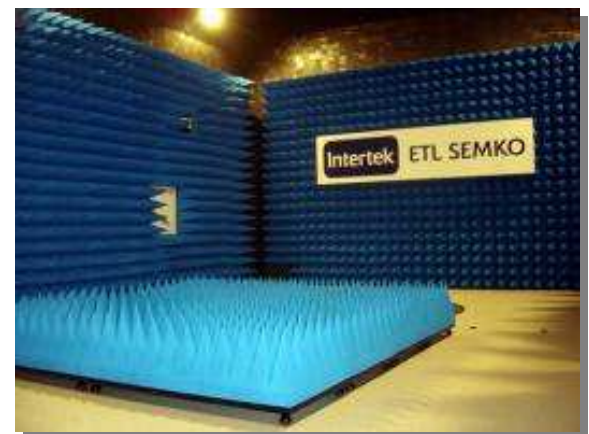
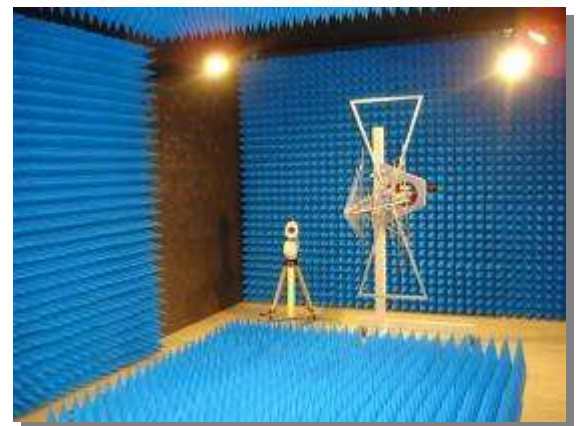
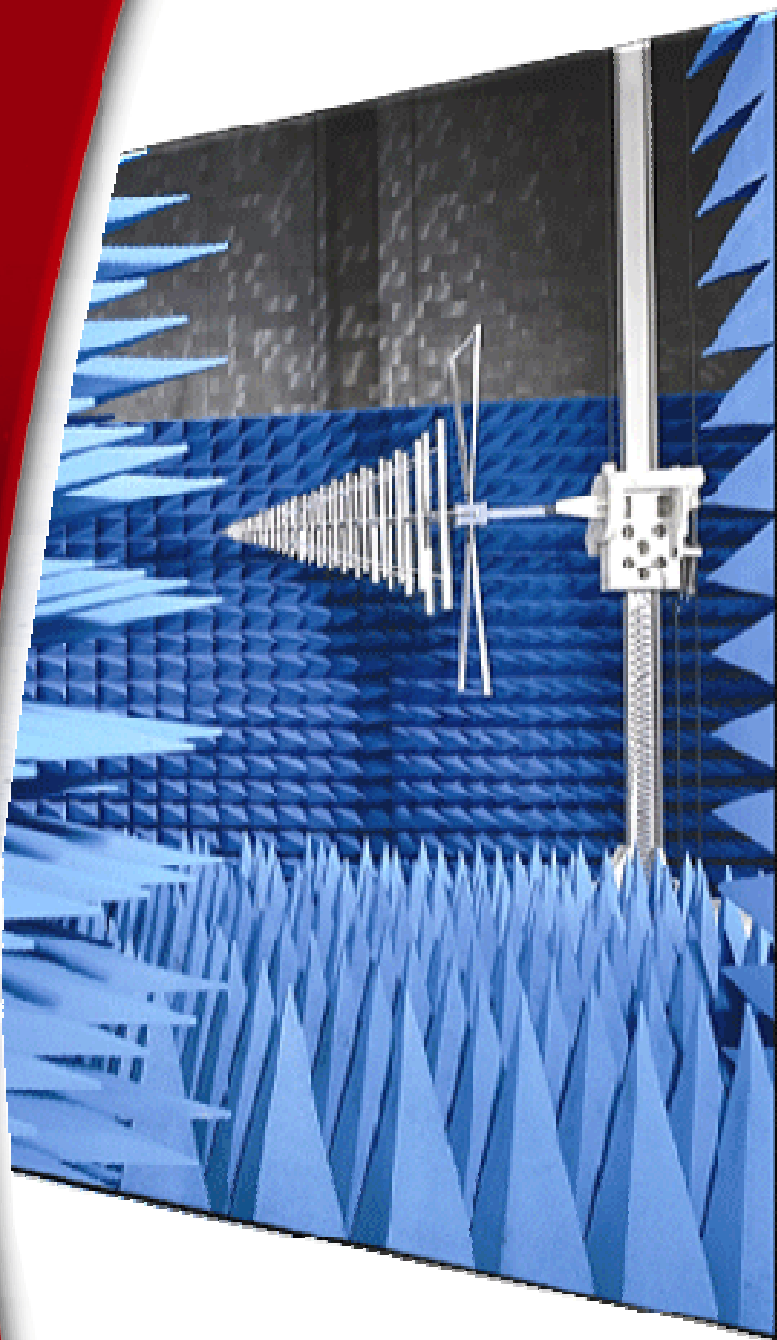


# HYBRID PYRAMIDAL ABSORBER HY AND HYT (TRUNCATED)

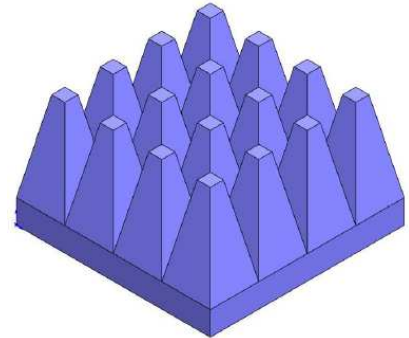
HY is a range of high performance electromagnetic absorbers dedicated to EMC applications. The combination of SIEPEL ferrite tiles performance levels at lower frequencies and pyramidal matched HY absorbers in the upper frequency range results in broadband reflectivity performances from 30 MHz to 40 GHz. HY absorbers are used in EMC anechoic chambers for EMI and EMS testing according to both commercial and military standards.



# HYBRID PYRAMIDAL ABSORBER HY AND HYT (TRUNCATED)

## MAIN FEATURES

- Suitable for EMC anechoic chambers
- Broadband frequency range 30 MHz – 40 GHz
- Performance levels guaranteed for 20 years
- Unique plastic paint for pyramidal foam absorbers
- Innovative, flexible installation system for ferrite panels
- Can be installed to upgrade existing shielded rooms



## DESCRIPTION

The key design advantage of HY hybrid absorbers is the **impedance matching** between the ferrite tiles and the pyramidal-shaped absorbers glued over the ferrite.

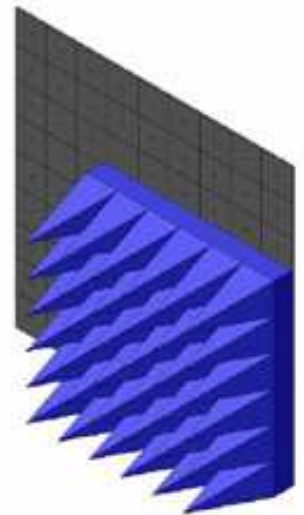
SIEPEL ferrite panels provide optimized reflectivity performances in the frequency range 30 MHz – 1 GHz \*, and in order to extend the performances up to 40 GHz, an immediate and simple idea would be to glue a regular pyramidal absorber on top of the ferrite. However, some care should be taken so that the pyramidal absorber doesn't "hide" the ferrite.

In other words the pyramidal absorber must be "transparent" enough to low frequency waves, so that they can be absorbed by the ferrite in an efficient way.

Thus, SIEPEL has developed a **special matched pyramidal absorber**, impregnated with a specially formulated carbon solution (different from regular APM pyramidal absorbers). This provides the combination ferrite + matched pyramidal absorber with **high performance** over the whole frequency range 30 MHz – 40 GHz.

Consequently, the broadband performances of HY absorbers make them ideal for use in **EMC anechoic chambers** to meet the specifications of the commercial **EMI** standards (such as CISPR 16-1-4, EN 50147-2, EN 55022, ANSI C63.4 and other similar standards) and **EMS** standards (EN / IEC 61000-4-3), as well as **MIL-STD** applications.

\*: more detailed information about ferrite panels in the data sheet **FERRITE ABSORBER - FE**



## GUARANTEED PERFORMANCES

These reflectivity performances are exceptional; the **values are guaranteed for 20 years**. These values are the fruit of extensive experience in electromagnetic absorber manufacturing. The reflectivity performances of our absorbers are factory checked, using cutting edge broadband equipment (14 m long coaxial line 1.83 x 1.83 m section, optimised design fully anechoic chamber, Vector Network Analyzers).

In addition, we offer to take care of the reflectivity measurements in our factory with SIEPEL engineers, for the customer.

GUARANTEED REFLECTIVITY PERFORMANCES (dB) OF HY ABSORBERS (normal incidence)															
Combination of ferrite tiles and special matched pyramidal hybrid absorbers															
Type	30 MHz	50 MHz	80 MHz	100 MHz	150 MHz	300 MHz	500 MHz	1 GHz	2 GHz	4 GHz	8 GHz	12 GHz	18 GHz	40 GHz	
HYBRID	HY 20	-18	-20	-21	-20	-19	-14	-12	-12	-10	-10	-12	-14	-16	-15
	HY 30	-18	-20	-20	-20	-17	-15	-13	-14	-11	-11	-15	-17	-20	-20
	HY 45	-18	-20	-19	-18	-17	-16	-15	-15	-14	-17	-20	-22	-24	-20
HYBRID TRUNCATED	HY 20 T	-18	-20	-20	-20	-19	-14	-10	-10	-9	-9	-9	-10	-11	-11
	HY 30 T	-18	-20	-20	-20	-17	-15	-13	-11	-10	-10	-12	-12	-20	-20

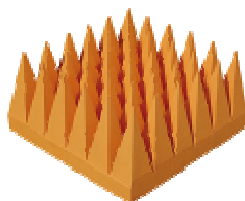
# HYBRID PYRAMIDAL ABSORBER HY AND HYT (TRUNCATED)

## DIMENSIONS

	Type	Total Overall Height (mm)	Total Overall Height (mm)*	Pyramid Height (mm)	Base Height (mm)*	Base Width (mm)	Weight (kg)*
HYBRID	HY 20	210	218	147	71	605 x 605	16
	HY 30	305	313	245	68	605 x 605	16,5
	HY 45	455	463	380	83	605 x 605	17,3
HYBRID TRUNCATED	HY 20 T	100	108	45	63	605 x 605	16
	HY 30 T	200	208	140	68	605 x 605	16,5

\*including ferrite tiles

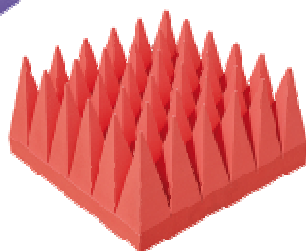
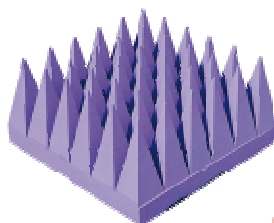
## UNIQUE PLASTIC PAINT



SIEPEL is the **only manufacturer in the world** to offer **plastic paint coating** for pyramidal absorbers.

This special painting treatment was developed to optimise carbon binding (no finger marks, and no pollution or carbon dust) and excellent ageing.

This plastic paint comes in a range of colours: please contact us to print your company's name or logo on your chamber!



## FIRE RETARDANT PROPERTIES

HY pyramidal matched hybrid absorbers are tested in SIEPEL's internal fire test lab as well as in independent test laboratories. HY absorbers are compliant with the following tests and standards:

- ISO 11925-2 Euroclass E
- NRL 8093 – tests 1, 2 & 3
- DIN 4102 – B2
- UL 94 HBF upon request

## EXTREME SOFTNESS – SHAPE MEMORY

HY pyramidal matched hybrid absorbers have an excellent shape memory. The high quality materials used, in combination with the various paints we propose, provide the unique advantage of extreme softness, which is therefore not easily breakable (no carbon dust) and is highly suitable for heavy duty chambers.

## RF POWER HANDLING

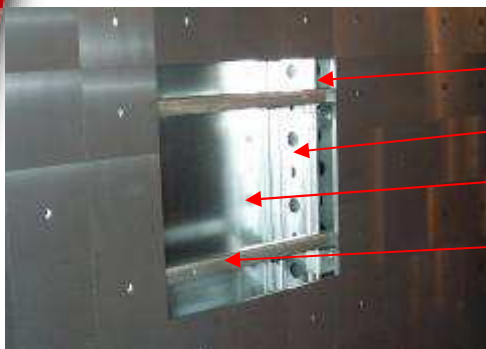
HY absorbers are designed to handle a power density of up to 2 kW/m<sup>2</sup>.



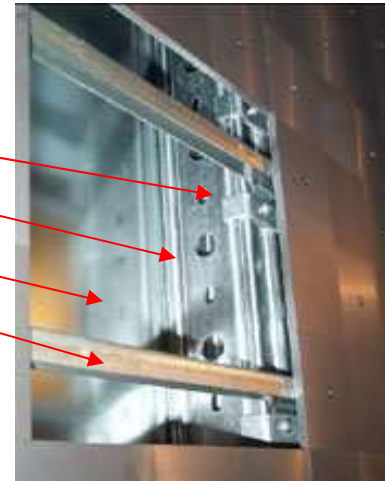
# HYBRID PYRAMIDAL ABSORBER HY AND HYT (TRUNCATED)

## INNOVATIVE FERRITE INSTALLATION

HY hybrid absorbers can be installed in brand new shielded rooms or to upgrade existing installations. SIEPEL ferrite panels (300 x 300 mm metal backed panels, each with 9 tiles glued over a steel plate) can be either screwed onto wooden boards in existing enclosures, or using a **unique flexible and innovative rail system** when installed in SIEPEL high performance shielded rooms (see following pictures).



MAIN PROFILE  
OMEGA PROFILE  
SHIELDING PANEL  
SECONDARY PROFILE



Ferrite panels are screwed onto a metallic sub-structure, made of main and secondary steel profiles. Vertical main profiles are directly fixed onto the shielded room, using the joining OMEGA profiles between two shielding panels. Then horizontal secondary profiles are screwed onto these main profiles.

Finally, each ferrite panel is screwed onto the secondary profiles. This flexible installation method, **with no drilling or holes in the shielding**, ensures:

- ✓ Excellent **reliability** of shielding effectiveness performances,
- ✓ Very **easy** and **quick installation** of ferrite panels on the walls and ceiling of the chamber,
- ✓ Easy dismantling of one or more panels anywhere, as needed,
- ✓ Easy **dismantling of the entire chamber** (for relocation or upgrade).

To upgrade the performance levels of the absorbers to 40 GHz and more, special matched pyramidal foam absorbers are directly glued over the ferrite tiles, using Neoprene contact glue (to be applied on both sides).

## “OPEN-CELL” STRUCTURE

The percentage of open cells within the foam absorber material is of utmost importance. HY matched pyramidal hybrid absorbers are made from high tech polyurethane foam, with 90% open cells. This configuration allows a far better impregnation of the carbon solution, and therefore an incomparable distribution of the carbon load through the absorber. The carbon is fixed through the use of a polymerised acrylic binder.

All these features lead to unique homogeneity and accurate control of electromagnetic parameters (complex permittivity  $\epsilon^*$ ).

## NUMERICAL SIMULATION

SIEPEL R&D engineers work with state-of-the-art electromagnetic numerical simulation software, in order to continuously optimize both the shape and impregnation agents of the absorbers, over wide frequency ranges.

