Where **office acoustics** are important, the acoustic design should be considered early in the design stage. Incorporating remedial measures is likely to be expensive and may not be practical if sufficient allowances have not been made.

However, as a starting point, this is a list of acoustic issues to consider with respect to office design.

**Room Fronts**

- **Sound insulation** across a wall containing a door will generally be poor, offering only at best a very basic level of acoustic privacy between the linked spaces. To avoid this by layout at design stage, consider carefully where meeting rooms, private offices etc will be positioned and avoid putting them in locations where this poor level of privacy could cause problems.

- To maximise the sound insulation of room fronts, use solid rather than glazed partitions and doors, and ensure doorsets are well sealed.

- An $R_w$ 45 dB wall (eg, 70mm stud, high density plasterboard, insulation in the cavity), and $R_w$ 35 dB doorset (55mm thick solid timber door, well sealed) would generally be expected to provide a basic level of privacy, assuming they are properly installed.

- For anything more than basic privacy, higher performance doors and partitions are required.

- Where privacy across room fronts is considered particularly important, the following measures can be considered:
  - Specialist doorsets
  - Back-to-back doors
  - Lobbied doorsets
  - “Protected” corridor access to meeting rooms
  - High acoustic performance double glazed fronts
  - Solid fronts
  - Layout such that sensitive receptor positions are well away from room front

- Glazed partitions do not perform as well as solid partitions. Higher performance glazed partitions are available, but are double-glazed and are often expensive.

- There is no benefit in enhancing the partition’s acoustic performance without also considering the doors.

- In critical applications, consider lobbied door entrances to meeting rooms/private offices. Back-to-back doors can also be considered. If this is done, partitions in excess of $R_w$ 45 dB should be specified.

- Any flanking noise paths will degrade the acoustic privacy that can be achieved. Flanking paths include:
  - Openings for ventilation
  - Penetrations through the wall (ductwork, sockets, switches, fixings for screens etc)
  - Profiles in the slab above
  - Partition intersections with mullions

- Conference calls are usually noisier than face to face meetings. If these rooms are to be used for conference calls, the sound insulation (including across the room front) becomes even more important.

**Cross Walls**

- A partition built from a raised access floor to the underside of a suspended ceiling will not usually achieve any acoustic privacy.

- A partition built from a raised access floor to the underside of a suspended ceiling can achieve a basic level of acoustic privacy between the two spaces if the partition is $R_w$ 48 dB (eg, 92mm stud, high density plasterboard, insulation in the cavity), void barriers are in place in the ceiling and floor voids, the ceiling is not continuous between the rooms, and achieves at least $D_{n,c,w}$ 35 dB (tends to be the more substantial tiles).
A partition built from a raised access floor to the underside of the slab above, can achieve a confidential level of acoustic privacy between the two spaces if the partition is $R_w$ 54 dB (eg, 70mm stud, 2 layers of high density plasterboard, insulation in the cavity, or twin/staggered stud systems), void barriers are in place in the floor voids and there is a ceiling installed.

The British Council of Offices provide guidance on the design of crosswalls in offices:

- Any flanking noise paths will degrade the acoustic privacy that can be achieved. Flanking paths include:
  - Openings for ventilation
  - Penetrations through the wall (ductwork, sockets, switches, fixings for screens etc)
  - Profiles in the slab above
  - Partition intersections with mullions

- Higher levels of acoustic insulation are often needed. For example:
  - The room is to be used for conference calls
  - The room anticipates heavy use for presentations that can include amplified audio
  - The room is to be used for particularly confidential meetings
  - Rooms used as studios, auditoria, screenings, gyms
  - The overall office environment is particularly quiet. For example, meetings rooms are centrally located on floors, or utilise chilled beam cooling systems.

- Higher levels can be achieved but require very careful consideration of the acoustic design.

- Foldable partitions are available with a range of acoustic performance $R_w$ 35-55 dB. This relates to laboratory tests. In general, such partitions will at best only achieve a basic level of acoustic privacy between the spaces they link, irrespective of the laboratory acoustic performance of the specified product.

- It is important to understand that acoustic performances specified in terms of $R_w$ are laboratory measured performances. This performance will not be achieved on site. The site performance is usually specified as $R_{w,1}$, $D_w$ or $D_{th,w}$. These parameters are not directly interchangeable. The relationship is complex, and depends on the quality of the installation and flanking details as well as the room geometry and the acoustic conditions in the room itself. If these parameters are part of a Specification or ERs, it is important that they are clearly understood.
Mechanical Services

- Noise from mechanical services is important, as it provides helpful sound masking which can help with improving privacy (see above).
- Fan Coil Unit systems are common, and must be carefully designed so that they are neither too noisy, nor too quiet. It is generally better to have larger oversized units working near the lower end of their range.
- The omission of ceilings can lead to higher noise levels from Fan Coil Units systems, as there is less control of noise breakout.
- Acoustic jackets and lagging may be required, particularly when there are no ceilings.
- Chilled Beam Systems are very quiet, which can cause problems with speech privacy.
- Chilled Beam Systems also commonly penetrate partitions. This significantly degrades the acoustic performance of the partition, even if the chilled beam is relatively well sealed.
- Any ductwork penetrations through partitions significantly degrades the overall acoustic performance of the partition. This is exaggerated when ceilings have been omitted, as the exposed penetration is directly open to the office space.
- Offices requiring a high level of privacy should have a dedicated ventilation system, with any unavoidable penetrations protected by a suitable detail, which could include a ceiling.
- Common ductwork with grilles between offices will lead to cross-talk, and attenuation (often significant) will be required if this cannot be avoided.

Room Acoustics

- The omission of sound absorption leads to highly reverberant spaces that get noisy, and can be distracting with a conversation or call at one end of an office more easily audible at the other end.
- All office spaces tend to benefit from a ceiling that utilises tiles that are Sound Absorption Class A.
- In an open plan office, if a ceiling is not being installed, sound absorption should be added in other ways. This could be hung baffles, rafts, cubes or spray finishes (direct to the soffit). A useful starting point is to try and provide an area equivalent to the floor area.
- Screening between workstations is also useful to improve privacy, and screening of other areas by the use of furniture as well as free standing absorbent screens should be considered.
- Localised absorptive wall panelling can be helpful too in critical areas, and is especially useful if the ceilings or soffit are high (>3m). Class A wall panels should be distributed evenly throughout the space. We can help you determine the quantity needed.
- Similarly, meeting rooms benefit from an absorptive ceiling, and usually require some sound absorbent wall panelling. If the room is to be used for conference calls, a large area of sound absorbent wall panelling may be needed, perhaps by creating a feature wall.
- Large meeting rooms (such as boardrooms) work better if the table and seats are arranged as an oval or circle rather than a rectangle. A low acoustically reflective ceiling (<3m) above the table helps intelligibility during a meeting, with substantial sound absorption through the use of wall panels, and in the ceiling borders.

For further information on how Spectrum can assist with your project, please visit [www.spectrumacoustic.com](http://www.spectrumacoustic.com), or alternatively contact us on 01767 318871 to discuss your requirements with one of our consultants.