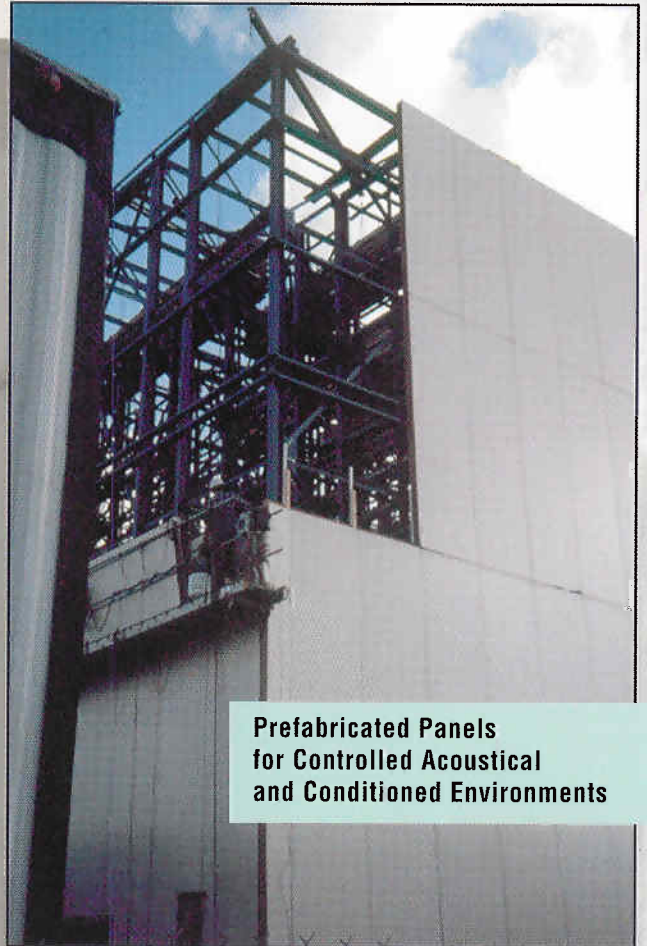
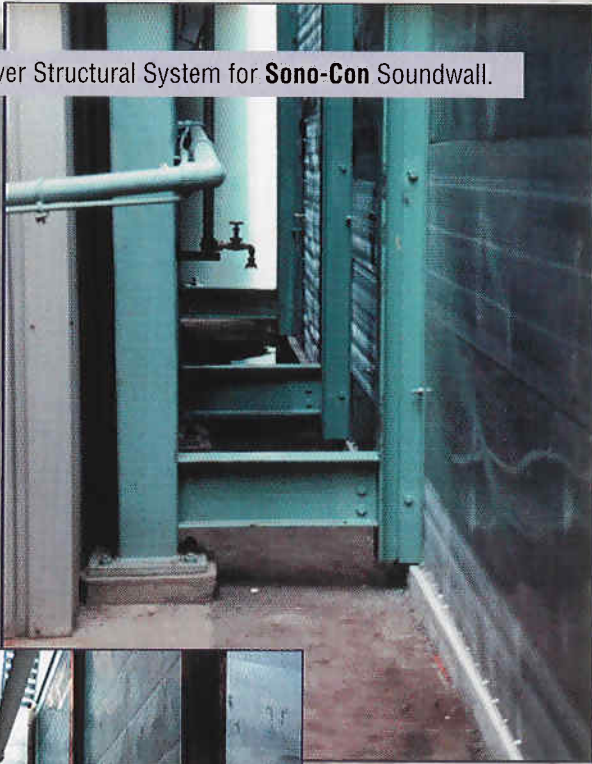


Duct Blower Noise contained by **Sono-Con** 26' high Soundwall.

## PANEL CONSTRUCTION OPTIONS

Standard Sono-Con panels withstand temperatures to 250 degrees and environments of 100 percent humidity. In other critical physically harsh or hazardous conditions, Sono-Con panels can be furnished with acoustic fill protection preventing the migration of oil and vapors into the panel core, special panel damping to minimize the path for structural borne energy, weather-tight panel connections or protection, as well as corrosion and temperature resistant materials or coatings.

Cantilever Structural System for **Sono-Con** Soundwall.

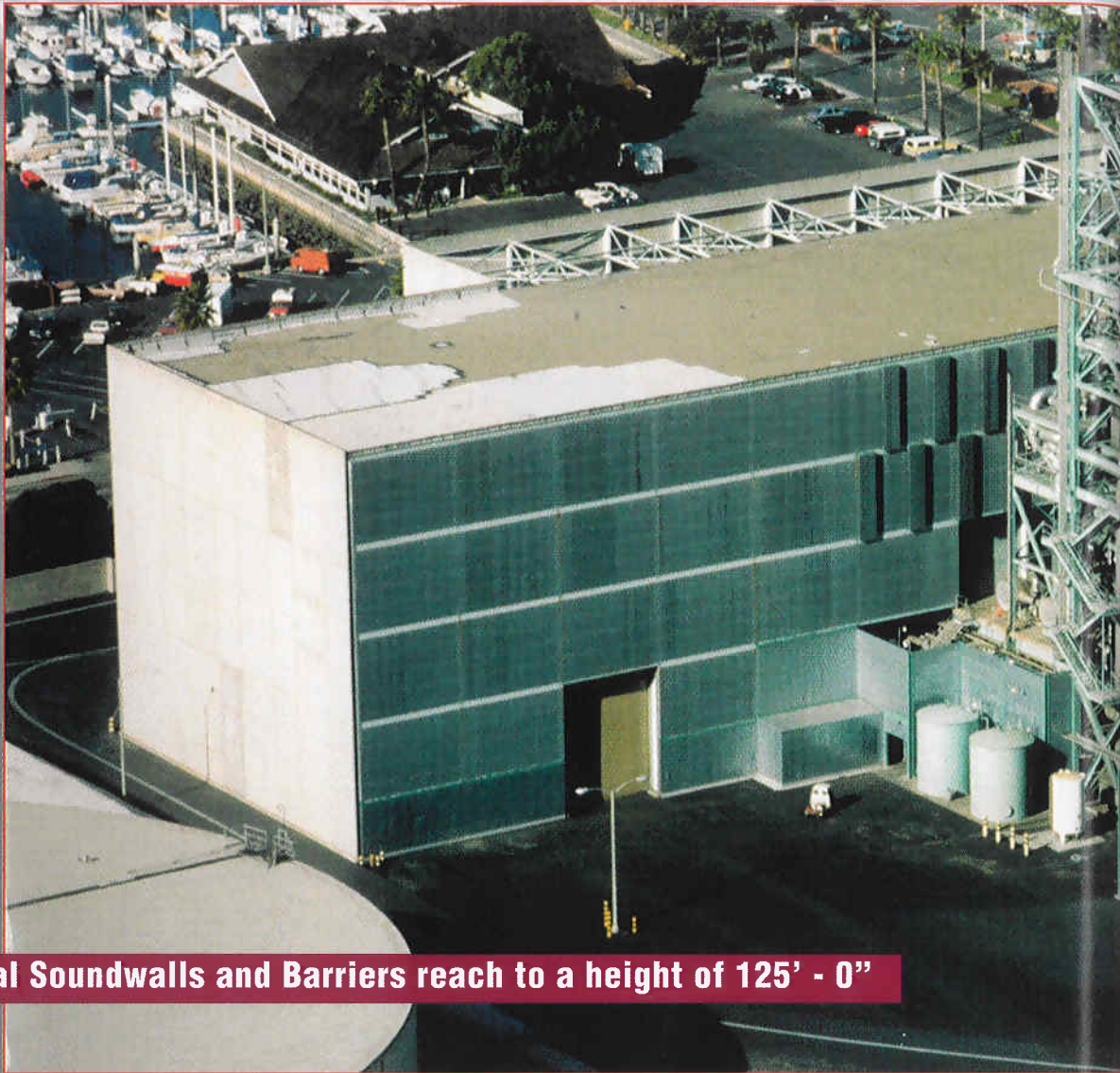


Prefabricated Panels for Controlled Acoustical and Conditioned Environments

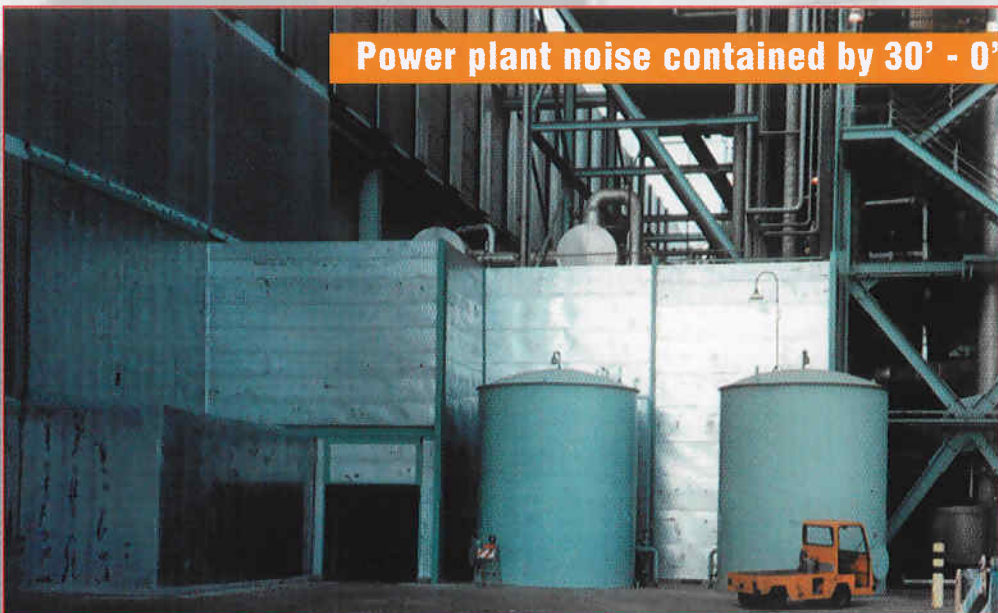
## STANDARD ACOUSTIC PANEL ACCESSORIES

Sono-Con panel systems are shipped with doors, equipment maintenance access hatches, windows, and silenced ventilation systems. Airconditioning including humidity control packages, raised floor systems, electrical devices and fire suppression systems are available.





**Sono-Con Acoustical Soundwalls and Barriers reach to a height of 125' - 0"**



**Power plant noise contained by 30' - 0" high Sono-Con Soundwalls**

Free-standing Sono-Con barriers acoustically protect adjacent work and residential environments from mechanical and air noise associated with the production of electrical energy. Access for personnel and vehicles is readily provided by electrically operated overhead doors. Galvanized construction resists corrosion and weathering.





Noise from large machinery such as power generation equipment is contained by enclosing such multilevel facilities with Sono-Con acoustical panel wall systems. Standard Sono-Con panel systems can attenuate high noise levels by as much as 60 dBA. They also absorb much of the incident acoustic energy which would otherwise be reflected and minimize or prevent an increase of the interior ambient sound pressure levels.

Reflected sound from equipment located adjacent to the outside of the noise control barrier is minimized by the use of *spaced sound absorptive panels* mounted in a random symmetrical fashion on the exterior wall.

Sono-Con acoustical panel systems are self-framing. Structural reinforcement is provided by integrating needed framework into the noise barrier system.

For multi-story applications, the acoustical panels are attached to a structural grid fastened to the building frame. This design permits removal of wall sections when needed for replacement or major overhaul of the equipment within the structure.

## PANEL CONSTRUCTION MATERIALS

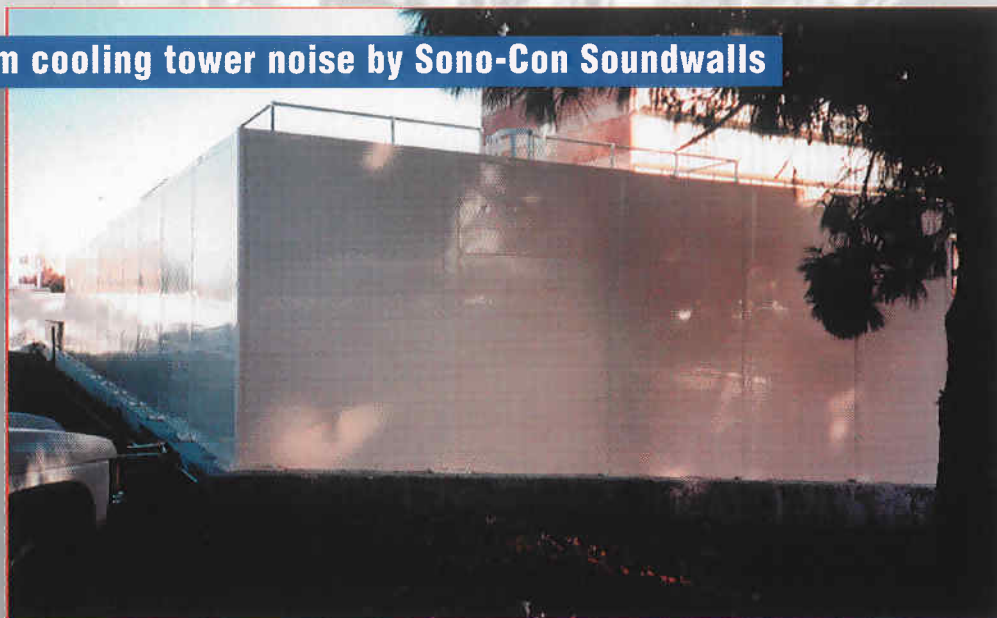
Sono-Con noise control systems are manufactured of materials compatible to the environment within which the enclosures or barriers are used. Sono-Con systems can be configured to meet industry specific regulations or recommended practices as the Food and Drug Administration (FDA), National Fire Protection Agency (NFPA), National Electrical Codes (NEC), or Good Manufacturing Practice (GMP).

Materials and finishes commonly used include:

- Cold Rolled Steel
- Galvanized Steel
- Aluminum
- Paint-Grip Finish
- Stainless Steel
- Industrial Enamel
- Powder Coat
- Anodize
- FRP

## Neighborhood protected from cooling tower noise by Sono-Con Soundwalls

Part of hospital conditioned air systems, the cooling towers must operate 24 hours per day. Noise levels which are typically masked during the day by normal ambient sound levels are prevented from intruding on the adjacent quiet residential community. The Sono-Con Soundwalls are fabricated and finished to match the community architectural standards.





Sono-Con enclosures are constructed of non-combustible, fire rated materials. The enclosures provide a safe work environment for hazardous fabrication processes. Silenced ventilation systems evacuate the work area of potentially noxious fumes or gasses. Lighting and other electrical devices selected to match Code regulations are installed as an integral part of the Sono-Con system.

Sono-Con acoustic enclosure systems are engineered to furnish ample uniform airflow necessary to prevent equipment overheating as well as necessary process air. Equipped with heavy duty air silencing systems, sound attenuation of the ventilation intakes and discharge openings match that of the enclosure walls and doors.

For critical applications, the Sono-Con ventilation systems incorporate redundant, fail-safe dual silencer/blower systems.

Equipment access and removal is provided by several enclosure features. Equipment removal is sometimes expedited by use of the *section panel roof assemblies* which can be easily removed and replaced by use of a crane.

*Fall-away removable panels* provide access to equipment at the sides of the enclosures without disruption of adjacent equipment and critical plant operations. Sono-Con sliding door systems enable oversize openings needed for frequent and routine equipment overhaul.



## Sono-Con Acoustic Enclosure and Dual Ventilation System

Pump and motor noise reduced to 30 dBA to meet property line community noise regulations.



## Cogeneration Plant

30' - 0" high **Sono-Con** soundwall engineered to withstand 95 mph winds.



Sono-Con sound control enclosures can be equipped with hinged access panels and removable panels which provide equipment security and can be located as necessary for ready inspection and maintenance.

Sono-Con Soundwalls eliminating line of sight and absorbing incident acoustical energy reduce noise which would be otherwise directed into the community. Attenuation performance is engineered in relation to the geometry of the noise source and it's location relative to the Sono-Con barrier and the community. Incorporating an impermeable membrane within the panels, the acoustical fill is protected against contamination and moisture migration.

Sono-Con Soundwalls are fabricated and finished to match community architectural standards. Attached to existing foundations, the Sono-Con Soundwalls withstand rigorous environmental conditions as well as Code provisioned wind and seismic loading. These Sono-Con walls can be quickly removed as required for equipment maintenance.

## Self-Ventilating Equipment Enclosures



Sono-Con enclosures selected for experimental pilot water reclamation project.

## Steel Framing Provides Free-Span Enclosure



Sono-Con enclosure contains noise and hazardous fabrications from adjacent office structure.

## Quiet Water Treatment Facility





# SONO-CON PANEL SYSTEMS

## SONO-CON CLASS ONE

Standard Panel System for most industrial applications. Available as 4-1/4" and 2-1/4" thick panels. Also available in alternate constructions to match specific acoustic or structural requirements.

### Acoustic Performance

**Sound Transmission Class (STC):**

2-1/4"

4-1/4"

37

41

**Noise Reduction Coefficient (NRC):**

1.11

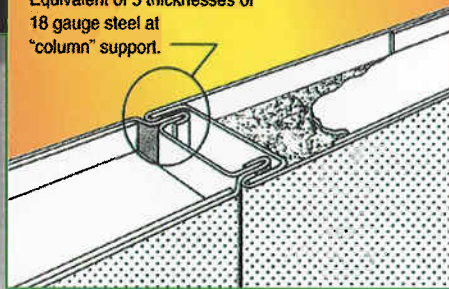
1.10

## SONO-CON CLASS ONE

Double wall panels for applications where high levels of noise reduction are needed. Standard panels 2", 4", or 6" thick have a perforated inner sheet and are packed with fiber insulation to provide noise absorption. Available in lengths to 24' or longer for special applications. Construction can be stainless, galvanized or cold rolled steel or aluminum.

### TONGUE & GROOVE DESIGN

Equivalent of 5 thicknesses of 18 gauge steel at "column" support.



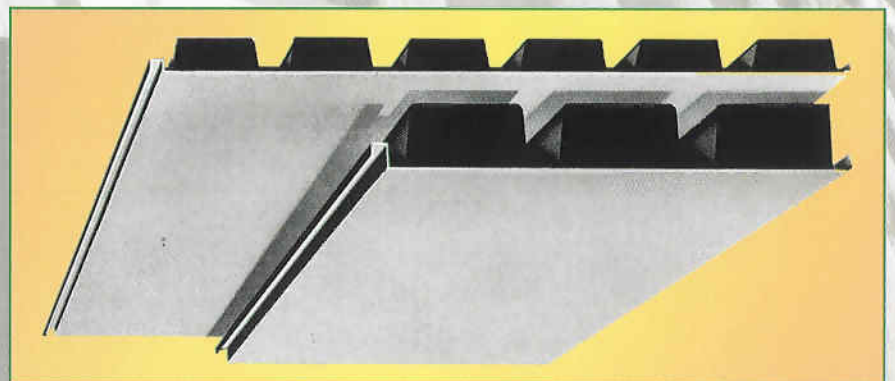
## SONO-CON CLASS TWO

For outdoor soundwall applications. Easily accommodates wall spans and barrier heights of 40'-0".

### Acoustic Performance

**Sound Transmission Class (STC):** 32

**Noise Reduction Coefficient (NRC):** 0.90



**Standard Sono-Con Class Two Panels** are 3" (75 mm) thick constructed of 16 gauge galvanized steel outer skin with 18 gauge galvanized perforated face sheet. Fibrous acoustical insulation (mineral wool or glass fiber) is installed in the continuous cells. Panels are joined with an interlocking connection and mechanically fastened utilizing self-drilling screws.

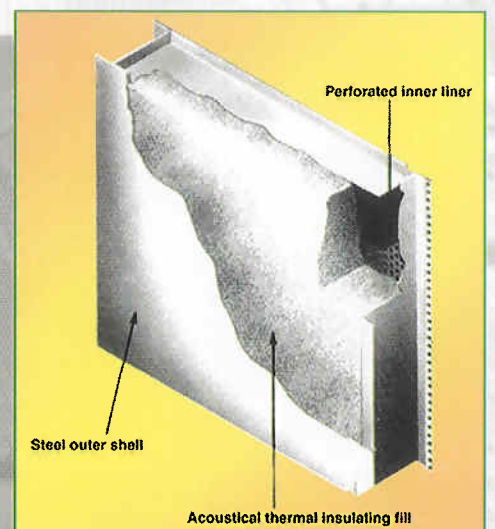
## SONO-CON SEPTUM

Combines high absorption characteristics with high transmission loss performance in the speech frequencies.

### Acoustic Performance

**Sound Transmission Class (STC):** 47

**Noise Reduction Coefficient (NRC):** 0.90







**Welded Sono-Con HD Acoustic Enclosure for aluminium mill applications**

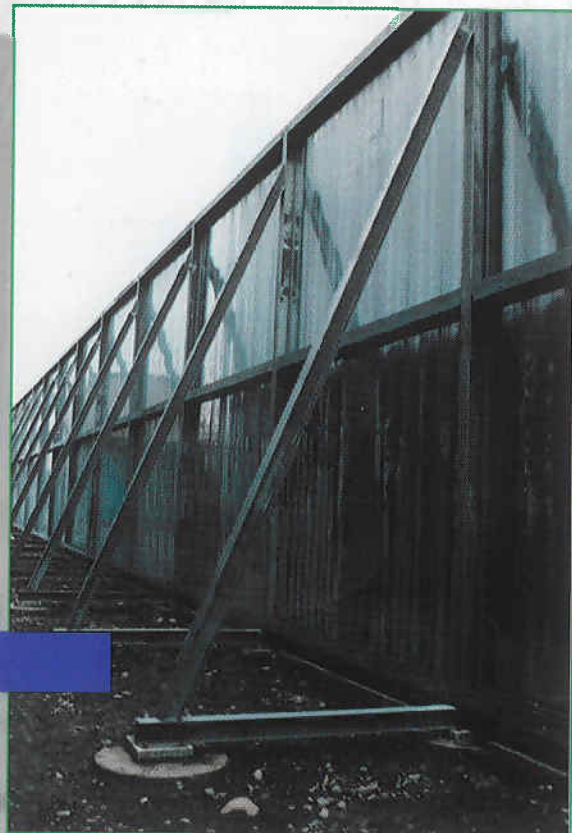
## **SONO-CON CLASS HD**

Double wall panels fabricated from 3/16" or 1/4" plate with fiber insulated packing and light gauge inner perforated sheet for use in enclosures where maximum levels of noise and environmental protection are required. Enclosures are generally shop welded and shipped as sub-assemblies for final assembly at the worksite. Assemblies are available in sizes up to 10'-0" X 10'-0" in cross section and up to 40'-0" long.

For long span systems, Sono-Con Soundwalls are cantilevered using poured or driven foundations. Size and depth of such foundations are dependent upon the existing soil conditions and the necessity to safely protect against failure due to wind loading. The Sono-Con prefabricated long span frames are readily attached to the foundation and efficiently transfer such loads to the footings or cassions.

## **Frame Supported Soundwall**

Structural *Bracing- A-Frame-System* attached to poured concrete footings economically resist wind loading.



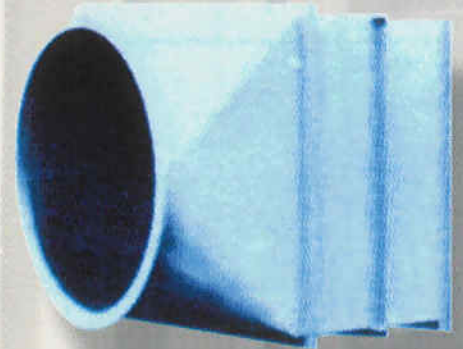


# SONO-CON SILENCERS

## REDUCE INTAKE AND EXHAUST NOISE



Sono-Con HD Silencers are engineered and fabricated to meet industrial service requirements of the petrochemical, power generation and manufacturing facilities. Products are constructed in accordance with the recommended practices of the American Welding Society (AWS), American Iron and Steel Institute (AISC), and the American Society of Testing Materials (ASTM).



Sono-Con silencers match high acoustical performance with the ability to accommodate high temperatures, pressures and gas velocities. Acoustical performance ratings are based on testing conducted by independent acoustical laboratories test in accordance with ASTM E-477.



Standard Sono-Con silencers are constructed to withstand temperatures from -40 degrees F to 350 degrees F (-40 degrees C to 175 degrees C). Silencers rated for high temperature application are suited for gas flow temperatures to 900 degrees F.

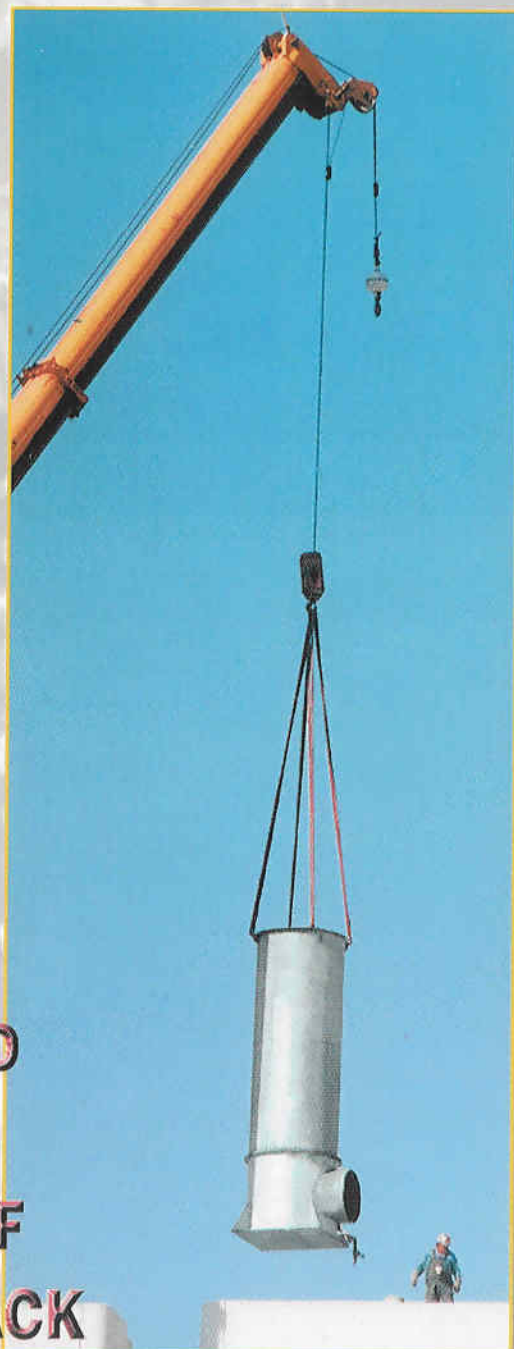


### MATERIALS OF CONSTRUCTION

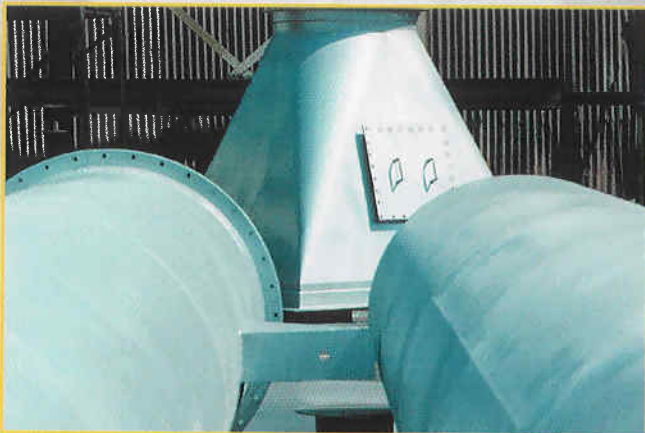
- Galvanized Steel
- Hot-rolled Carbon Steel
- Stainless Steel
- Polypropylene

Acoustic fill: Inert high density acoustical glass fiber insulation.





**ENGINEERED  
AND FABRICATED  
FOR EFFICIENT  
INSTALLATION OF  
SILENCER AND STACK  
ASSEMBLIES**





## PANEL SYSTEMS

### SONO-CON SOFTWALL

PHOENIX-E's unique soft wall panels for constructing low cost engine or machine enclosures where 10-15 db noise reduction is required. Semi-rigid composite panels incorporate both noise barrier and sound absorptive properties shipped with support frames and hardware. Installation can be performed by PHOENIX-E or customer personnel.



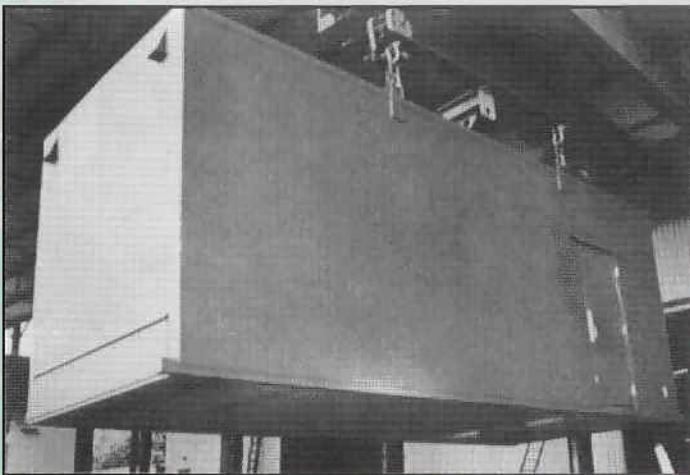
### SONO-CON PANEL SERIES

Double wall panels for applications where high levels of noise reduction are required. Standard panels 2", 4", or 6" thick, have a perforated inner sheet and are packed with fiber insulation to provide noise absorption. Available in lengths to 24' or longer for special applications. Construction can be of stainless, galvanized or cold rolled steel, or aluminum.

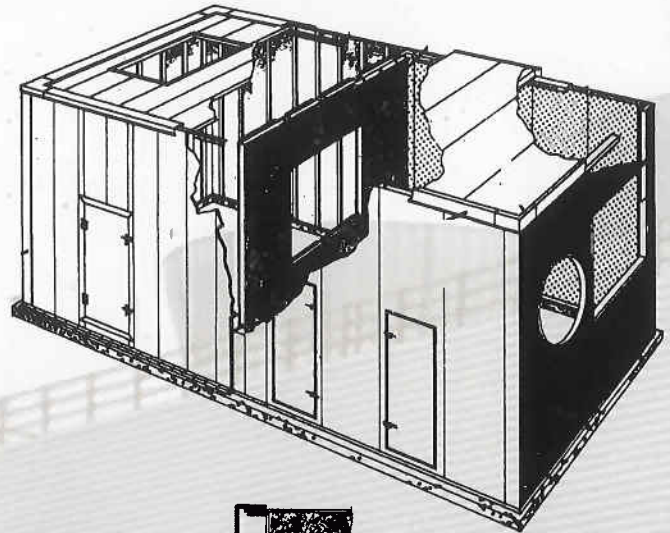
*SONO-CON SOFTWALL Acoustical Enclosure System. The panels are track supported. Transparent sliding panels facilitate visual inspection and equipment maintenance.*

### SONO-CON HD ENCLOSURES

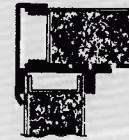
Double wall plate enclosures for applications where maximum levels of noise and environmental protection are required. Fabricated from 3/16" or 1/4" plate, with fiber insulation packing and light gauge perforated interior sheet, the enclosures are completely welded to offer maximum structural integrity. Available in sizes up to a maximum of 10'-0" x 10'-0" in cross section by 40'-0" long, weighing 40,000 lbs.



## HEAVY DUTY INDUSTRIAL NOISE CONTROL



CORNER

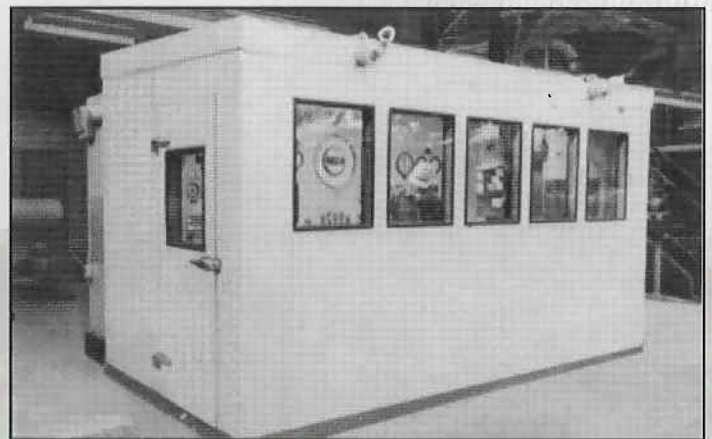


WALL/ROOF



CORNICE

*Several panel constructions are incorporated into equipment noise control enclosures to optimize acoustical performance and minimize costs.*



*ABOVE: Equipped with lifting rings, sound proof office is readily moved as needed with overhead hoist.*

*LEFT: Factory assembled acoustical enclosures complete with structural skids are often utilized for diesel and gas turbine generator and compressor packages.*



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