# NOISE CONTROL AND REDUCTION BY THE USE OF SOUND ABSORBERS

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Let alone the discussion whether noise should be treated or not, it is quite clear that excessive noise could be treated. In our opinion it also should be treated. The "tools" used can and shall be different depending on local conditions. Treatment of noise problems is a specialist subject; thus solutions must be tailored to suit the whole situation, not only the noise problem.

The use of acoustic absorbers as a noise control "tool" has in Sweden been a common approach for more than 15 years. Today the noise control aspects are carefully considered when designing new buildings for the industry or when alterating already existing ones. We work within the noise control program with various systems and products for existing and newly-built plants and therefore we have a quite clear view of what could be expected from installation of our products.

Due to the fact that the unwanted sound often is created at several or a great number of positions in a hall, the use of acoustic absorbers as main treatment may be the simpliest and best solution for reasons of costs and efficiency.

Furthermore, the psycological impact of a reduction caused by acoustic absorbers is often rated higher compared with the same

reduction obtained by source treatment. This is due to the considerable reduction of reveberation time, the reduction of the general noise level and introduction of a non-diffuse sound field which improves the stereophonic hearing function.

The last effect also gives a good guidance for further treatment of point sources.

Acoustic absorbers have the main feature of removing a maximum of reflected sound and thus reduce the noise level in the receiving point. The sound absorption properties of ECOMAX mineral wool products depend on thickness, way of application and are varied by frequency. In the frequency range of 500-2000 Hz, which often is demanding for the dBA-rating, the absorption factor is quite close to 1.0.

In large rooms, as industrial halls tend to be, the roof is the dominating reflecting surface and the walls have only influence quite close to themselves. We thus assume that the effect of roof-mounted acoustic absorbers is influenced only by the ceiling height (of the room parameters), the absorption properties of the ceiling and the scattering effect of the interiors, i.e. machines, material stores etc., and of the average distance between noise sources.

Small or narrow rooms, where the reflecting walls have a considerable influence on the general noise level obtained, can acoustically be made into large rooms by covering the walls by high effective absorbers.

The experience has shown that a reduction of the general noise level can be obtained within the range of 5-10 dBA. A reduction of 10 dBA is found where all the conditions are favourable and 5 dBA if they are not favourable.

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Below there are som examples of noise reduction obtained in industrial halls of different dimensions and volumes. The conditions could be briefly described as follows. All the factories have concrete floorings.

## Hall A

Tube making mill with cutting and trimming operations of stainless steel pipes. Brick walls and roof of corrugated steel sheet with parts having roof lights. Noise treatment in the shape of vertical hanging ECOMAX acoustic absorbers with a density of approximately one unit per sqm roof area. The noise sources are rather sparse.

## Hall B

Production shop, mainly dealing with large steel sheets or steel constructions. Walls and roof of lightweight concrete. Acoustic absorbers of 50 mm thick ECOMAX tissued slab fixed in direct contact with the roof, covering the whole area. The noise sources are sparse.

## Hall C

Canning industry with walls and roof of lightweight concrete. Acoustic absorbers of 50 mm thick ECOMAX tissued slab in a suspended ceiling, covering the whole area. Suspension depth of approximately 200 mm. The noise sources are close to each other.

| Hall | Measures height x width x length | Approx. volume | Rev. time at 1000 Hz Before | After | General level reduction |
|---|---|---|---|---|---|
| A | 10 x 67 x 150 m | 100 000 m3 | 4,8 sec. | 2,3 sec. | 8,5 dBA |
| B | 7,5 x 32 x 55 m | 13 200 m3 | 3,4 sec. | 1,2 sec. | 11,5 dBA |
| C | 5 x 47 x 150 m | 35 000 m3 | 2,5 sec. | 0,7 sec. | 6 dBA |

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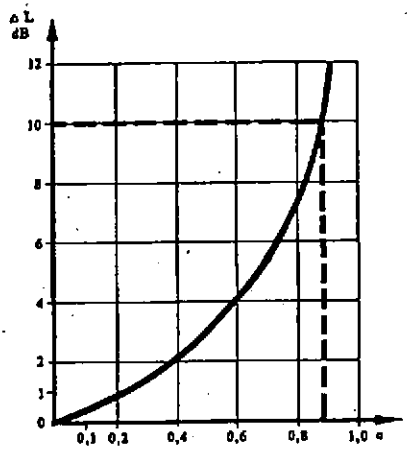
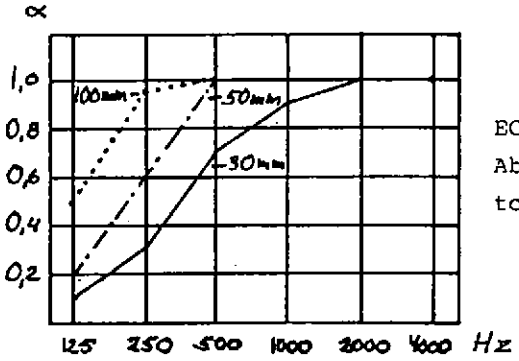
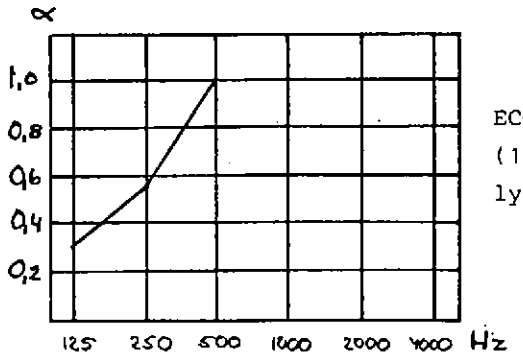



Attenuation of reflected sound due to absorption properties.




ECOMAX Tissued Slab Absorption figures referenced to thickness.




ECOMAX acoustic absorbers (1.0x0.6 m) hanging vertically with density 1 pce/sqm.