handed over by
Frenzelit GmbH • P.O. Box 11 40 • 95456 Bad Berneck • Germany
+49 9273 72 - 0 +49 9273 72 - 222 info@frenzelit.com www.frenzelit.com



# Technical Information

## Fabric Expansion Joints in facilities with acoustical requirements

### 1. General

Fabric expansion joints are mainly used to compensate movements of duct systems.

Consideration of acoustic criteria is not the primary task of a fabric expansion joint. Compared to the entire system, an expansion joint has a very small surface area and thus only a minor influence on the total sound emission.

If there are other acoustic requirements besides the avoidance of structure-borne sound transmission, additional measures may have to be taken.

### 2. Fundamental Research by the Fraunhofer Institute IBP

The Quality Association for Fabric Expansion Joints e.V. and the Fraunhofer Institute IBP with good reputation made research to evaluate acoustic solutions for expansion joints in exhaust gasflow of noisy aggregations (exhaust units).

The components of the fabric expansion joint that absorb the movement were measured. These flexible parts can consist of fabric layers, foils, elastomers, polymers, composite materials and mineral insulating materials.

These usually interrupt the structure-borne sound in the duct system and absorb the sound by dissipating the sound energy.

### 3. Test results of the IBP Institute

Using the latest measurement technology, the IBP acoustic laboratory tested fabric expansion joint solutions with varying layer structures and different insulations.

For the measurements, an emission source was used that approximates the sound spectrum of a gas turbine. The installation situation of the various fabric expansion joint solutions corresponds to the outlet of a gas turbine.

Depending on the material layer make up and the variation of the insulation it was prove that the fabric materials provide better acoustic insulation compared to the duct system. This starts already at a frequency of 200 Hz.

All measurements showed that the fabric expansion joint has no detectable effect on the entire noise emission of the installation compared to a duct with 6 mm wall thickness and the relevant surface exposed to noise.

The test results for a fabric expansion joint with selected insulation variants are shown schematically in the following diagram.

**Edited by the Quality Committee of the Quality Association for Fabric Expansion Joints**

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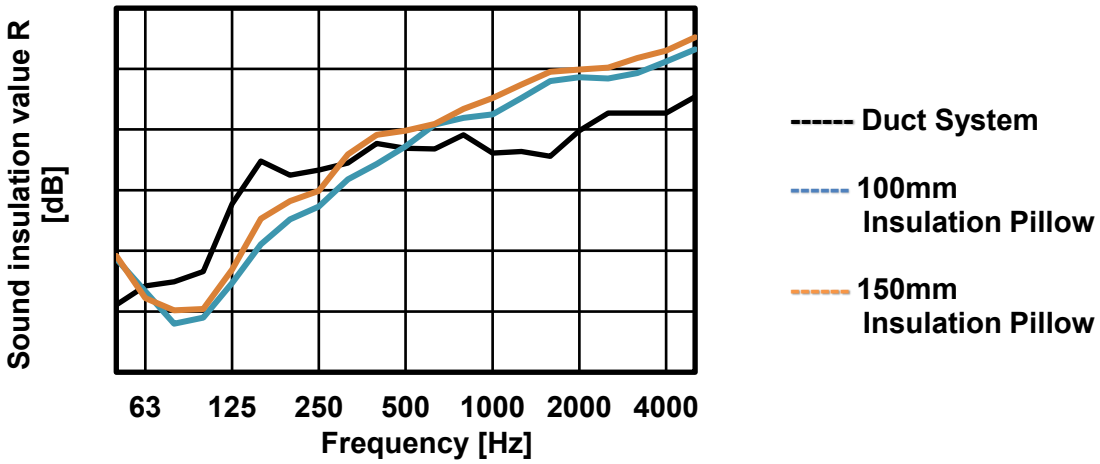


## 4. Acoustic measures

In general, materials with a greater weight per unit area, i.e. either higher density or greater wall thickness, increase the sound reduction index. However, adjustments in the expansion joint are only possible to a limited extent because they could limit the functional flexibility.

An additional effective acoustic measure is an insulating element arranged around the expansion joint as a complete insulating bonnet or, depending on the acoustic requirements, only as a partial insulating element. It should be noted that these acoustic insulation elements are arranged at a distance to ensure the required heat dissipation. Ideally, this is done by using an acoustic insulation. See also TI-011 "Insulation requirements for fabric expansion joints".

A singular consideration of the acoustic emission of fabric expansion joints is not targeted, as it can only be evaluated in connection with the entire emission of the plant.

## 5. Recommendation

Since the acoustic effect of a fabric expansion joint depends on many factors, we recommend involving a member of RAL-Quality Association for Fabric Expansion Joints in the early stages of system planning if the acoustic requirements are critical.

Member companies of the RAL Quality Association are able to develop an optimal solution.

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