



Absorber Lining

For the selection of the absorber material several things must be considered; the frequency range that have to be covered (including the requirements regarding chamber performance), the size of the place of installation as well as the respective costs.

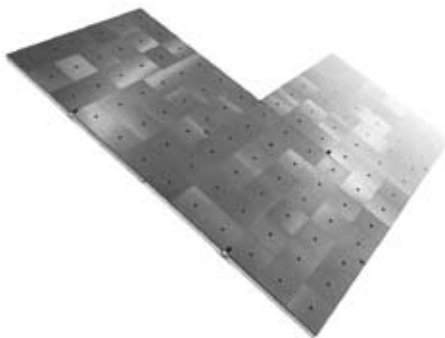
You can choose ferrite, pyramid or hybrid absorbers.

The following differences between the absorber types must be taken into account:

- **Reflectivity over a defined frequency range**
- **Dimensions (length) and consequently the space required**
- **Cost**



Ferrite absorber panel



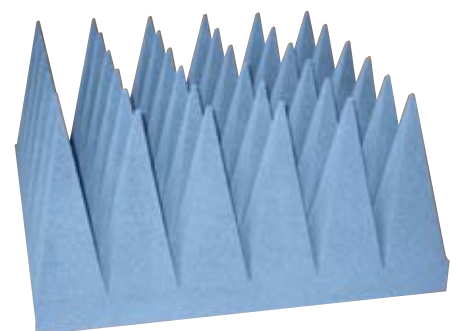
Ferrite Absorbers

An important advantage of ferrite absorbers is the fact that, despite their small thickness, they offer very good reflection attenuation characteristics starting already from a frequency of 30 MHz, thus being perfectly suitable for the use in smaller rooms. The biggest disadvantage however, is the relatively high price as well as the limitation of frequencies up to 1 GHz.

Ferrite absorbers should be considered in all the cases where pyramid absorbers cannot be used due to limited space. An extension of the frequency range up to 18 GHz can be achieved by using a combination of ferrite absorbers with short pyramid absorbers (see hybrid absorbers).

Pyramid Absorbers

Pyramid absorbers are available in sizes (lengths) of 100 mm to 2.500 mm. The required length depends mainly on the wavelength of the lowest usable frequency specified for the anechoic chamber. The length decreases with increasing frequency. Pyramid absorbers of a size of ≥ 2.000 mm are mainly used in chambers with measuring distances of up to 10.0 m where the requirement for NSA correlation of better than ± 4 dB has to be fulfilled from 30 MHz to 1 GHz. In tests with frequencies starting at 80 MHz (e.g. in immunity tests according to IEC/EN 61000-4-3) the respective requirements can be fulfilled already with a pyramid length of 75 cm. For measurements in the range ≥ 1 GHz, even sizes of 200 to 300 mm are sufficient. Compared to ferrite absorbers, the pyramid absorbers offer the considerable advantage of lower price (depending on size), lower weight and their practically unlimited use up to the high GHz range.



Foam pyramid absorbers

Absorbers

Non-Combustible Pyramid Absorbers in Thin-Film Technology

The Franko_{sorb}[®] RF absorbers are constructed in the so-called "thin film" technology which totally replaces the carbon filled foam absorber technology. This gives the Franko_{sorb}[®] RF absorber the following significant advantages:

- High absorption capability
- No aging or drooping problems
- Non-combustible acc. to DIN 4102, fire-class A2
- Weatherproof
- Low ongoing ownership costs
- High repeatable performance characteristics
- Non-toxic waste
- No carbon dust

The mechanical realization of the absorber shape is independent from the absorbing function, realized by the resistance film. The shape of the absorber can be made of a light-weight non-combustible, weatherproof and otherwise suitable material. In comparison, the absorber film is very thin. Typically it has a thickness of 10 µm. Consequently, all the advantages of the "shape material" also holds for the complete absorber.

- The absorbing foil is situated on the surface of the absorber and mounted directly on the shape material. Consequently, it can transfer absorbed energy very effectively to its surrounding and the absorber is capable of resisting very high field strength.
- Transportation volume is low because the hollow construction allows stacking.
- All the material in the thin-film technology absorber is non-toxic and non-combustible according to DIN 4102 class A2.
- Franko_{sorb}[®] pyramid absorbers (fire class A2 and B2) fulfil the requirements for cleanroom compatibility acc. to ISO 14644-1, class 5.

Hybrid Absorbers

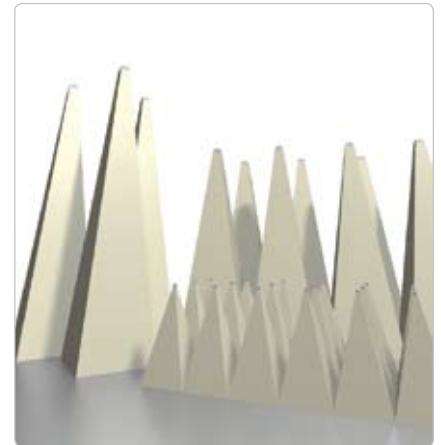
Hybrid Absorbers are a combination of ferrite absorbers with impedance matched pyramid absorbers installed in front of them. The hybrid absorbers combine the advantages of:

- Ferrite absorbers with good attenuation characteristics starting at 30 MHz and being flat
- Short pyramid absorbers with good attenuation characteristics up to the high GHz range

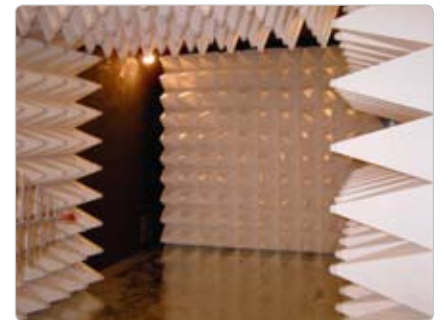
Hybrid absorbers are a good solution for smaller rooms (e.g. 3 m test range) with restricted external dimensions and frequency ranges from 30 MHz up to approx. 20 GHz.

Customized Solutions

A combined arrangement of pyramid and hybrid absorbers is also possible if the available space requires special solutions for best performance.

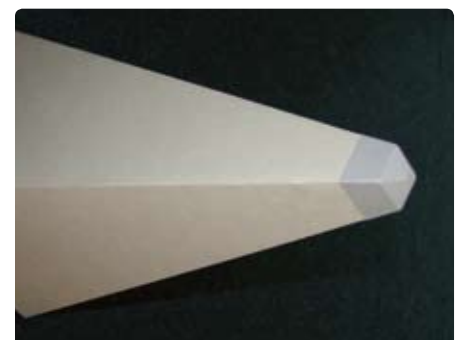


Pyramid absorbers / thin-film technology



Hybrid absorbers with non-combustible pyramid absorbers / thin-film technology

**FRANKONIA IS THE ONLY
MANUFACTURER WORLDWIDE
WHO PRODUCES NON-COMBUSTIBLE
ABSORBERS ACCORDING TO
FIRE-CLASS DIN 4102 A2**



Hybrid absorber, thin-film technology

Installation / Abbreviation of Absorbers

Installation of the Absorbers

a) Ferrite Absorbers

The individual ferrite tiles are pre-assembled on chip wood boards, size 600 mm x 600 mm. For assembly in the chamber a rail system is installed in a grid of 600 mm which is screwed to the double bent edges of the shielding panels. The absorber panels are then bolted to the rails. If the chamber is constructed as a fully anechoic chamber, including the floor, the same absorber panels are used for the floor. To protect the ferrites on the floor, the surface is covered with a 5.0 mm thick felt covering. The floor height of the false floor will be at the same level as the doorsill.

b) Pyramid Absorbers

Pyramid absorbers are hung into a rail system construction, either directly (in case of thin-film absorbers) or after having been pre-assembled on supporting plates (in case of foam absorbers). In combination with ferrite absorbers the thin-film absorbers are installed using plastic threaded rods and the foam absorbers using a "Velcro" fastening.

All types of installation allow easy disassembly of the absorbers without damage.

Abbreviation (name convention) of Absorber Types

- Franko_{Sorb}® Fxxx: Ferrite absorber
- Franko_{Sorb}® Pxxx: Thin-film pyramid absorber
- Franko_{Sorb}® PFxxx: Foam pyramid absorber
- Franko_{Sorb}® Hxxx: Hybrid absorber with thin-film pyramid absorber
- Franko_{Sorb}® HFxxx: Hybrid absorber with foam pyramid absorber

(xxx = height of the absorbers)

The suffixes B2 and A2 indicate the respective fire class of the absorbers. Non-combustible absorbers (fire class A2) can only be realized with thin-film pyramid absorbers.



Structure for the installation of ferrite absorbers



Rail system for the installation of pyramid absorbers

Installation of Hybrid absorbers:



Step 1



Step 2



Step 3