

Customized and Standard Modular Noise Enclosures

Reduction of airborne noise

Noise Enclosure

For Offshore, Power Generation and Industrial Applications



Vibratec[®]
akustikprodukter

Concept & Design:

Vibratec offer two basis designs that can be customized according to client requirements.

Modular Standard:

A standard modular noise enclosure in galvanized steel or AISI 316 steel. Easy to assemble with bolts, joints and corner profiles. Panel thickness is standard of 25 mm, but can be manufactured in 50 mm thickness or even higher, depending on the noise requirements

Modular Customized:

A fully customized noise enclosure in either galvanized steel, AISI 316 steel or in sea water resistant aluminum. Typical thickness of panel is from 50-80 mm. This type is typical for offshore use, or for applications with special requirements.

Both concepts offer high noise reduction. Can be designed and manufactured as single panel construction or as box in box construction.

Acoustic design according to acoustic requirements, with the philosophy of making the optimum solution for materials, weight, cost, environmental conditions and acoustical performance, i.e optimum total R_w value for the enclosure, taking into account the gaps, leakage, cable trays and pipe penetrations. Furthermore the design is optimized for reduction of radiated structureborne noise from the enclosure surfaces by using either free layer damping or constrained layer damping technology. This can even be optimized for various temperatures, depending on site location and use for indoor/ outdoor applications.

In all our projects and solutions for enclosures, the following are or can be included.

- o Acoustic design/ optimization and calculation of insertion loss
- o CAD drawing in 3D
- o Tests and measurements
- o FE analysis
- o Detailed component engineering
- o Ventilation design, natural or forced
- o Silencer design
- o Manufacturing, testing and installation
- o Documentation and manuals
- o Material certificates

Validation:

Each noise enclosure are acoustically tested in the workshop or on the installation site by Vibratec.

In order to ensure that we meet the requirements for max. required sound pressure level SPL, as specified, a number of noise measurements are carried out. These measurements are performed with a special loudspeaker system, and the insertion loss in sound pressure level are documented.

$$IL_p = \Delta L_p = L_{p, \text{no. encl.}} - L_{p, \text{with encl.}}$$

Typical applications:

- Pumps
- Compressors
- Engines
- Turbines

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Offshore enclosure -acoustic test



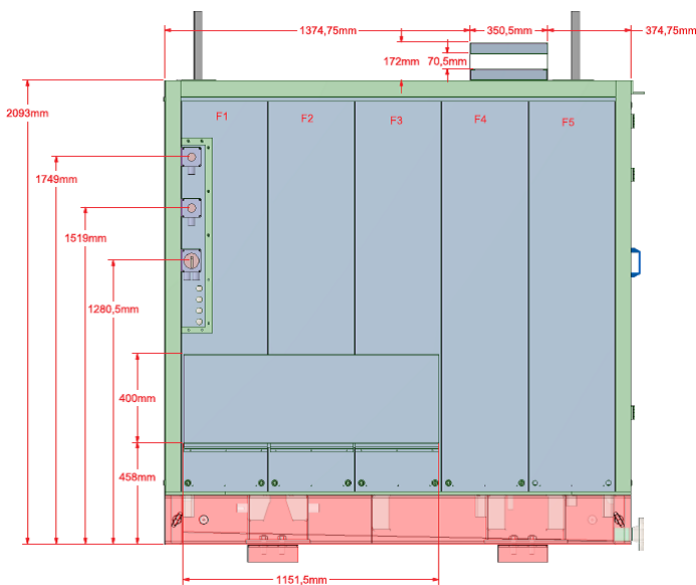
Assembled offshore enclosure



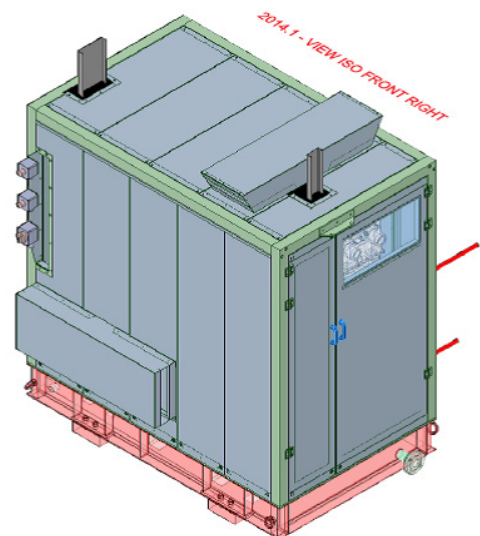
Heavy duty Frame for enclosure panels



Test assembly of offshore enclosure



CAD layout



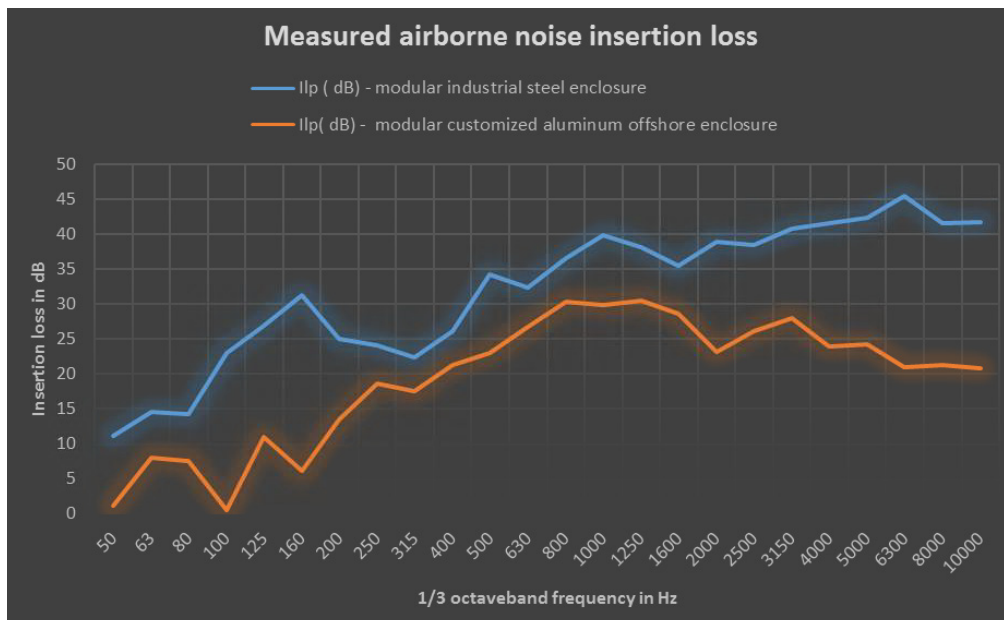
3D design

Examples of tested acoustic performance:

A given design is tested, verified and controlled for acoustic leakage and weak spots. Critical design elements can be changed if tests indicate any failure in expected performance. Tests are performed with gaps, silencers and all penetrations. This leads to the real Insertion loss and not a laboratory based value.

As an example, the figure below shows two results for noise reduction with different designs of enclosure.

Higher insertion loss values than shown below can be achieved, by change in design and construction of enclosure.



The noise enclosure made in aluminum has low weight for ergonomic assembly and disassembly, which can be done in a few minutes for all panels and silencers. The solution offers a high insertion loss for medium and higher frequencies. For low frequency applications, a steel panel structure must be used. The steel panels are approximately 3 times heavier than the aluminum ones, thus resulting in a heavier solution. Due to the modular construction also the steel panel structure is easy to assemble and disassemble.

Examples of noise canopy for vacuum pump:

A small customized enclosure 1x1,5x2 m made of steel panels and doors with 50 mm thick panels. Assembly based on modular concept with standard frame, joints, and corner profiles. The panels are powder coated in RAL-color according

to client wish.

Vacuum pumps are resiliently mounted inside the enclosure in order to reduce the transmission of structureborne noise to the structure.

All panels are treated with a free layer damping to minimize the radiation of structureborne noise.

The acoustic performance of this canopy is the blue line in the above IL-curve.



Example of acoustic canopy for vacuum pump

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