

Kaisound Semi-rigid FEF combines the Thermal and Accoustic Performance

Designed for all type of industrial pipelines, tanks, vessels, heavy equipments and particularly for cryogenic applications (LNG & LPG).

- Excellent Combination of the Thermal and Accoustic properties
- Robust and High Compression Strength Resistance
- Less space
- Reduce Corrosion under insulation (CUI)
- Prevent Condensation, Icing and Heat Loss
- Easy, quicker application
- Reduced maintenace costs
- Fully compatible with Metal jacket, Non-Metallic Jacket or GRP jacket

ISO 15665 is designed to enable noise control engineers to specify the correct type and thickness of insulation in order to achieve a specific noise level reduction. The standard uses A, B and C performance classification, where class A is the lowest performance classification and C is noted as the highest.

Table 1 shows the required insertion loss values required for a particular insulation system to comply with the classification criteria in each of the octave band centre frequencies. The classification is further split into pipe diameter, which takes the re-radiation effects of the pipe insulation into account.

Table 1 : Minimum insertion loss required for each class

Standart Industry Specification									
MINIMUM INSERTION LOSS REQUIRED FOR EACH CLASS, ISO 15665:2003									
Standart ISO 15665:2003			Frequency, Hz						
Class	Nominal Pipe Diameter D mm		125	250	500	1000	2000	4000	8000
	lower Limit	upper Limit	Minimum insertion loss, dB						
A1	<300		-4	-4	2	9	16	22	29
A2	≥300	<650	-4	-4	2	9	16	22	29
A3	>650		-4	2	7	13	19	24	30
B1	<300		-9	-3	3	11	19	27	35
B2	≥300	<650	-9	-3	6	15	24	33	42
B3	>650		-7	2	11	20	29	36	42
C1	<300		-5	-1	11	23	34	38	42
C2	≥300	<650	-7	4	14	24	34	38	42
C3	>650		3	9	18	25	33	40	40
D2	≥300	<650	-3	4	15	36	45	45	45
D3	>650		3	9	26	36	45	40	40

Kaisound Industrial Acoustic and Thermal Insulation Systems

Specification and Class by ISO15665 standard

KAISOUND CLASS A2 and B2 / required thickness : 61.5mm

Benefits: excellent noise reduction, space efficiency; robust; long-term integrity.

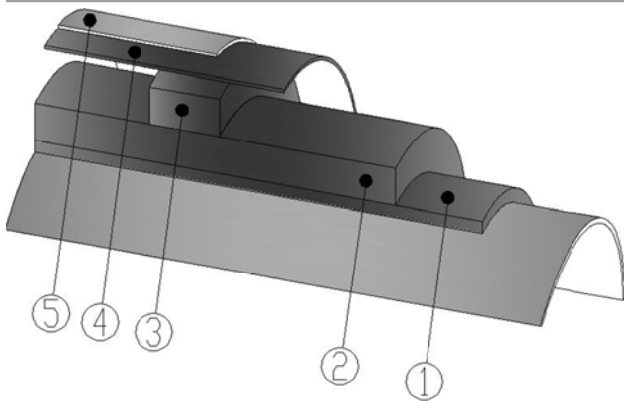
The systems combine the fire resistant Metal jacket with CUI-reducing closed cell insulation R-force (Semi-rigide FEF). These Class A, B acoustic systems are suitable for operating temperatures between -200°C to +105°C.

Materials:

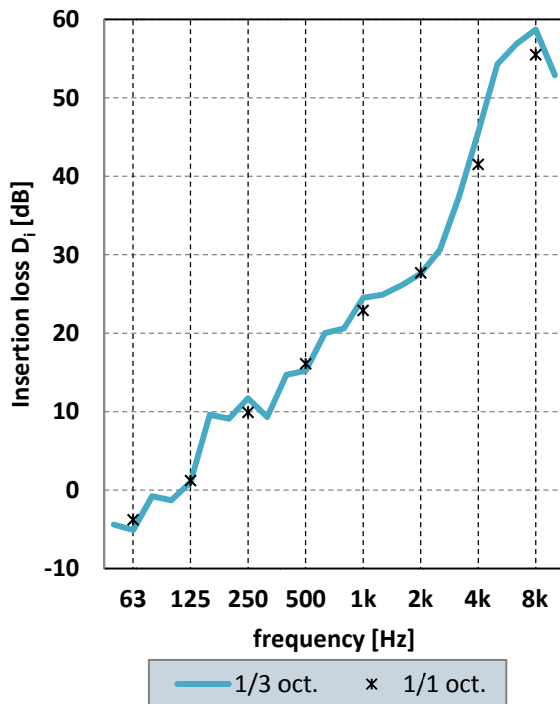
R-force SERIEF & FEF is the semi-rigid « closed cells » elastomer combining the excellent thermal performances (low thermal conductivity) and natural water vapour barrier. It is effective acoustic decoupling with the high mechanical strength (compression resistance >50kPA).

Terodemfoil is an excellent sound dumping material.

Metal jacket is a traditional sheet metal cladding system fabricated from hot-dip galvanized steel sheets, aluminium sheets or stainless austenitic steel. Metal cladding provides the excellent fire and mechanical resistance



- ① Kaiflex R-FORCE HF (8 mm) - (HRF-8)
- ② Kaiflex R-FORCE plus (25 mm) - (RF-25)
- ③ Kaiflex R-FORCE AG (25 mm) - (AG-25)
- ④ Terodemfoil (2.5 mm) - (ADF-2)
- ⑤ Aluminium-Zinc-Sheet (1 mm) - (AZ-1)



volume: 214m³ measured at: Peutz
 bandwidth: 1/3 octave Laboratory for Acoustics
 Class (ISO 15665): A2,B2

Insertion loss	frequency [Hz]							
	63	125	250	500	1k	2k	4k	8k
1/3 oct. dB	-4,4	-1,3	9,1	14,7	20,6	26,1	37,4	56,9
1/1 oct dB.	-3,8	1,2	9,9	16,1	22,9	27,7	41,5	>55,5

Kaisound Industrial Acoustic and Thermal Insulation Systems

Specification and Class by ISO15665 standard

KAISOUND CLASS C2 / required thickness : 90.5mm

Benefits: excellent noise reduction, space efficiency; robust; long-term integrity.

This system combines the mechanical strong and fire resistant Metal jacket with CUI-reducing closed cell insulation R-force Semi-rigid Elastomer, the mass vibration damping layers. This Class C acoustic system is suitable for operating temperatures between -200°C to +105°C.

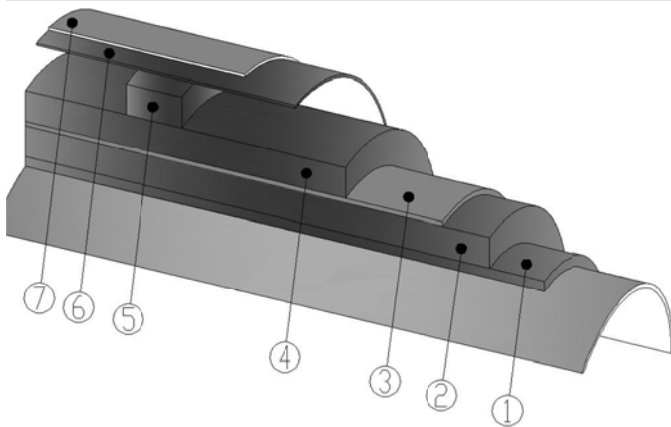
Materials :

R-force SERIEF & FEF is the semi-rigid « closed cells » elastomer combining the excellent thermal performances (low thermal conductivity) and natural water vapour barrier. It is effective acoustic decoupling with the high mechanical strength (compression resistance **>50kPA**).

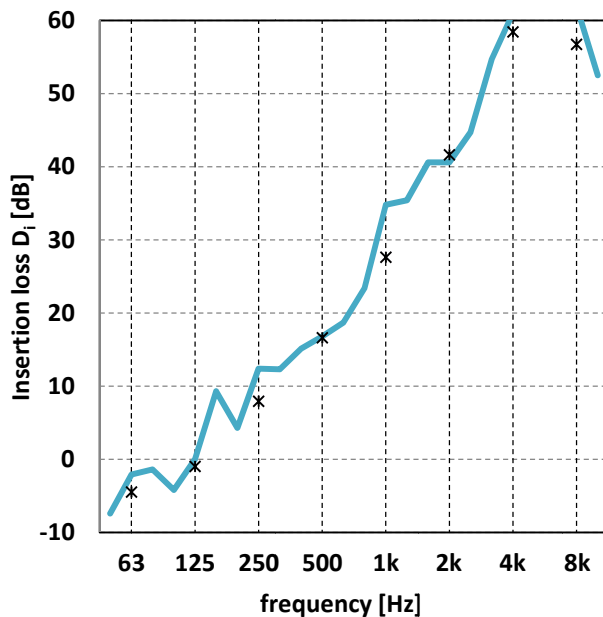
Kaisound SB is a vinyl sound barrier mat loaded with naturally occurring materials. It greatly reduces the transmission of air-borne sound and enhancing the insertion loss performance of pipe insulation.

Terodemfoil is an excellent sound dumping material.

Metal jacket is a traditional sheet metal cladding system fabricated from hot-dip galvanized steel sheets, aluminium sheets or stainless austenitic steel. Metal cladding provides the excellent fire and mechanical resistance



- ① Kaiflex R-FORCE HF (8 mm) - (HRF-8)
- ② Kaiflex R-FORCEplus (25 mm) - (RF-25)
- ③ Kaisound SB (4 mm) - (SB-4)
- ④ Kaiflex R-FORCEplus (25 mm) - (RF-25)
- ⑤ Kaiflex R-FORCE AG (25 mm) - (AG-25)
- ⑥ Terodemfoil (2.5 mm) - (ADF-2)
- ⑦ Aluminium-Zinc-Sheet (1 mm) - (AZ-1)



volume: 214m³ measured at: Peutz
 bandwidth: 1/3 octave Laboratory for Acoustics
 Class (ISO 15665): A2,B2,C2

Insertion loss	frequency [Hz]							
	63	125	250	500	1k	2k	4k	8k
1/3 oct. dB	-7,4	-4,2	4,3	15,1	23,4	40,6	54,7	>66,7
	-2,1	0,0	12,4	16,8	34,8	40,6	>61,0	>62,0
	-1,4	9,3	12,3	18,7	35,4	44,7	>68,8	>52,5
1/1 oct dB.	-4,5	-1,0	7,9	16,6	27,6	41,6	>58,4	>56,7

KAISOUND CLASS D2 / required thickness : 159.5 mm

Benefits: excellent noise reduction, space efficiency; robust; long-term integrity.

This system combines the fire resistant Metal jacket with CUI-reducing closed cell insulation R-force Semi-rigide Elastomer, the sound absorbing open cell and mass vibration damping layers. This Class D acoustic system is suitable for operating temperatures between -200°C to +105°C.

Materials :

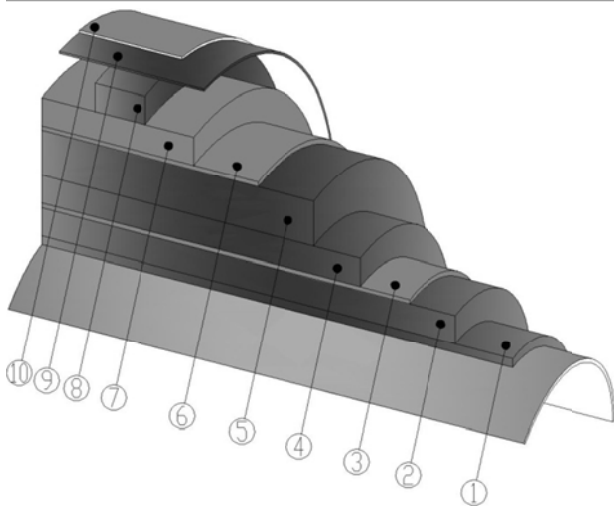
R-force SERIEF & FEF is the semi-rigid « closed cells » elastomer combining the excellent thermal performances (low thermal conductivity) and natural water vapour barrier. It is effective acoustic decoupling with the high mechanical strength (compression resistance >50kPA).

Kaisound SB is a vinyl sound barrier mat loaded with naturally occurring materials. It greatly reduces the transmission of air-borne sound and enhancing the insertion loss performance of pipe insulation.

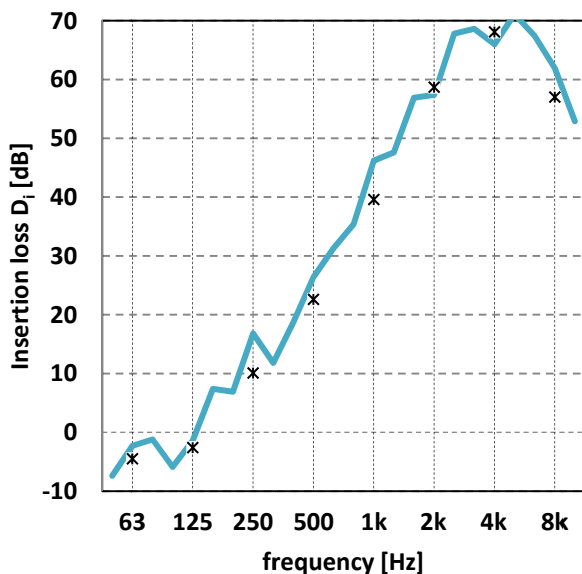
Kaisound 240 is the flexible « open cells » high density elastomer. It is a visco-thermal absorption layer across the entire frequencies range (Hz). It is also an excellent airborne noise barrier.

Terodemfoil is an excellent sound dumping material.

Metal jacket is a traditional sheet metal cladding system fabricated from hot-dip galvanized steel sheets, aluminium sheets or stainless austenitic steel. Metal cladding provides the excellent fire and mechanical resistance



- ① Kaiflex R-FORCE HF (8 mm) - (HRF-8)
- ② Kaiflex R-FORCEplus (25 mm) - (RF-25)
- ③ Kaisound SB (4 mm) - (SB-4)
- ④ Kaiflex R-FORCEplus (25 mm) - (RF-25)
- ⑤ Kaiflex R-FORCEplus (40 mm) - (RF-40)
- ⑥ Kaisound SB (4 mm) - (SB-4)
- ⑦ Kaisound 240 (25mm) - (SO-25)
- ⑧ Kaiflex R-FORCE AG (25 mm) - (AG-25)
- ⑨ Terodemfoil (2.5 mm) - (ADF-2)
- ⑩ Aluminium-Zinc-Sheet (1 mm) - (AZ-1)



volume: 214m³ measured at: Peutz
 bandwidth: 1/3 octave Laboratory for Acoustics
 Class (ISO 15665): A2,B2,C2 Class D2 (Shell DEP)

Insertion loss	frequency [Hz]							
	63	125	250	500	1k	2k	4k	8k
1/3 oct. dB	-7,4	-5,9	6,9	18,7	35,4	56,9	>68,6	>67,4
	-2,3	-1,4	16,8	26,4	46,2	57,4	>66,0	>61,9
	-1,2	7,4	11,8	31,3	47,6	>67,8	>71,1	>52,9
1/1 oct dB.	-4,5	-2,6	10,1	22,6	39,6	>58,7	>68,1	>57,0

— 1/3 oct. x 1/1 oct.