



HIPOWER Sound Attenuated Enclosures Specifications

HIPOWER SYSTEMS offer a variety of enclosure designs to meet customer’s needs. From mobile units to standby generators, we make sure each Enclosure has the HIPOWER quality name to it.

Table 1 provides general information about Enclosure specifications. (Table 1 does not apply to 20’ containers)

Enclosure Specification:

| Description | Material/Process Identification | |
|--------------------------------------|---|--------------------------------------|
| Enclosure Structure | Frame Material | HRPO Steel |
| | Enclosure Material | HRPO Steel |
| Enclosure Insulation & Soundproofing | Polyurethane Foam (Black) / Technical data p.4 (GAS RANGE) Rock Wool (Volcanic) (DIESEL RANGE) | |
| Coating / Finish | Enclosure & Frame Finish | Powder Coating / Technical data p.11 |

Table 1

Each Enclosure design has either a lifting eye on top of the Enclosure or an opening for forklift access on the bottom of the Enclosure. On each side of the generator, there are access door which allows users to obtain access to oil filters, oil drains etc. Each door is held in place by stainless steel hinges with rubber joints. The access doors can be locked using provided keys (depending on style of unit) with the unit to ensure safety. Some models have a see through window to view the control panel. The control panel Enclosures are NEMA 2 rated.

The exhaust system uses aluminized piping to prevent corrosion. On the outlet side of the exhaust, rain caps are installed to prevent foreign particles from entering the exhaust system. To ensure rusting does not occur on the outside of the generator, the process of powder coating has been implanted. Salt tests have been conducted on our powder coating canopies and have exceeded 1,000 hours of salt spray tests (P.9). All of our Enclosure designs are fireproof and waterproof.





The Enclosure is soundproofed using insulation material. Currently our standard materials used in our units are listed in Table 1. Each unit has different dBA ratings. Please refer to that specific unit catalog for further information.

Easy access to radiator fills through opening on the roof of the enclosure. The roof is fitted with a flange to assure a full access to radiator filling cap and maintenance. Emergency stops are present on the outside of the Enclosure as well as on the inside of the Enclosure on the control panel. The control panel is situated inside the Enclosure structure to assure full protection.

We provide winter packages for generators that are exposed to extreme climate conditions. Table 2 provides basic information about winter package accessories.

| | |
|---|---|
| Shutter System w/ actuator (NEMA 3 rated) | Hydraulic Shutter System: Operates by sensing temperature of coolant in the engine/radiator system. |
| | Electric Shutter System: Operates by sensing surrendering temperature inside the Enclosure. |
| Snow Hood | Prevents snow from entering the generator. Available for both Inlet & Outlet side. |
| Engine Block Heater | Electric Block Heater: Heats coolant in the engine/radiator system using electricity. Has internal thermostat to maintain a range of temperature. |
| | Hydronic Block Heater: Heats coolant in the engine/radiator system using diesel fuel. |
| Battery Blanket | Provides warmth to the battery package. |
| Space heater inside control panel | The space heater maintains the right temperature inside the control panel Enclosure. |
| Bent Exhaust Outlet | The outlet exhaust piece is bent to prevent snow from accumulating on the exhaust top. |
| Shut Down Valve | Provides safety in hazardous areas when positive air is achieved in the system. |

Table 2

Enclosures are wind rated to 100 mph. There are four different frame structures we provide with our Enclosure designs:

- Open Bottom Frame Structure
- Closed Bottom Frame Structure
- Skid Frame Structure
- Trailer Mounted Structure





Table 3 provides information of type of application used.

| Frame Style | General Use |
|-------------------------------|---|
| Open Bottom Frame Structure | Mainly used for standby application, to mount external fuel tank on the bottom of the generator. |
| Closed Bottom Frame Structure | Mainly used for standby application. Closed bottom frames provide leak proof structures from contaminates presented from the engine and other components inside the enclosure. |
| Rental Skid Frame Structure | Used for rugged terrains. Contains internal fuel tank. Skid frames provide leak proof structures from contaminates presented from the engine and other components inside the enclosure. |
| Trailer Mounted Structure | All three types of structures listed above can be mounted on trailers to provide mobility. |

Table 3



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Start of Technical Data of Polyurethane Foam

PRODUCT DESCRIPTION: 1 inch thick polyether foam with black urethane facing hot rolled laminated

FOAM

| Physical Property | Description - Value | Tolerance | Test Standard |
|---------------------------------|--|-----------|-------------------|
| Material | Polyether Polyurethane Foam | NA | NA |
| Color | Charcoal | NA | NA |
| Density | 1.8 lb/cf | + - 0.18 | ASTM D3574 |
| Elongation | 140% | minimum | ASTM D3574 |
| Tensile Strength | 12.0 psi | minimum | ASTM D3574 |
| Tear Strength | 1.00 pli | minimum | ASTM D3574 |
| Compression Set @ 50%, 22 Hours | 5% typical | | ASTM D3574 Test D |
| Pores per inch | 60-70 typical | | |
| Thermal Conductivity | 0.27 BTU-in/(Hr-ft ² -°F) typical | 0.01 | |
| Flammability | MVSS302, UL-94 HF-1 | | |

FACING

| Physical Property | Description - Value |
|-------------------|---------------------|
| Material | Polyurethane |
| Thickness | 0.002 inch |
| Color | Black |

AVAILABLE SIZES

| | |
|-------|--------------|
| Roll | 54" X 100' |
| Sheet | As Specified |

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ABSORPTION COEFFICIENT AND NRC to ASTM E1050

| <u>1/3 octave</u> <u>(Hz)</u> | <u>Absorption</u> |
|----------------------------------|-------------------|
| 63 | 0.02 |
| 80 | 0.03 |
| 100 | 0.04 |
| 125 | 0.03 |
| 160 | 0.06 |
| 200 | 0.07 |
| 250 | 0.09 |
| 315 | 0.09 |
| 400 | 0.14 |
| 500 | 0.18 |
| 630 | 0.22 |
| 800 | 0.32 |
| 1000 | 0.42 |
| 1250 | 0.51 |
| 1600 | 0.62 |
| 2000 | 0.76 |
| 2500 | 0.85 |
| 3150 | 0.83 |
| 4000 | 0.71 |
| 5000 | 0.60 |
| 6300 | 0.65 |
| NRC | 0.36 |



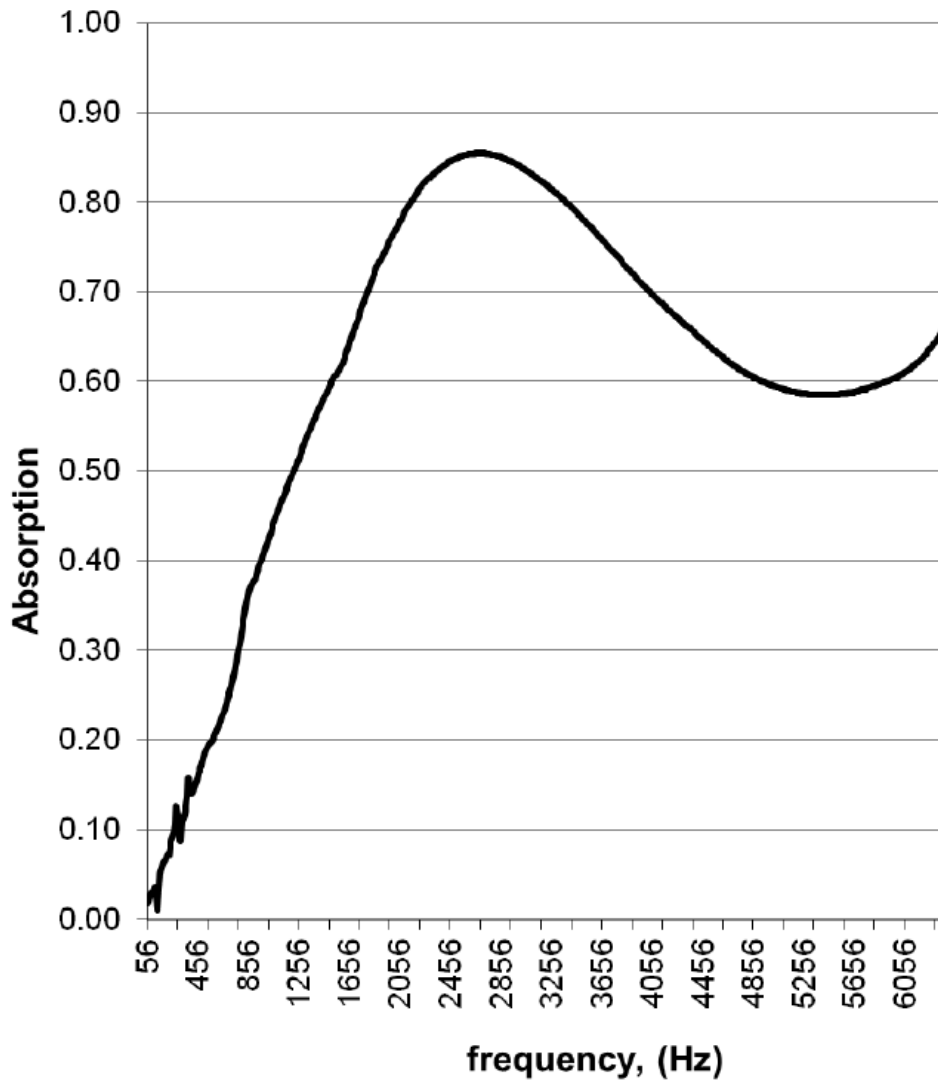
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**ASTM E1050
Normal Incidence Absorption
AF-021-40-UB**



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ABSORPTION COEFFICIENT, NRC and SAA to ISO 354

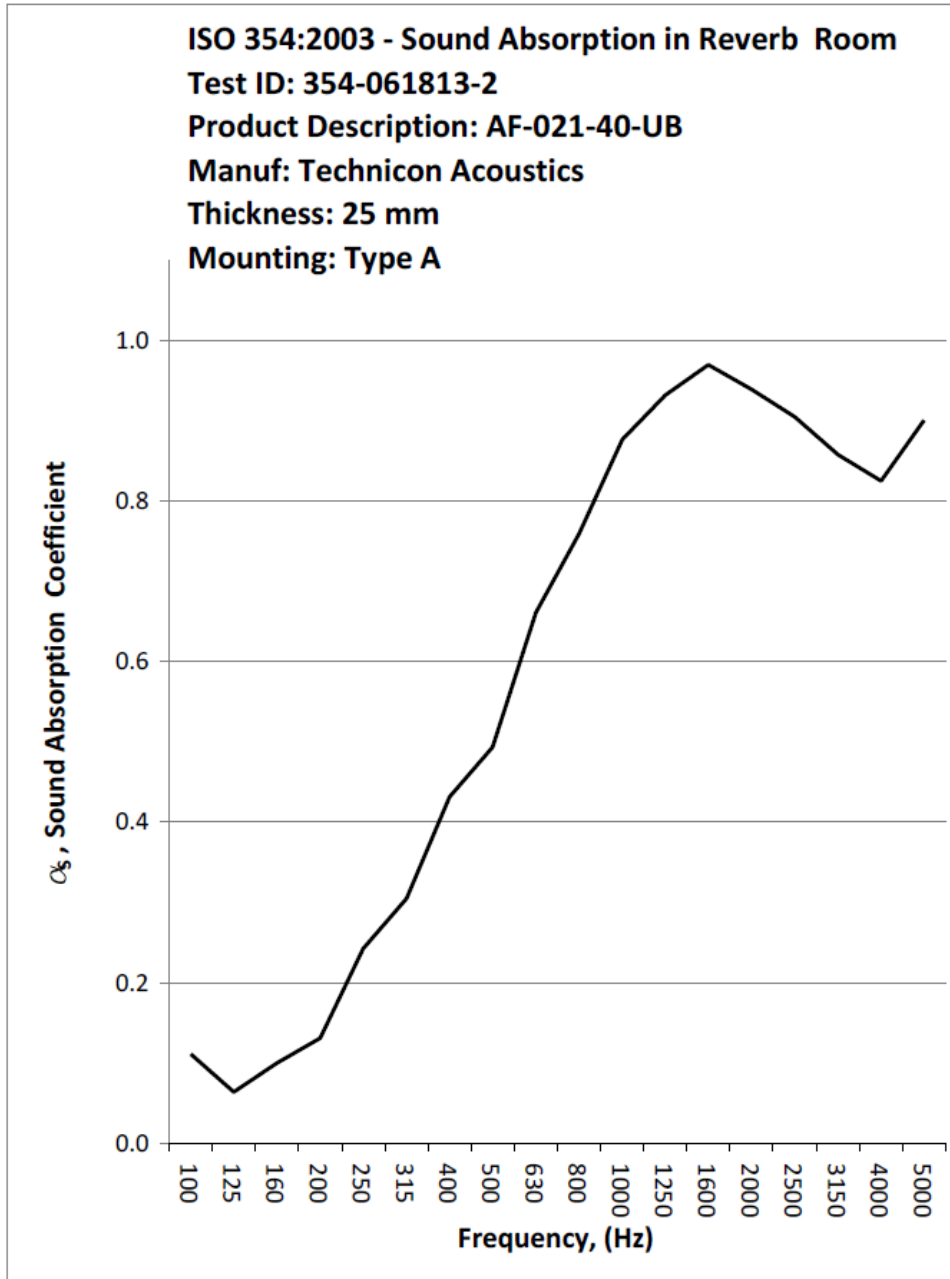
| Frequency (Hz) | Sound Absorption Coefficient α_s |
|-------------------|---|
| 100 | 0.11 |
| 125 | 0.06 |
| 160 | 0.10 |
| 200 | 0.13 |
| 250 | 0.24 |
| 315 | 0.30 |
| 400 | 0.43 |
| 500 | 0.49 |
| 630 | 0.66 |
| 800 | 0.76 |
| 1000 | 0.88 |
| 1250 | 0.93 |
| 1600 | 0.97 |
| 2000 | 0.94 |
| 2500 | 0.90 |
| 3150 | 0.86 |
| 4000 | 0.82 |
| 5000 | 0.90 |
| NRC | 0.64 |
| SAA | 0.64 |



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End of Technical Data of Polyurethane Foam



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Start of Technical Data of Salt Spray Test



Technologies

LABORATORY REPORT PHOSPHATING LINE

Customer: HIMOINSA

CORROSION TEST (PRE-TREATMENT + PAINT):

| | |
|---|-------------|
| Type of test: Neutral Salt Spray according to the Norms ASTM B-117-07 / UNE-EN ISO 7253 | |
| Substrate / Colour of paint | Steel / Red |
| Thickness (µm): | 100 |
| Delamination degree (d) (mm)(288 h) | < 0,5 |
| Corrosion degree (c) (mm)(288 h) | < 0,5 |
| Delamination degree (d) (mm)(624 h) | < 0,5 |
| Corrosion degree (c) (mm)(624 h) | < 0,5 |
| Delamination degree (d) (mm)(1000 h) | < 0,5 |
| Corrosion degree (c) (mm)(1000 h) | < 0,5 |
| Blistering (1000 h) | 0 |

Blistering: Norm ASTM D 714-56

D: dense MD: medium dense M: medium F: low 0: nothing

Test conditions (ASTM-B 117-07/ UNE-EN ISO 7253):

Panels rack: plastic, 20° angle.

Temperatura of the cabinet: 35 ± 2 °C

Salt solution: 50 ± 5 g/l de NaCl in deionized water.

pH of the salt solution along the test: 7,03

Average condensed salt solution along the test: 1,53 ml / hour.

Evaluation:

UNE-EN ISO 4628-8:

Delamination degree (d)= (d₁-w)/2, where: d₁: average value of total delamination (mm) ; w: initial cut (0,5 mm)

Corrosion degree (c)= (w_c-w)/2, where: w_c: average value of total corrosion; w: initial cut (0,5 mm)

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Type of tests: Adhesión & Impact according to the Norms ISO 2409 / UNE-EN ISO 6272

| | |
|--|-------------|
| Substrate / Colour of paint | Steel / Red |
| Thickness (µm): | 100 |
| Adhesión: | 0 |
| End point of failure by impact (*) (cm.) | 100 |

(*): Intrusion.

Adhesion: Norm ISO 2409

0: clean borders 1: 5 % loss 2: 5-15 % loss 3: 15-35 % loss 4: 35-85 % loss 5: 100 % loss

Impact resistance: Norm UNE-EN ISO 6272

End point of failure by impact: Maximum height from where the paint is not damaged.

Weight: 1 kg.

Esferic ball: Ø 12,5 mm

End of Technical Data of Salt Spray Test



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Start of Technical Data of Powder Coating Process

Technical Report

STEEL PARTS PAINTING PROCESS

Machinery used:

KFP 250 Automated painting line & Nordson Speedking painting cabin.

This line is composed by a 250 meters long auto transporter and 77 transporting shafts with capacity for pieces of weight up to 500 kg and 4500x2000 mm size.

I.- The first stage are different chemical treatments:

- 1.- Alkaline degreasing.
- 2.- Osmosis water washing.
- 2.- Activation. "Grain size refinement".
- 3.- Zinc phosphatizing "Micro crystalline surface preparation".
- 4.- Osmosis water washing.
- 5.- Film level Pasivation. "Empowers the phosphatizing for a higher corrosion resistance"

II.- The second stage is drying tunnel.

The parts enter in a forced ventilation tunnel with 100°C of temperature for 10 minutes, where they are perfectly dried before entering the next stage.

III.- The third stage is color change:

The parts enter en the Speedking rapid color change cabin where two robots with six spray guns each are covering the total piece surface with electrostatic powder paint. The cabin permits color change in seven production minutes, it is auto cleanable and has a power recycling efficiency of 99%.

IV.- The forth stage is oven polymerization:

The parts enter into the oven at 220°C maximum for 15 minutes, in this stage there is a polymerization of the powder paint, after this stage parts are unloaded an assembled.

End of Technical Data of Powder Coating Process



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