FAQ - Frequently Asked Questions

FESI- Acoustic Commission

14.a Industrial Acoustic Pipe Insulation

Question:
What are the international standards and guidelines to determine the noise insulation system of pipes? And what is approximately the sound reduction which can be achieved?

Answer:
Standards to determine the noise insulation system of pipes:

- ISO 15665:2003. Acoustics – Acoustic Insulation for pipes valves and flanges
- Similar standards and guide lines:
  - NORSOK standard R-004 class 6,7 & 8,
  - ASTM E 1222.
  - CINI 9.2.02
  - Shell DEP 31.46.00.31

All the standards and test codes make a difference in acoustic performance by using classes of insulation. But in general 3 classes can be made: A, B, and C, see table 1.

Class	Thickness of poreus layer [mm]	Minimum mass per unit area of cladding [kg/m^2]	Examples of standard metal sheet
A	50	2	0,7 mm Aluminium
B	100	5	0,7 mm Steel
C	100	10	1,3 mm Steel

Table 1: General classes of acoustic pipe insulation

In Table 2 an (indicated) insertion loss is presented for the different classes as listed in Table 1. Acoustic insulation is most effective at higher frequencies.

Class	Minimum insertion loss [dB] Octave-band centre frequency [Hz]						
	125	250	500	1000	2000	4000	8000
A	- 4	- 2	5	10	15	20	25
B	- 8	- 1	10	20	25	30	35
C	- 5	10	15	25	30	35	40

Table 2: General indication of insertion loss of acoustic pipe insulation

Note: Acoustic insulation will reduce the noise radiated directly from the pipe but there is a counteracting effect: For radiation of any residual vibrations the insulation cladding has a larger area than the surface area of the bare pipe.
Furthermore the cladding may have a higher radiation efficiency than the pipe, at low frequencies. These effects are relatively more important on small diameter pipes and pose a limit to the applicability of the various classes of insulation.

By calculating the pipe insulation systems use the standards and guidelines as presented above.

Because the performance of Class C insulation is not adequate in every case, for exceptional cases a Class D has been added. For Class D an absorbent layer of porous material created by two times 50 mm of insulation with different compositions is applied. Between the two layers of insulation a heavy sealing partition jacket is foreseen. See the standards and guidelines for detailed information.