

## 5 Room Acoustics

Room acoustics deals with the acoustical properties of an enclosed space when the sound source comes from within this enclosed space.

The indoor acoustic climate can be dramatically improved by maintaining suitable reverberation times and installing absorptive treatments.

It is likely that absorptive treatments will be needed for rooms with speech intelligibility requirements.

Care is needed for the implications that the absorptive treatments can have in relation to the infection control, their cleaning, the impact damage etc.

Install sound - absorbent treatment in all areas (including all corridors), except acoustically unimportant rooms e.g. storerooms. Sound absorbent materials should be installed with due consideration of the cleaning requirements, the infection control, patient safety, clinical and maintenance requirements. For example, some sound absorbing acoustic ceiling tiles are not suitable for wet areas, isolation areas or operating theatres. These are not permitted under Part C and D of these Guidelines. So more suitable alternatives should be identified, where necessary.

Typically, the allocation of the absorptive materials will be at the ceiling. However, absorptive floor finishes or wall panels can also be considered.

Acoustically absorbent materials should have a minimum absorption area equivalent to a Class C absorber (as defined in ISO 11654:1997) covering at least 80% of the area of the floor, in addition to the absorption that may be provided by the building materials normally used. If a Class A or B absorbent material is used, less surface area is needed. Refer to the following table with indicative absorptive class range:

Absorption class	Sound absorption coefficient					
	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
Class A	0.20	0.65	0.90	0.95	0.90	0.80
Class B	0.15	0.55	0.80	0.85	0.80	0.70
Class C	0.10	0.35	0.60	0.60	0.60	0.50

Table 4 – Typical sound absorption values / Class

For rooms requiring optimum acoustic conditions i.e. lecture theatres, specialist advice from an Acoustic Engineer should be sought.

Acoustic absorption is likely to be needed in large open spaces such as a large lecture hall, large waiting area or atrium space. Other similar areas include reception areas and cafeterias.

Appropriate reverberation time criteria, based on the specific requirements of the spaces needs to be agreed and incorporated into the design solutions.

In addition to the regular use of the space consider the absorption requirements when there is a need for public address and voice alarm systems.

Examples of absorptive materials can be the following:

- Acoustic ceiling tiles
- Perforated boards
- Acoustic panels on walls or ceilings
- Soft floor coverings
- Soft furnishings

Attention is required when selecting the products. It is necessary that they comply with other design requirements such as:

- Fire requirements- fire resisting materials may be required
- Infection control requirements- porous materials may not be permitted in some areas such as bathrooms, wet areas, operating theatres, laboratories and other clinical areas
- Ceiling access requirements- some engineering systems in the ceilings may require access for maintenance

## Part G: Acoustics

- Lighting requirements- the required level of lighting should not be compromised
- Moisture resistance- in wet areas the material must resist the penetration of moisture as this may promote the growth of mold
- Floor Cleaning and Maintenance- some floors must be impervious and easily cleaned using wet processes, implying a hard surface

Soft floor finishes such as carpet minimise noise generation and dampen the noise generated by other sources. Carpet use is effective in some corridor areas where a great deal of noise can be generated. However, care is needed since there is easy movement by trolleys, bed trolleys and wheelchairs are equally important. Also refer to Part C of these Guidelines for recommendations on the floor finishes. In many clinical and laboratory areas, carpet may not be used.

The typical uses of Carpet as a solution for sound absorption in healthcare settings include the following:

- Administration areas
- Education areas
- Lecture rooms and classrooms
- Public and visitor corridors
- Inpatient Unit corridors (but not the bedrooms or supporting rooms)
- Waiting areas

Cushioned vinyl is effective in terms of noise generation, however, it does not dampen other noises as effectively as carpet.

Hard surfaces such as ceramic tiles, stone, terrazzo, laminates or similar finishes generate noise from walking staff and visitors, impact such as dropped items and also reflect noise from other sources. These factors should be taken into consideration in the selection of the materials.

Where excessive amounts of hard surfaces are used in potentially noisy areas, mitigation strategies should be considered for the introduction of some acoustically absorbing materials elsewhere within the space.

### 5.1 Access Panels

In many areas access to the ceiling services or equipment pendants requires proprietary access panels. Install acoustically certified access panels to equal the acoustic performance of the element in which they are installed.

Access panels in ceilings over ensuite, bathrooms and risers containing waste pipes should have a minimum rating of  $R_w$  30. This requirement may be waived if the surrounding walls of the room are taken full height to meet the soffit of the floor above and are sealed.

Ideally access panels for waste piping shall not be located on the sides of risers containing waste pipes facing habitable rooms. However, if this is unavoidable, the minimum rating of such access panels should be  $R_w$  30.

Access panels below fan coil units (if any) should have the same surface density and acoustic properties as the ceiling in which they are installed.