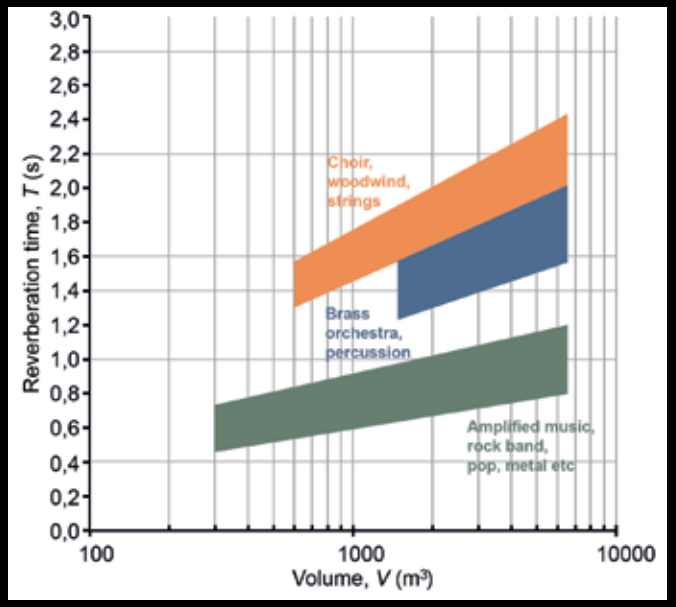


Ideal values of reverberation time for various types of music for a given size hall.

Reverberation Time - what is the optimum value?

For a given size venue it should be possible to lower the reverberation time by 50% in the crucial frequency bands in order for the hall to sound equally optimal whether for chamber music, a brass orchestra or a rock band. This is a fact and is stated by for instance the Norwegian standardization organization, Standard Norge, in NS 8178:2014.

This has only rarely been obtained before due to at least one of three reasons:

1. The reverberation time range has not been wide enough
2. The reverberation time has been modified at the incorrect frequencies (much more so at high requencies than at low)
3. Variable acoustics technologies are often challenging to incorporate into the interior design

The present technology makes up for all of these shortcomings.

The product complies with relevant building regulations.
The technology is patented.

Visit **www.flexac.com** for more information
Phone Flex Acoustics at +45 4088 3723

Flex Acoustics™

evoke

One hall - all music genres

The *evoke* variable acoustics system

With the brand new *evoke* technology from Flex Acoustics as of 2019, music halls can now present any style of music as well as theater and even cinema, with optimal acoustics and sound. The technology is not visible, but rather, embedded in the interior architecture.

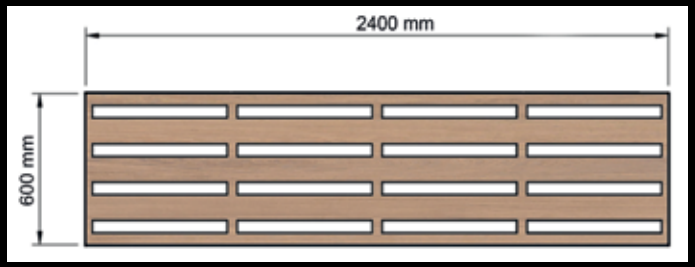
The technology consists of numerous modules mounted on ceiling and wall areas, in a large enough quantity to reach the acoustic variability desired. Each module measures 240 x 60 cm and can be mounted on both wall and ceiling surfaces. Various surface materials, such as wood, can then be mounted onto the modules.

The modules are either opened for the sound to be absorbed, or closed to reflect sound - with the flick of a switch. These modules, when in the open state, have a high absorption coefficient at lower frequencies but not at high. This has been proven to be essential for an ideal sound at for instance pop and rock concerts. When closed, the hall will present a long reverberation time essential for classical music genres.

Typically, a large share of the ceiling area must be covered as well as a portion of wall areas to optimize the hall for all genres of music. The modules are connected in a number of circuits, for instance three or four, as recommended by an acoustic consultant. Each preset corresponds to one specific musical genre. The venue program of an entire season can be pre-programmed into the *evoke* control unit to ensure the optimal preset for an ideal sound at every event.

Ventilation ducts, fire-sprinkler systems, lighting, etc. are hidden in the cavity behind the Flex Acoustics variable modules.

Four modules (240 x 60 cm) side by side. The *evoke* modules can be mounted both on wall and ceiling surfaces. Here the modules are seen in their closed state.



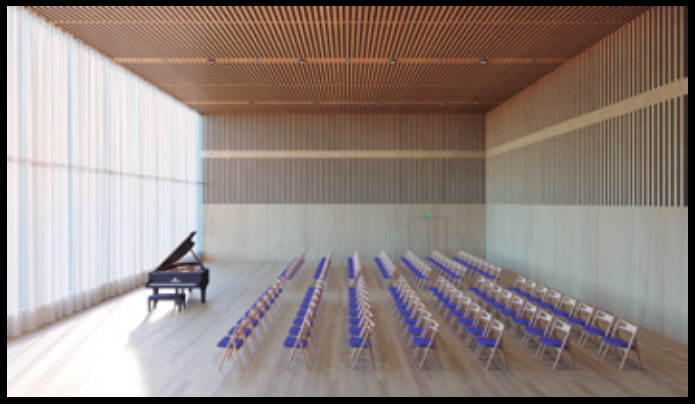
Surface panels of any finish can be mounted flush onto the variable steel modules. Hence the design possibilities for wall and ceiling are endless.

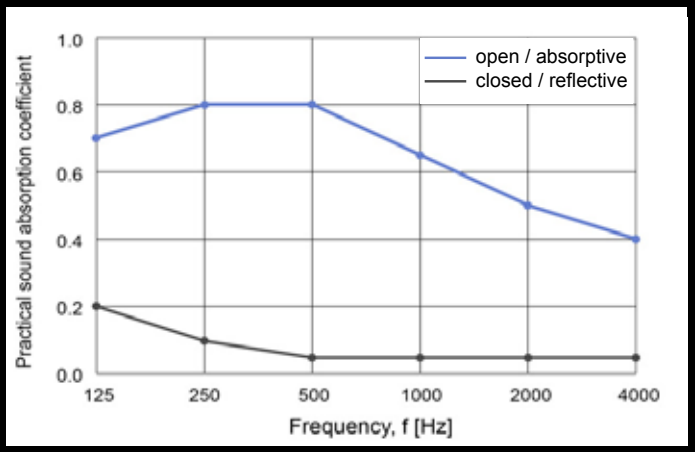
Choose any surface finish for the interior design

Surface panels with various finishes can be mounted flush onto the variable modules. The modules are thereby embedded in the interior architecture. The architect and the hall executives can thus decide which design finish they want in the hall. Panels can be laquered or have finishes of any type of wood. The surface panels are appropriately perforated in front of the opening parts of the variable modules and comply with normal building regulations.

The surface panels can attain various perforation patterns as suggested by an acoustician and an architect for a given project. They can also advise where to mount the variable *evoke* modules in order to achieve the variability sought after.

The hall can appear visually exactly the same regardless of which preset is chosen for a given musical setting. The variable modules themselves are painted in matte black or any other desired color and can be left without surface panels.





Certified measurements of absorption coefficients of the evoke modules (no front panels) in their opened and closed states. Full report available.

Certified measurements by Delta Acoustics, Denmark

- According to the test method EN ISO 354:2003
- 7 modules side by side - total surface area: 10,1 m2
- Total depth of construction: 400 mm
- Sound absorption material: 90 mm mineral wool with acoustic lining on both sides
- Air cavity behind mineral wool: approx. 200 mm
- The specimen was mounted as Type E-400 mounting on the concrete floor of the reverberation room
- Each panel measures 2400 x 600 mm and weighs 64 kg

With the 0,2 absorption coefficient at 125 Hz in the closed state the hall will be naturally tamed and will not need significant other permanent absorption at this frequency.

With air cavities greater than 200 mm, low frequency absorption can attain higher values than what is seen in the diagram above. Modules mounted in the ceiling would often have a 500 mm cavity or more. Acousticians can order other types and thicknesses of absorption material than used in the test and chose the depth of the air cavity.

The variable modules can be mounted in a zigzag pattern to obtain a better sound-diffused room and can be mounted horizontally.

Maintenance and warrantee: There is a 3 year warrantee on *evoke* modules. It is recommended that the owner create a maintenance budget and replace the motor on all panels every 10-15 years for a lifespan on the system of 40 years or more. The modules are otherwise maintenance free.