

Absorber Lining

For the selection of the absorber material, frequency range to be covered (including the requirements regarding room quality), size of the place of installation available and the respective costs, must be considered.

You can choose ferrite, pyramid and 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
- Costs

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 30MHz, thus being perfectly suitable for the use in smaller rooms. The biggest disadvantage however, is the relatively high price as well as the maximum frequency of 1GHz - 2GHz.

Ferrite absorbers should be considered in all the cases where pyramid absorbers cannot be used due to the limited space. An extension of the frequency range up to 18GHz 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 100mm to 2.500mm. 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 $\geq 2,000$ mm are mainly used in chambers with measuring distances of up to 10.0m where the requirement for NSA correlation of better than ± 4 dB has to be fulfilled from 30MHz to 1GHz. In tests with frequencies starting at 80MHz (e.g. in immunity tests according to EN 61000-4-3) the respective requirements can be fulfilled already with a pyramid length of 75cm. For measurements in the range ≥ 1 GHz, even sizes of 200 to 300mm 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.



Ferrite absorber panel



Pyramid absorber/thin-film technology



Foam pyramid absorber

Non-Combustible Pyramid Absorbers in Thin-Film Technology

The FrankoSorb® RF absorber uses a new "thin film" technology that totally replaces the carbon in the conventional absorber, and foam is no longer required as the base support material.

This gives the FrankoSorb® RF absorber the following significant advantages:

- High absorption capability
- No aging or drooping problems
- Fireproof
- Weatherproof
- Low ongoing ownership costs
- High repeatable performance characteristics

The mechanical realization of the absorber shape is independent of the absorbing function realized by the resistance film. The cover or coating can be made of a lightweight non-combustible, weatherproof and otherwise suitable material. In comparison, the film is very thin; the polymer substrate typically has a thickness of 10µm. Consequently, all the advantages of the "shape material" also holds for the complete absorber.

- The absorbing film 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 surroundings and the absorber is capable of withstanding very high field strengths.
- Transportation volume is low, because the hollow construction allows stacking.
- All the materials in the new technology absorber is non-toxic and non-combustible according to DIN 4102 class A2

FRANKONIA is the only manufacturer worldwide that produces absorbers according to the strict fire class DIN 4102 A2.

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 30MHz and being flat
- Short pyramid absorbers with good attenuation characteristics into the high GHz range.

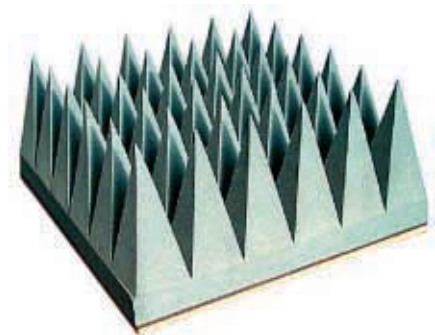
Hybrid absorbers are a good solution for smaller rooms (e.g. 3m test range) with restricted external dimensions and frequency ranges from 30MHz up to approx. 20GHz.

Customized Solutions

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



Hybrid absorbers with non-combustible pyramid absorbers



Hybrid absorbers with foam pyramid absorbers

Installation of the Absorbers

a) Ferrite Absorbers

The individual ferrite panels are assembled on chip wood boards, size 600mm x 600mm. For assembly in the chamber, a rail system is installed in a grid of 600mm, which is screwed to the double bent edges of the shielding panels. The absorber panels are then bolted to the rails. If the chamber must be 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 5.0mm 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 combinations 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.



Substructure for the installation of ferrite absorbers

Abbreviations (name convention) of Absorber Types

Frankosorb Fxxx:	Ferrite absorber
Frankosorb Pxxx:	Thin-film pyramid absorber
Frankosorb PFxxx:	Foam pyramid absorber
Frankosorb Hxxx:	Hybrid absorber with thin-film pyramid absorber
Frankosorb HFxxx:	Hybrid absorber with foam pyramid absorber

(xxx = height of the absorbers))

The suffixes B1, 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.