

Beyond the Noise: Smart Acoustic Design with Office Booths



Colloquy



created in association with
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KOPLUS

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Office Acoustics and Booth Design: A Practical Guide

Stand-alone pods have been available as a furniture item for use in workplaces and education facilities since around 2010. The premise of the pods and booths is to provide somewhere to hold meetings and make calls without the need to build rooms thus adding flexibility and reducing costs, particularly dilapidation costs at the end of tenure.



Acoustic Expectations

It is firstly important to understand who is likely to use the pods/phone booths and how private those conversations need to be in relation to someone outside of the pod/booth.

The term “soundproof” is often used but is not a useful term because it implies not hearing any sound **beyond the unit**. Better to establish the criteria from the list below bearing in mind that simply specifying the highest level will likely incur cost that may not be required.

Privacy Rating	Subjective Impression
High	Raised voices are barely audible and unintelligible
Good	Normal speech is barely audible, raised voices are mostly unintelligible
Basic	Normal speech can be overheard some of the time, raised voices can be heard
Poor	Normal speech can be heard most of the time

Typically for internal meetings that require little or no privacy but are simply required to reduce disruption to other staff Basic is sufficient. For HR or more sensitive meetings, perhaps financial meetings High may be required and for everything in between Good is probably adequate.

Speech Privacy Potential

The table above is a great place to start but if you take a pod/booth and move it to a new location the subjective result may well be different. When situated in a busy or noisy location it may not be possible to hear any conversation and be subjectively “High” but moved to a quiet location the same unit may only appear Basic. THE LOCATION is as important as the product.

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If we add the normal ambient background sound level (building services, normal traffic noise) to the table above it is now Speech Privacy Potential.

Privacy Rating	Privacy Rating	Subjective Impression
High	85	Raised voices are barely audible and unintelligible
Good	75	Normal speech is barely audible, raised voices are mostly unintelligible
Basic	65	Normal speech can be overheard some of the time, raised voices can be heard
Poor	<65	Normal speech can be heard most of the time

This is not the same as a manufacturer's rating or a laboratory result. Speech Privacy Potential or SPP is the manufacturers rating or laboratory rating for the product and the normal ambient sound added together.

POD A has a rating of 38 – much the same level as a room built with single glazed partitions built from raised floor to drop ceiling with vertical plenum barriers above the ceiling, a swing door.

Situated in an office with ambient sound level of 30dB the SPP will be $38 + 30 = 68$, Basic.

Situated in an office with ambient sound level of 40dB the SPP will be $38 + 40 = 78$, Good.

Listening & Hearing

Two very slightly different terms. Listening can be considered active. Somebody actively trying to listen.

Hearing is considered "Passive". Someone concentrating on something else but hearing without trying.

When considering a POD/Booth it is extremely likely that you will be listening which may not be typical of the final scenario when installed.



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Proximity

Sound reduces at approximately 3dB for a doubling of distance (this is very much an ideal but useful to remember). 2m from a pod will likely mean 3dB better privacy than 1m from the pod.

Orientation

As with builtrooms typically the weakest part of the pod/booth is likely to be the door, by orientating the door side its possible to further reduce the likelihood of conversations being heard. A room or Pod with overall rating of 38dB will probably have a door side rating of 30 – 35 dB so a possible 3 – 8 dB improvement.

Reverberation or Echo

Whilst the internal reverberation or echo of a pod/booth/meeting room is important for speech clarity within the unit the reverberation or echo outside is also important. Without proving this mathematically, a higher reverberation in the “listening” space will reduce the speech privacy of the pod/booth/meeting room.

Acoustic Ratings – Useful or not?

There is currently no simple way for larger pods to be measured a standard way. Manufacturers are left to measure and report any ratings in the way they feel is most meaningful. That ranges from testing a single wall or component in a laboratory and applying that result as indicative of the whole unit to simulating the standard method of measuring two adjacent built rooms.

The former would normally be referred to as R_w and the latter as D_w or D_nT_w . When acousticians and specifiers use R_w they would expect that to be 5dB greater than the subsequent D_w when the pod/booth/meeting room is in situ.

The standard for phone booths is now ISO 23351-1. Which has a dB result that is not compatible with R_w or D_w or D_nT_w so cannot be used as a comparison with pods/booths not tested by the same method. To help simplify the results of ISO 23351 units tested may have a class of A – E.



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Comfort

Sound for most people is essential, humans are not predisposed to silence and like to feel connected to others, there is an expectation of acoustics for various situations, whether that is a restaurant, a meeting room or sports hall. The same applies to pods, users need to feel connected to the rest of the office, not to hear words but to hear activity. A pod that is isolated entirely will not be comfortable to work in for any length of time.

Internal Noise

As above there is an expectation that there will be some noise, air circulation noise should be between 30 & 40 dBA.

Typical acoustic terms

Rw	Laboratory measured attenuation
Dw	Field measured attenuation
DnTw	Field measured and adjusted for reverberation of receiving room
Ambient sound	Natural sound of a space without human activity but with any mechanical noise
RT	Reverberation time in seconds (echo)



Office Booth Sound Ratings Guidance

ISO 23351-1:2020

The ISO 23351-1:2020 standard facilitates the objective comparison of the sound-reducing qualities of office phone, work and meeting booths.

When evaluating products, ensure decibel reduction figures are based on ISO 23351 testing from certified external facilities to avoid arbitrary results.

What is ISO 23351-1:2020?

This standard measures the speech level reduction of furniture ensembles and enclosures. The result is denoted as DS,A (decibels/dB), ranging from Class A+ (highest isolation) to Class D (lowest). No manufacturers currently have an A+ rating (> 33 dB).

Classification System

For ensuring speech privacy in a typical office, a pod must achieve a minimum sound reduction of 25 dB (ISO 23351). Only compare ratings measured by certified external facilities.

Ambient Noise Consideration

As booth costs can vary significantly due to construction quality and sound ratings, it is important to know what level of booth/pod sound reduction is probably required.

The activity within the booth and personnel in the vicinity is also crucial. For example; If you require total privacy because of confidential meetings or calls, you will need either Class A or a highly rated Class B.

Ambient Noise Consideration:

In very quiet office spaces below 35 dB ambient noise levels (which is not that rare - in fact quite common), Class A pods might be necessary to prevent conversations from being heard outside of the pods.

In most office environments, Class B pods provide sufficient privacy without the eerie silence that can sometimes accompany more heavily insulated spaces and which might cause occupants to feel isolated/disconnected.

In very quiet office spaces, a Class A pod might create an environment that feels excessively silent. Humans naturally require a certain level of ambient noise to remain comfortable.

In noisy office environments (>60 dB ambient noise levels), a Class C pod would be sufficient.

-**Very Quiet Offices (<35 dB)**: Class A pods might be necessary.

-**Typical Offices**": Class B pods are usually sufficient.

-**Noisy Offices (>60 dB)**": Class C pods may suffice.





Construction

Another important element of choosing a booth is its construction method and the materials it is built from. The strongest booths with the highest longevity are usually made from STEEL. This prevents warping of MFC/MDF wood products (from which most inferior booths are often made) by either ambient moisture and temperature or from people leaning on the back and side panels. Both cause sound leakage over time, causing a reduced effectiveness of sound absorption and non-closing doors.

ISO 23351-1:2020 Class	Speech level reduction (DS,A)	Speech privacy
A	30-33 decibels/dB*	
B	25-30 decibels/dB	
C	20-25 decibels/dB	Depends on background noise level in the office
D	15-20 decibels/dB	Depends on background noise level in the office
E	< 15 decibels/dB	



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