ultrafonic
make it sound better

What is the right absorption for small meeting rooms and teleconferencing?

Answer: The smallest amount that makes the room echo not a problem. (Also, the lowest cost, easiest to install and most practical).

The common misconception;

If we have two types of absorbers, each with a different NRC (Noise Reduction Coefficient), then we need more of the one with the lower NRC to achieve the same total absorption.

Example;

Absorber 1 – NRC 0.6

Absorber 2 – NRC 0.9

You might think that since absorber 2 is has an NRC 1.5 times that of absorber 1, you would need 1.5 times as many square metres of absorber 1 to get the same effect – but this is wrong.

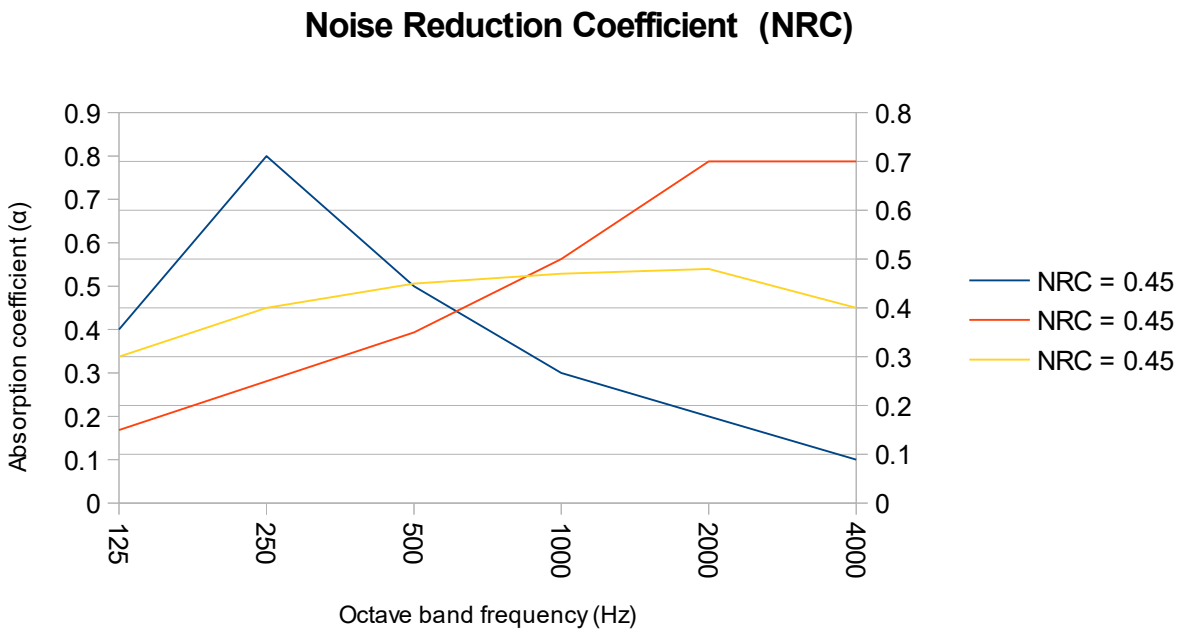
e.g.

3 square metres of Absorber 1 (NRC 0.6) = 1.8 metric Sabins of absorption

2 square metres of Absorber 2 (NRC 0.9) = 1.8 metric Sabins of absorption

However, this is misleading because NRC is an average figure that does not give enough information. NRC is a gross oversimplification that hides the relationship between absorption and frequency.

The graph below shows 3 very different absorbers, all with the same NRC (NRC is simply the average of absorption coefficients from 250 to 2000 Hz).



The common problem;

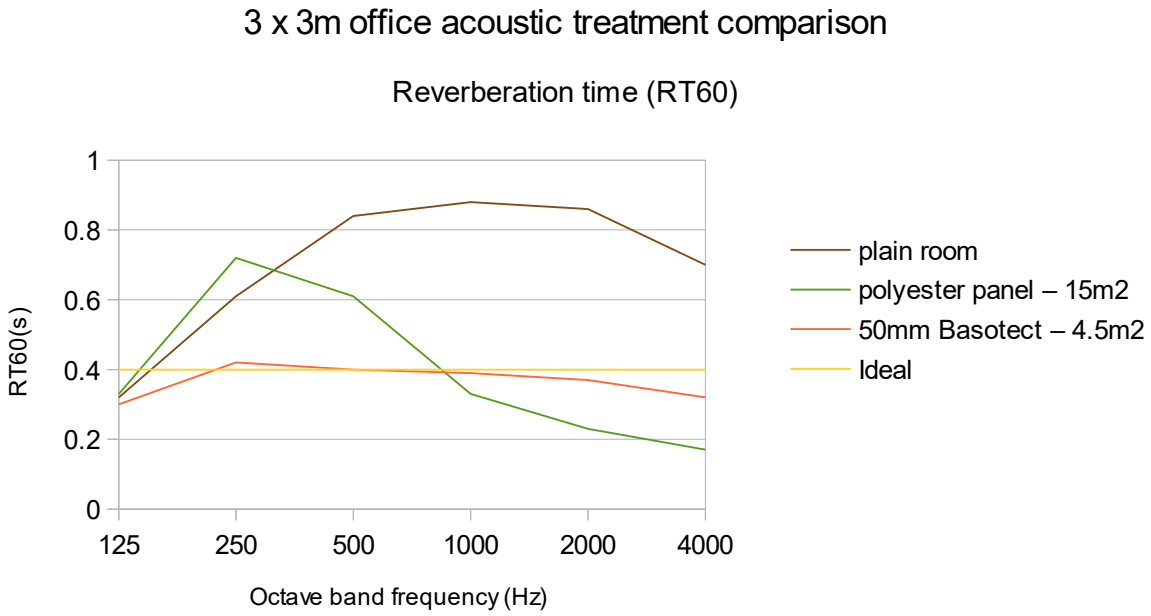
The previously described misconception is used (generally because it is presumed cheaper) and lots of wall and ceiling space is covered in thin absorbers. This may result in a reasonable effect as a single figure, and meet WH&S requirements for total noise dose, it will not be suitable for speech or teleconferencing.

This is what happens;

A standard office or meeting room which is too reverberant (plain room) is not overly improved with 15 square metres of 12mm polyester panel. High frequencies are absorbed too much leaving the room feeling dead. Low frequencies are not absorbed making the room sound boomy. Both of which make speech unclear, especially if on the phone or in a telemeeting. This is because the polyester panel has much more high frequency absorption than low or mid frequency absorption*.

By contrast, the use of a much smaller amount of thicker absorption results in a room highly suited to speech and phone or teleconferencing. This is because thicker absorbers also cover the low and mid frequency range*.

* the absorption coefficinets used for the absorbers and all room materials are included at the end of this article.



Not only does the application of a smaller amount of thicker absorption result in a better sounding room, it is a lower cost installation. Quite clearly, 4.5 square metres of thicker material is only 30% of the 15 square metres of thinner material, and has a **lower material and installation cost.**

It is also much mor realistic to be able to apply this amount of absorption in a normal office as much space is often occupied by windows, whiteboards, A/V equipment etc.

As well, you could keep applying more thinner material and NEVER get a decent sounding room. In fact it would get worse because the high frequency would be even more over absorbed and the low frequency would remain unchanged.

The Australian Standard AS/NZS 2017:2000 recommends the following reverberation times for this type of room;

OFFICE BUILDINGS	
Board and Conference Rooms	0.6 to 0.8s
Executive office	0.4 to 0.6s
Video/audio conference rooms	0.2 to 0.4s

Benefits of using the right type of absorption;

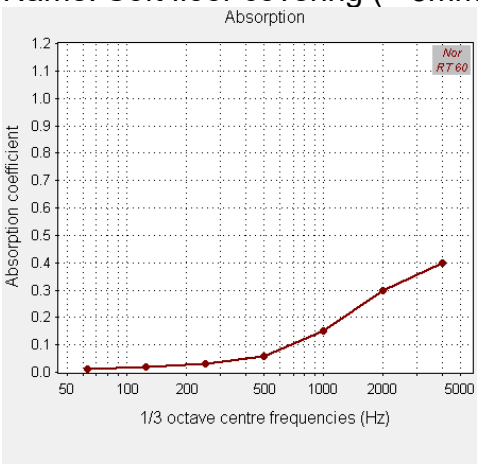
* Lower cost
* Less wall and ceiling space used
* Easier installation
* Much better sound for speech and teleconferencing
* More likely to get approved because of all of the above

Appendix;

Calculation method: ARAU-PUCHADES

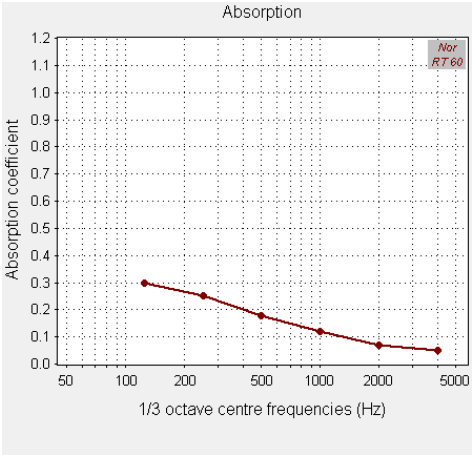
ABSORBENTS USED

Name: Soft floor covering (< 5mm)



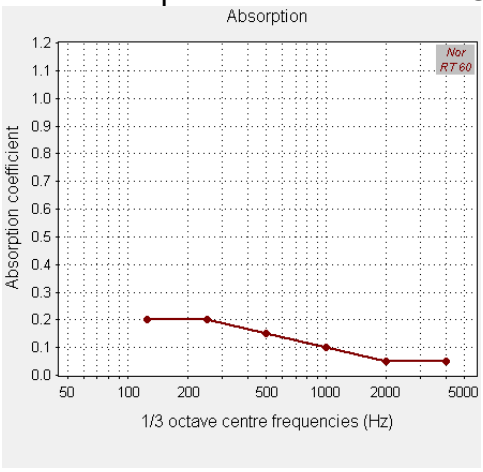
Area: 9 m2 on surfaces X

Name: Glass Window 4mm



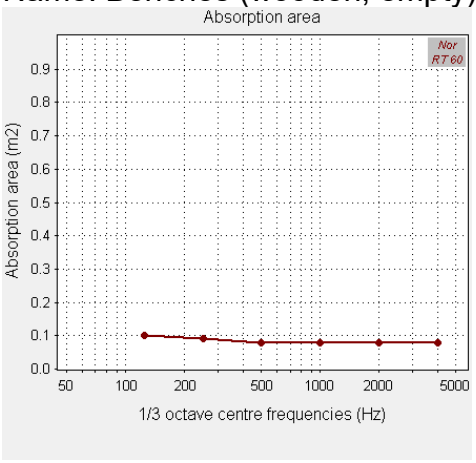
Area: 2 m2 on surfaces Y

Name: Suspended Plasterboard Ceiling



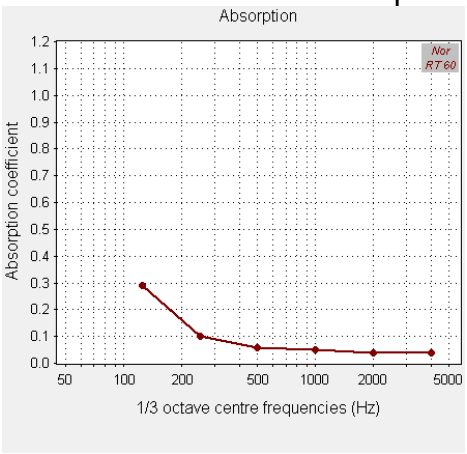
Area: 7.5 m2 on surfaces X

Name: Benches (wooden, empty)



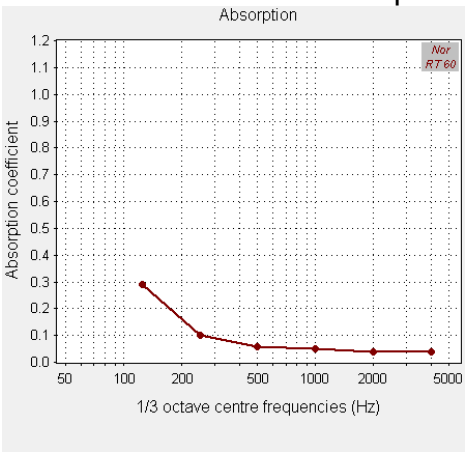
Number: 1 assigned to surface X

Name: Plasterboard 12mm panelling on studs



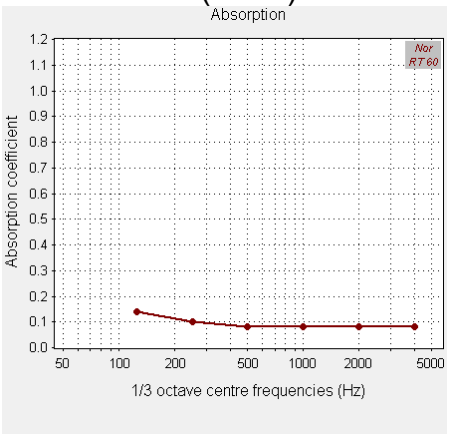
Area: 11.5 m2 on surfaces Y

Name: Plasterboard 12mm panelling on studs



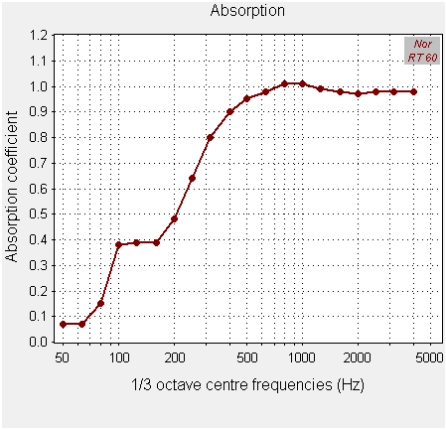
Area: 11.5 m2 on surfaces Z

Name: Doors (wood)



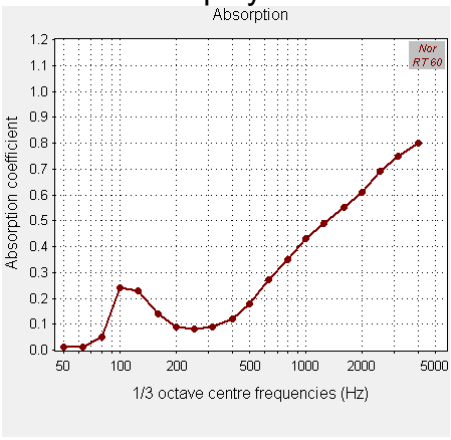
Area: 2 m2 on surfaces Z

Name: 50mm Basotect on Plasterboard wall (combined absorption)



Area: 1.5 m2 on surfaces X
Area: 1.5 m2 on surfaces Y
Area: 1.5 m2 on surfaces Z

Name: 12mm polyester board on Plasterboard wall (combined absorption)



Area: 5 m2 on surfaces X
Area: 5 m2 on surfaces Y
Area: 5 m2 on surfaces Z

DATA FOR THE ROOM
Room volume: 22 m3
Temperature: 23 deg.C
Rel. humidity: 40 %

Total surface area: 48 m2
Surface area X: 18 m2
Surface area Y: 15 m2
Surface area Z: 15 m2