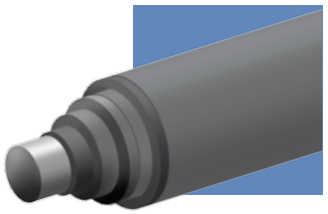
January 2013

K-FLEX K-FONIK INDUSTRIAL

Sound & Thermal Insulation design compliant with ISO 15665



L'ISOLANTE K-FLEX
A NEW GENERATION OF INSULATION MATERIALS

www.kflexenergy.com

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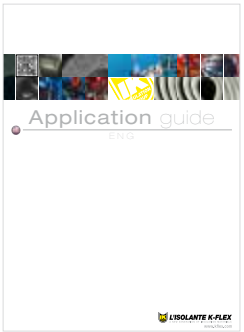
NB: FOR INSTALLATION OF THE K-FLEX K-FONIK INDUSTRIAL SYSTEM PLEASE REFER TO THE K-FLEX INSTALLATION GUIDE AND TO THE K-FLEX IN CLAD INSTALLATION MANUAL TOGETHER WITH THE SPECIFIC INSTRUCTIONS GIVEN IN THIS MANUAL.

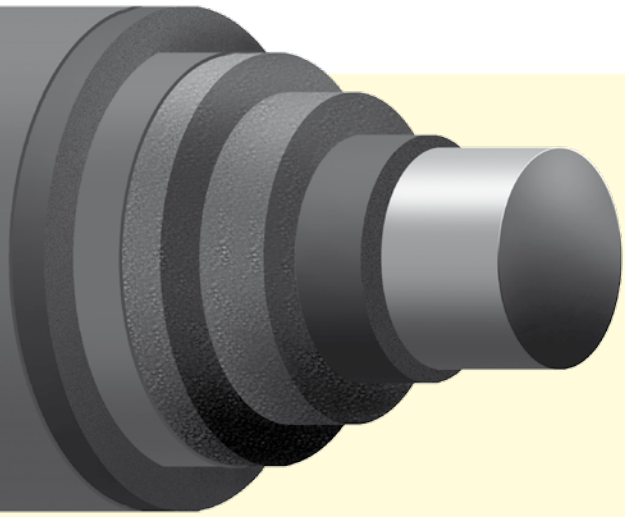
INSTALLATION MANUAL IN CLAD SYSTEM
IN CLAD SYSTEM Technical guide:
elastomeric foam and cladding.



APPLICATION MANUAL
FEF insulating materials
applicaiton manual

You can download
the documentation at:
www.kflexenergy.com

Introduction:
STANDARD FOR **INDUSTRY ISO15665**

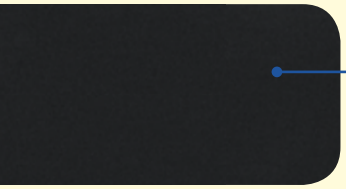


What is ISO 15665?

ISO 15665:2003 defines the acoustic performance of three classes (A, B and C) of pipe insulation. It is applicable to the acoustic insulation of cylindrical steel pipes and to their piping components. It is valid for pipes up to 1 m in diameter and a minimum wall thickness of 4,2 mm for diameters below 300 mm, and 6,3 mm for diameters from 300 mm and above.
ISO 15665:2003 covers both design and installation aspects of acoustic insulation and provides guidance to assist noise control engineers in determining the required class and extent of insulation needed for a particular application. It gives typical examples of construction methods, but the examples are for information only and not meant to be prescriptive.

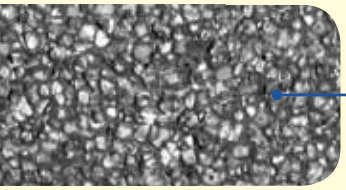
How does a multilayer acoustic configuration work?

In a correct sound insulation design for industrial application, the configuration must comprise three different mechanisms: sound barrier, decoupling and absorption/ dissipation. This is the reason why we need a multilayer configuration, with different materials for specific purposes.



MASS BARRIER high density material with sound insulation effect and improved transmission loss. K-FLEX **K-FONIK GK**, K-FLEX **K-FONIK GV**, K-FLEX **IN CLAD JACKETING**.

ABSORPTION/DISSIPATION open cell foam with sound absorption high properties. K-FLEX **K-FONIK OPEN CELL 240**.



MECHANICAL DECOUPLING flexible closed cell foam. K-FLEX **ST**, K-FLEX **ECO**, K-FLEX **HT (EPDM** FOAM**)**.

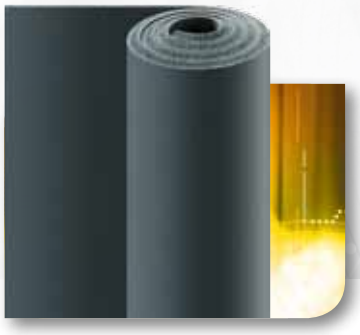
Flexible Elastomeric Foam Layer

K-FLEX ST

Elastomeric insulation for all applications, both civil and industrial. Designed for the insulation of large surfaces. **K-FLEX ST** is ideal for the insulation of large diameter ducts and pipes. By reducing the number of sections required they simplify installation, saving on time and labour costs.

K-FLEX ECO

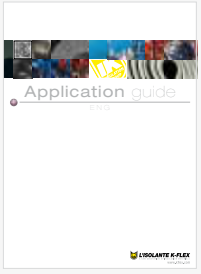
This green elastomeric insulation material is formulated and produced without using halogens. Thanks to its composition, any fumes given off during a fire are transparent and non-toxic to anyone in the vicinity. Approval and certification of product values are part of the company's strategy aimed at optimizing and continuously improving basic requirements. This policy was rigorously applied to the manufacturing of **K-FLEX ECO**, making it an extremely interesting, effective and safe insulation product.



K-FLEX HT

Elastomeric Insulation EPDM based, the rational and convenient solution for industrial.

REFERENCE

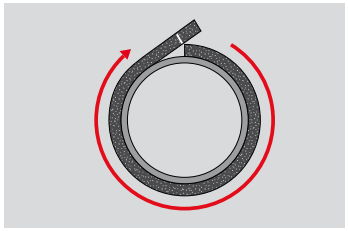


FEF (pipes, elbows, "T" Fittings, Valves, Flanges) should always be installed according to the *K-FLEX Application Manual* more information at www.kflex.com

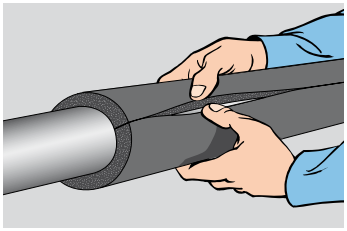
Flexible Elastomeric Foam Layer

INSULATING PIPING WITH K-FLEX SHEETS

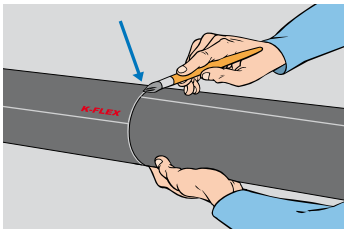
> FIRST LAYER



Wrap a strip of K-FLEX of the same thickness as that to be used around the pipe to be insulated and measure the exact length required.

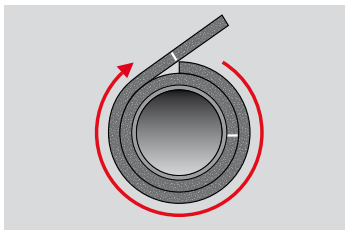


Wrap the insulation sheet around the pipe and press the glued edges together starting at the ends, then the center and then working along the rest of the length.

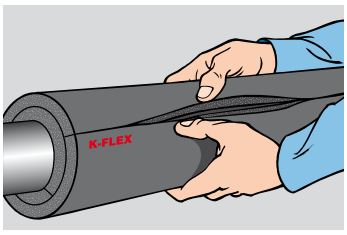


Glue the insulating sheeting to the subsequent sections along the length of the pipe.

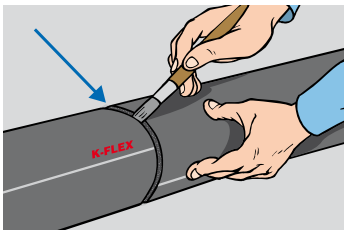
> OTHER LAYERS



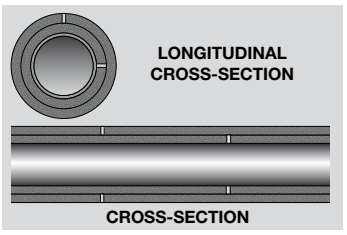
Measure the overall diameter with the first sheet in place.



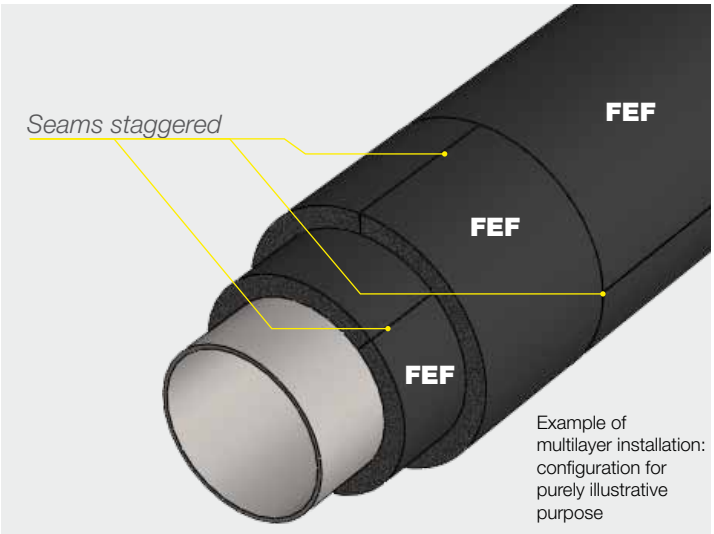
Wrap the insulation sheet around the tubing, ensuring that the seam does not overlap that of the underlying insulation.



Adjacent sections of insulation should be glued at their respective ends.



When installing the second layer, make sure that the seams do not overlap those underneath (see diagram). This ensures that, when the plant is operational, maximum insulating properties are maintained as the materials expand or contract.



Example of multilayer installation: configuration for purely illustrative purpose

NB:

> Recommended glue: K-FLEX K-414 or K-FLEX K-420, over 100°C use K-FLEX K-425 HT for high temperature

> No Overlap

> Adjacent sections of insulation should be glued at their respective ends.

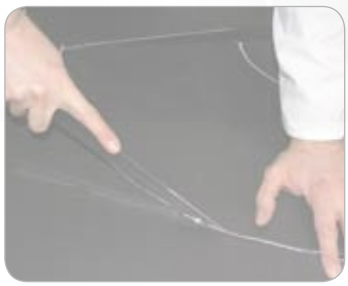
> Thoroughly degrease the surface to be insulated with the producer's specified thinners

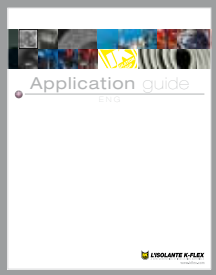
Flexible Elastomeric Foam Layer

ELBOWS and "T" PIECES

SPECIAL PARTS

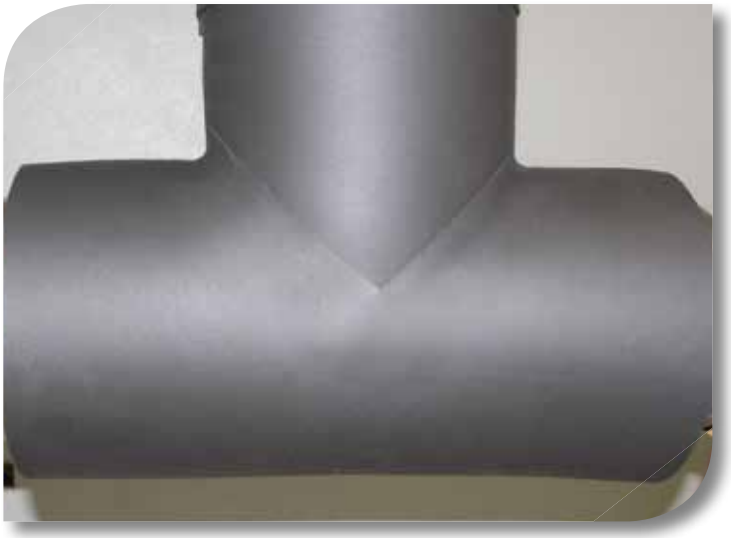
For all layers of insulation, the FITTINGS (VALVES, FLANGES etc) must be sized, shaped and assembled, glued together, as indicated in the installation manual.





REFERENCE

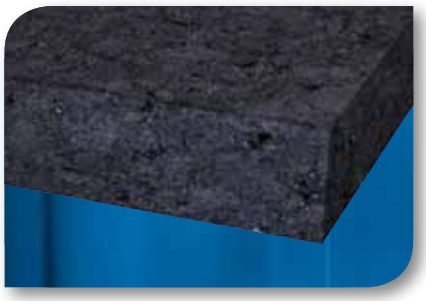
FEF (pipes, elbows, "T" Fittings, Valves, Flanges) should always be installed according to the *K-Flex Application Manual* more information at www.kflex.com



K-FLEX K-FONIK **OPEN CELL 240**

ABSORPTION and **DISSIPATION LAYER**

Installation: K-FLEX K-FONIK **OPEN CELL 240**



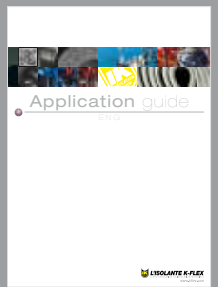
When installing **K-FLEX K-FONIK OPEN CELL 240** please use the same process as for FEF closed cell sheets. The instructions in the **K-FLEX INSTALLATION MANUAL** should therefore be referred to for each stage of the installation, including sizing, cutting and gluing of both the straight sections and any special items such as elbows, fittings, valves, flanges, etc.

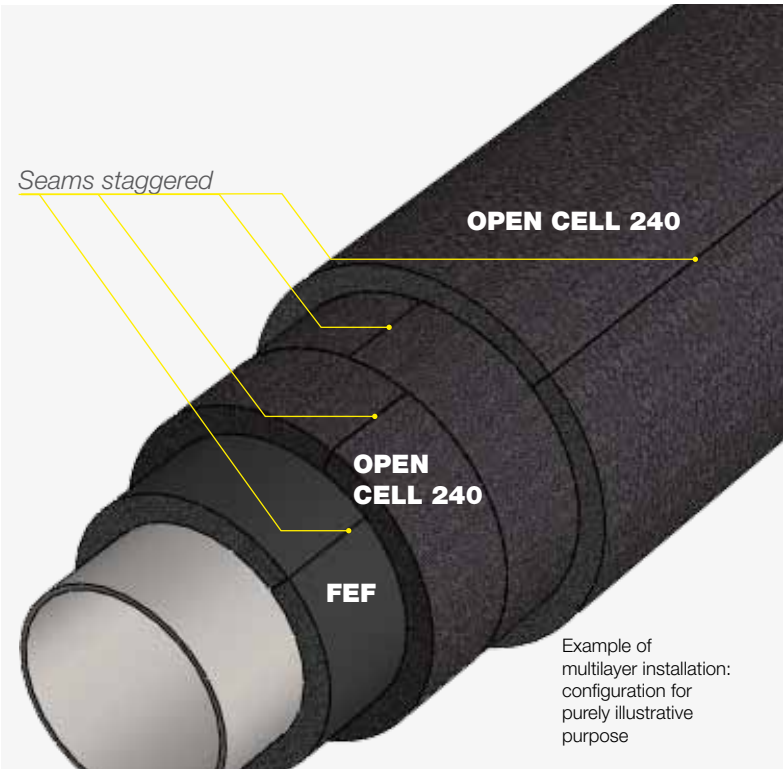
NB:

- Recommended glue: K-FLEX K-414 or K-FLEX K-420, over 100°C use K-FLEX K-425 HT for high temperature
- No Overlap
- Adjacent sections of insulation should be glued at their respective ends.

REFERENCE

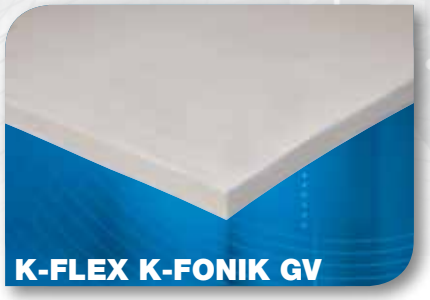
K-FLEX OPEN CELL 240 (pipes, elbows, "T" Fittings, Valves, Flanges) should always be installed according to the *K-Flex Application Manual* more information at www.kflex.com





Example of multilayer installation: configuration for purely illustrative purpose

K-FLEX K-FONIK **GK** or **GV (mass barrier)**



HIGH-DENSITY ELASTOMERIC ACOUSTIC INSULATING PANEL, AVAILABLE PRE-CUT TO SIZE FOR OEM AND **INDUSTRIAL APPLICATIONS.**

K-FLEX K-FONIK GK is a viscoelastic acoustic insulation product made with partially reticulated polymers. Its special sound insulation characteristics make this an excellent product for traditional applications in the construction sector, eg. acoustic insulation of brick walls and plasterboards and for O. E. M. application.

K-FLEX K-FONIK GV is a viscoelastic acoustic insulation product made with partially reticulated polymers and fire-proof mineral fillers. Its special sound insulation characteristics make this product an excellent solution for the shipbuilding and railway sectors.

NB:

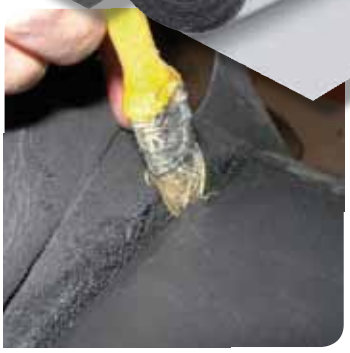
To install the acoustic material where required, please use the correct procedure as follows:

1. The acoustic barrier shall be secured tightly around the whole of the insulated equipment using stainless steel bands, 20 mm wide x 0.50 mm thick secured with a suitable buckle type fixing. Each one metre length of installation requires a minimum of 3 steel bands.
2. All fabricated items shall, where applicable, have a minimum 50 mm overlap on all seams and joints.
   Before securing the stainless steel bands, it is important to apply K-FLEX K-420 or KFLEX K-414 adhesive with a brush onto both surfaces of the overlap area.

Example of multilayer installation: configuration for purely illustrative purpose

K-FLEX IN CLAD **JACKETING**

FLEXIBLE POLYMERIC COVERING OF 1 MM IN THICKNESS. K-FLEX IN CLAD GIVES LONG LASTING PROTECTION AGAINST AGGRESSIVE MARINE ENVIRONMENTS AND IS UV AND VAPOUR RESISTANT.



1. PREPARATION OF IN CLAD JACKETING

> From a roll of K-FLEX IN CLAD, cut a sheet with the same width as the circumference of the insulated tube, adding an excess of roughly 50 mm for the longitudinal overlap.

2. INSTALLATION

> Apply a layer of K-FLEX K-420 glue along the section of the tube to be covered with K-FLEX IN CLAD.

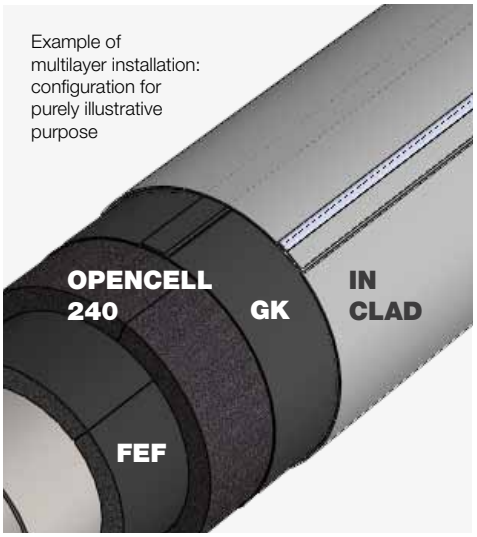
> Position the K-FLEX IN CLAD on the area where the glue has been applied and from that point wrap the K-FLEX IN CLAD sheet around the whole section.

> Securely press down the K-FLEX IN CLAD covering along the whole circumference, in order to obtain a tightly fitting cover.

> With a brush, apply K-FLEX K-420 adhesive on both ends in order to obtain a perfect seal against water between the covering and the insulation material. NB: Take care to stagger the edges of the insulation and the the edges of K-FLEX IN CLAD to avoid continuity with the underlying. Each sheet of K-FLEX IN CLAD should be positioned in such a way as to overlap the next sheet by at least 50 mm.
Use K-FLEX K-420 on both the longitudinal and transverse overlaps.

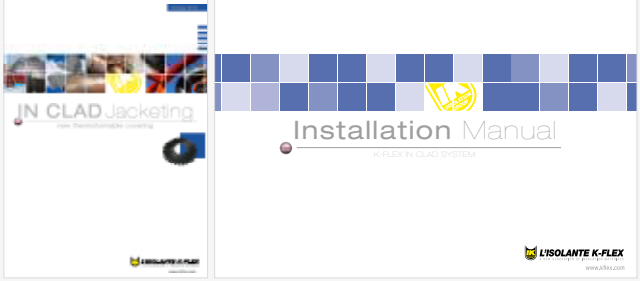
3. APPLYING MARINE SEALANT

> Apply a 10 mm width and 4 mm thick layer of marine sealant K-FLEX K-Mastic 55 on both sides of all the joints. edge.



Example of multilayer installation: configuration for purely illustrative purpose

REFERENCES!



IN CLAD Jacketing should always be installed according to the
K-FLEX IN CLAD Application Manual or
K-FLEX IN CLAD JACKETING Application Manual
more information at www.kflex.com

PIPE SUPPORTS AND ACOUSTIC/THERMAL BRIDGES

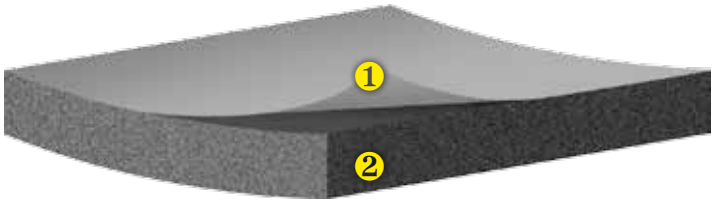
PIPE SUPPORTS AND STEEL INSTALLATIONS

1. WHERE THERE ARE SPACE RESTRICTIONS AND IT IS NOT POSSIBLE TO FULLY INSULATE PIPE SUPPORTS AND STEEL INSTALLATIONS TO THE CORRECT SPECIFIED THICKNESS, THE INSULATION LAYER MUST BE TRIMMED CLOSELY AROUND THE STEEL SUPPORT LEAVING NO GAPS.
2. ALL CUT-AWAY AREAS MUST BE SEALED WITH THE APPROPRIATE K-FLEX ADHESIVE AND K-MASTIC TO PROTECT THEM FROM THE ENVIRONMENT AND MAINTAIN MAXIMUM INSULATION.

3. ALL STEEL WORK CONNECTED DIRECTLY TO THE MAIN INSTALLATION MUST BE INSULATED TO THE SAME THICKNESS AND COMBINATION OF INSULATION MATERIALS SO AS TO AVOID ACOUSTIC BRIDGING AND MAINTAIN OPTIMUM PERFORMANCE.

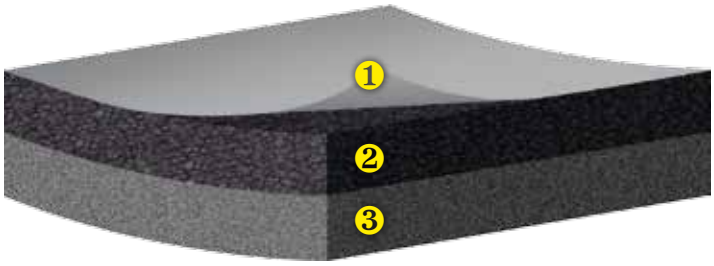
K-FLEX ACOUSTICAL CONFIGURATIONS FOR ISO 15665 CLASSES

K-FLEX K-FONIK INDUSTRIAL "A2"



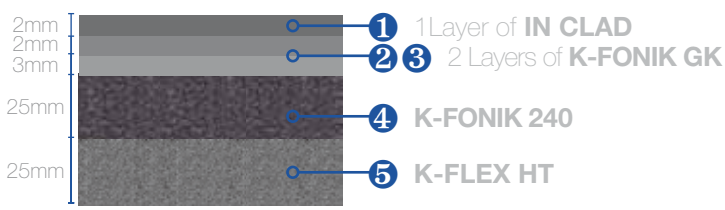
Test Result Class A2 nom. pipe-Ø: ≥ 300mm to < 650 mm	Weight:	Octave band centre frequency, Hz						
		125	250	500	1000	2000	4000	8000
1 Layer K-FLEX HT, 1 Layer K-FLEX IN CLAD	5 Kg/m²	4,5	1	7	12,5	20	31,5	40

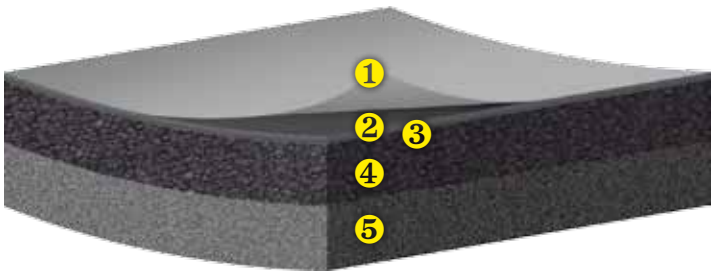
K-FLEX K-FONIK INDUSTRIAL "B2"



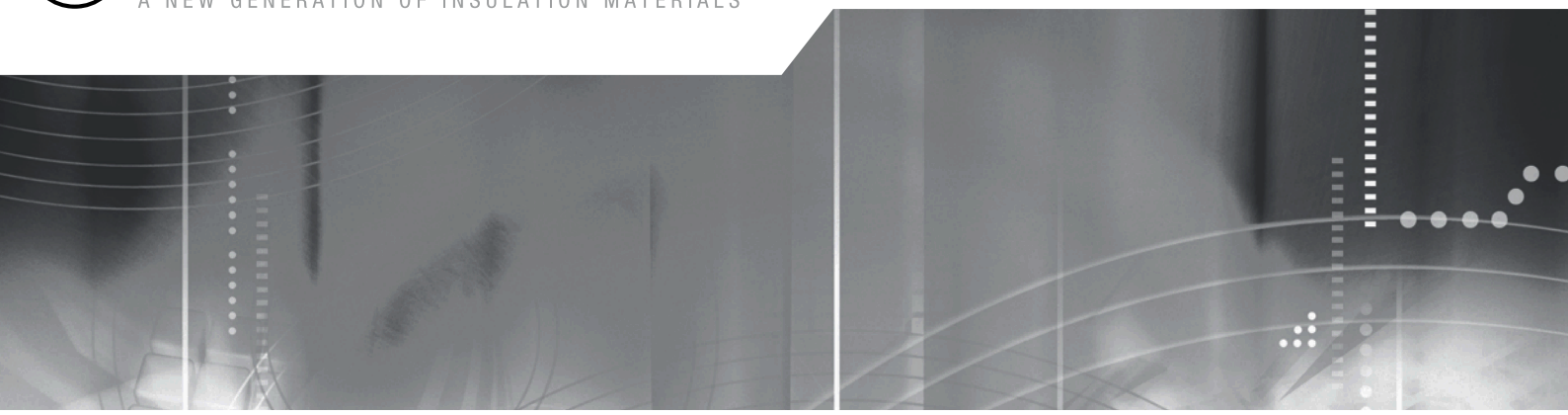
Test Result Class B2 nom. pipe-Ø: ≥ 300mm to < 650 mm	Weight	Octave band centre frequency, Hz						
		125	250	500	1000	2000	4000	8000
1 Layer K-FLEX HT, 1 Layer K-FLEX K-FONIK 240, 1 Layer K-FLEX IN CLAD	12 Kg/m²	4	2	14	22	34	44,5	50,5

K-FLEX K-FONIK INDUSTRIAL "C2"

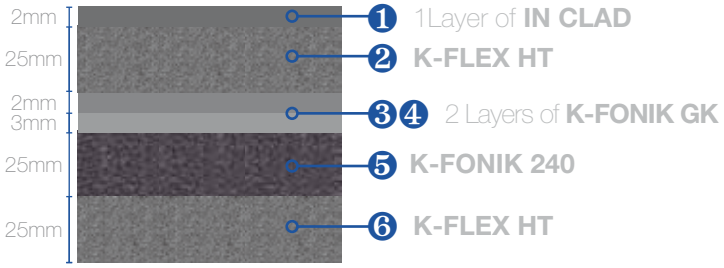


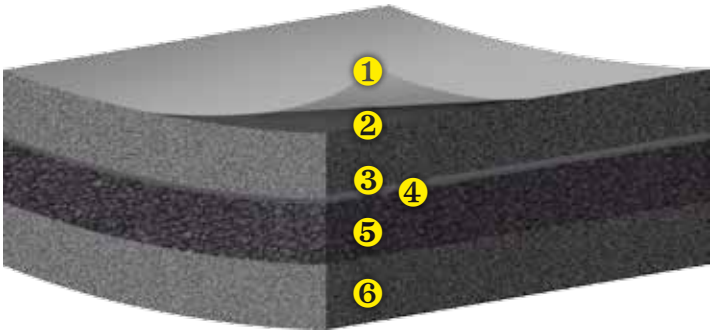


Test Result Class C2 nom. pipe-Ø: ≥ 300mm to < 650 mm	Weight	Octave band centre frequency, Hz						
		125	250	500	1000	2000	4000	8000
1 Layer K-FLEX HT, 1 Layer K-FLEX K-FONIK 240, 2 Layers K-FLEX K-FONIK GK, 1 Layer K-FLEX IN CLAD	25 Kg/m²	5	4,5	15,5	24	40	53,5	54,5



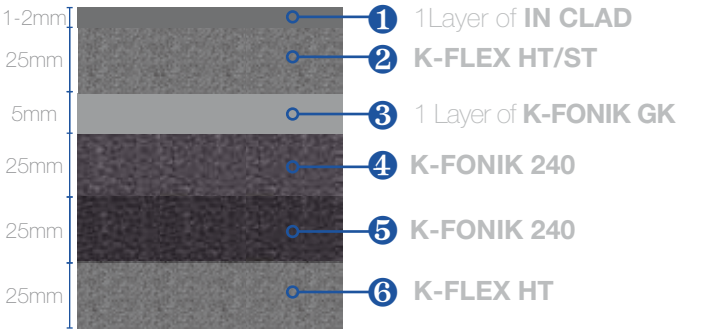
K-FLEX K-FONIK INDUSTRIAL "C2"

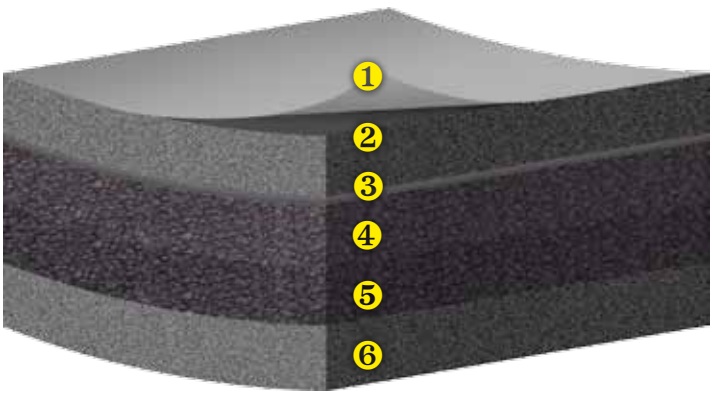




Test Result Class C2 nom. pipe-Ø: ≥ 300mm to < 650 mm	Weight	Octave band centre frequency, Hz						
		125	250	500	1000	2000	4000	8000
1 Layer K-FLEX HT, 1 Layer K-FLEX K-FONIK 240, 2 Layers K-FLEX K-FONIK GK, 1 Layer K-FLEX HT, 1 Layer K-FLEX IN CLAD	27 Kg/m²	4,5	4,5	17	30	46,5	52,5	54,5

K-FLEX K-FONIK INDUSTRIAL "D2"





Test Result Class D2 - SHELL nom. pipe-Ø: ≥ 300mm to < 650 mm	Weight	Octave band centre frequency, Hz						
		125	250	500	1000	2000	4000	8000
1 Layer K-FLEX HT, 2 Layers K-FLEX K-FONIK 240, 1 Layer K-FLEX K-FONIK GK, 1 Layer K-FLEX ST, 1 Layer K-FLEX IN CLAD (2mm)	29 Kg/m²	0	8,5	24,5	38,5	52	55	49
1 Layer K-FLEX HT, 2 Layers K-FLEX K-FONIK 240, 1 Layer K-FLEX K-FONIK GK, 1 Layer K-FLEX ST, 1 Layer K-FLEX IN CLAD (1mm)	28 Kg/m²	-1	6,5	20,5	37	52	55,5	49
1 Layer K-FLEX HT, 2 Layers K-FLEX K-FONIK 240, 1 Layer K-FLEX K-FONIK GK, 1 Layer K-FLEX HT, 1 Layer K-FLEX IN CLAD (2mm)	30 Kg/m²	-1	8,5	20	36	51	56	50,5

EXAMPLES:

K-FLEX K-FONIK

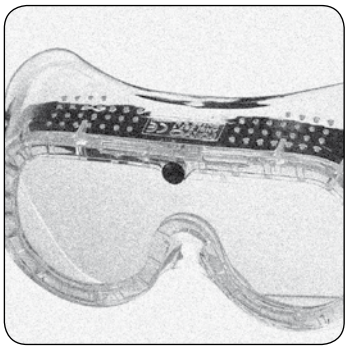
OPEN CELL 240

Example of multilayer installation: configuration for purely illustrative purpose

HEALTH, SAFETY AND MATERIAL STORAGE

GLOVES

GOGGLES



HELMET

GENERAL RECOMMENDATIONS

> Always use Personal Protection Equipment
> Follow manufacturer's recommended guidelines
> Please observe all the installation site safety recomandations

All technical documentation in electronic format can be found at the L'ISOLANTE K-FLEX website in our online data-base* at: *www.kflex.com,* by clicking on the voice "Download area" in the menu.

It is necessary to register on the "Download area**" page to receive your password. This will allow you to enter into our on-line database*

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Industrial

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