



**ArmaSound®**  
**Industrial Systems (EL/MC)**

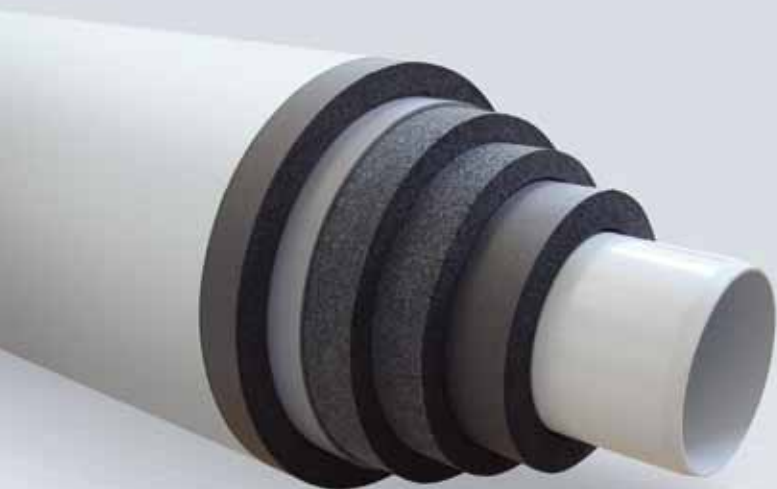
▶ **ArmaSound® Industrial Systems**

**THE FIRST SOUND CONTROL SYSTEMS TO MINIMISE  
THE RISK OF UNDER INSULATION CORROSION**

**ARMASOUND INDUSTRIAL SYSTEMS – Combining thermal insulation and noise reduction**



## The First Sound Control Systems to Minimise the Risk of Under Insulation Corrosion



### Your benefit:

Combining thermal insulation and noise reduction, ArmaSound Industrial Systems are the latest development for Marine, Offshore and Industrial environments.

The sandwich system of Armaflex, ArmSound RD 240 and Arma-Chek R or metal jacketing coverings provides significant noise reduction for all pipe work typically used by these industries.

- ▶ Combined thermal and acoustic properties
- ▶ The “built-in water-vapour-barrier” provides continuous long-term thermal efficiency
- ▶ Prevents condensation by using closed cell technology
- ▶ No galvanic corrosion
- ▶ Reduces Health and Safety risks
- ▶ Resists UV, oil, chemical and weather attacks
- ▶ Significantly reduced insulation thickness and overall system weight
- ▶ Considerable reduction in maintenance costs
- ▶ Meets ISO 15665 Class A to Class C, Class D acc. to Shell DEP Spec. No. 31
- ▶ Meets NORSOK standard R-004 Class 6, 7 and 8
- ▶ Meets ASTM E 1222



Acoustic Protection

## What is ISO 15665: Acoustic standard

ISO 15665 is an international standard setting classes for acoustic pipework insulation systems. Insulation systems are classified by their insertion loss performance and the diameter of pipe onto which they are applied.

The standard allows noise control engineers to select the correct insulation system during the design stage in order to ensure that specified noise targets are met.

Table: Minimum insertion loss required for each class acc. ISO 15665:2003

Class	Nominal pipe diameter D mm		Octave band centre frequency, Hz						
	Lower limit	Upper limit	125	250	500	1.000	2.000	4.000	8.000
			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	< 1.000	- 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	< 1.000	- 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	< 1.000	1	9	17	26	34	38	42

## ArmaSound Industrial Systems EL acc. to ISO 15665 with Arma-Chek R covering

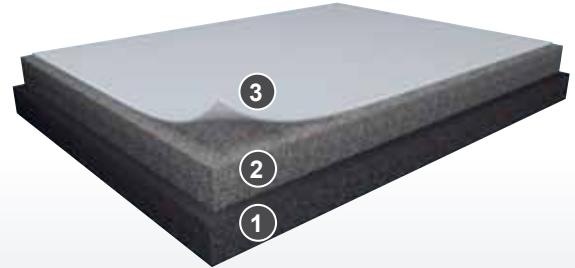
### ArmaSound Industrial System A (EL)



- 2** Arma-Chek R      2 mm
- 1** Armaflex            25 mm

Test Results Class A2	Octave band centre frequency, Hz						
nom. pipe-Ø: ≥ 300mm to < 650mm	125	250	500	1.000	2.000	4.000	8.000
Insertion loss, dB	1.4	-3.7	3.9	12.8	18.9	28.6	38.9

### ArmaSound Industrial System B (EL)

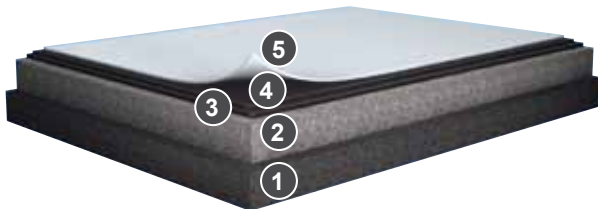


- 3** Arma-Chek R      2 mm
- 2** ArmaSound RD 240    25 mm
- 1** Armaflex <sup>(1)</sup>            13 mm

Test Results Class B2	Octave band centre frequency, Hz						
nom. pipe-Ø: ≥ 300mm to < 650mm	125	250	500	1.000	2.000	4.000	8.000
Insertion loss, dB	0.9	0.8	9.2	17.2	28.6	38.2	42.0

<sup>(1)</sup> If thermal considerations for cold applications should be made: Class B will also be achieved with a 25mm layer of Armaflex in place of the 13mm layer.

### ArmaSound Industrial System C (EL)



- 5** Arma-Chek R      2 mm
- 4** ArmaSound Barrier E    nom. 2 mm
- 3** ArmaSound Barrier E    nom. 3 mm
- 2** ArmaSound RD 240    25 mm
- 1** Armaflex            25 mm

Test Results Class C2	Octave band centre frequency, Hz						
nom. pipe-Ø: ≥ 300mm to < 650mm	125	250	500	1.000	2.000	4.000	8.000
Insertion loss, dB	-1.2	11.8	16.3	24.3	36.0	49.8	47.6

### ArmaSound Industrial System D (EL)

Acc. to SHELL DEP Spec No. 31



- 6** Arma-Chek R      2 mm
- 5** Armaflex            25 mm
- 4** ArmaSound Barrier E    nom. 4 mm
- 3** ArmaSound RD 240    25 mm
- 2** ArmaSound RD 240    25 mm
- 1** Armaflex            25 mm

Test Results Class D2	Octave band centre frequency, Hz						
nom. pipe-Ø: ≥ 300mm to < 650mm	125	250	500	1.000	2.000	4.000	8.000
Insertion loss, dB	-3.3	5.1	15.6	37.2	48.8	49.7	45.6

## Application Areas



Industrial Applications



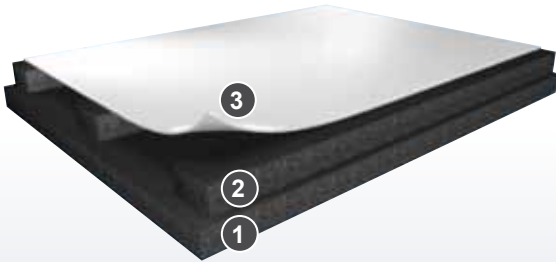
Gas & Oil Facilities



Cryogenic Applications

## ArmaSound Industrial Systems MC acc. to ISO 15665 with Metal Cladding

### ArmaSound Industrial System A (MC)



<b>3</b>	Steel Jacket	1 mm
<b>2</b>	Armaflex Spacer*	25 mm
<b>1</b>	Armaflex	19 mm

Test Results Class A2	Octave band centre frequency, Hz						
nom. pipe-Ø: ≥ 300mm to < 650mm	125	250	500	1.000	2.000	4.000	8.000
Insertion loss, dB	3.0	3.8	9.6	14.4	23.3	29.6	40.1

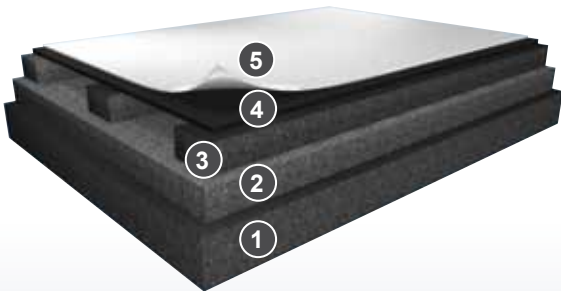
### ArmaSound Industrial System B (MC)



<b>4</b>	Steel Jacket	1 mm
<b>3</b>	ArmaSound Barrier T	nom. 2.3 mm
<b>2</b>	Armaflex Spacer*	25 mm
<b>1</b>	Armaflex	32 mm

Test Results Class B2	Octave band centre frequency, Hz						
nom. pipe-Ø: ≥ 300mm to < 650mm	125	250	500	1.000	2.000	4.000	8.000
Insertion loss, dB	7.0	8.3	18.0	21.7	30.3	42.0	53.1

### ArmaSound Industrial System C (MC)



<b>5</b>	Steel Jacket	1 mm
<b>4</b>	ArmaSound Barrier T	nom. 2.3 mm
<b>3</b>	Armaflex Spacer*	25 mm
<b>2</b>	ArmaSound RD 240	20 mm
<b>1</b>	Armaflex	32 mm

Test Results Class C2	Octave band centre frequency, Hz						
nom. pipe-Ø: ≥ 300mm to < 650mm	125	250	500	1.000	2.000	4.000	8.000
Insertion loss, dB	3.1	9.0	25.0	32.9	41.1	53.4	49.7

### ArmaSound Industrial System D (MC)



<b>6</b>	Steel Jacket	1 mm
<b>5</b>	ArmaSound Barrier T	nom. 2.3 mm
<b>4</b>	Armaflex Spacer*	25 mm
<b>3</b>	ArmaSound RD 240	20 mm
<b>2</b>	Armaflex	32 mm
<b>1</b>	Armaflex	32 mm

Test Results Class D2	Octave band centre frequency, Hz						
nom. pipe-Ø: ≥ 300mm to < 650mm	125	250	500	1.000	2.000	4.000	8.000
Insertion loss, dB	6.0	10.9	27.1	36.0	47.9	55.1	52.8

\* Dimension for Spacer Rings made of Armaflex: (100mm wide, 300mm spacing)

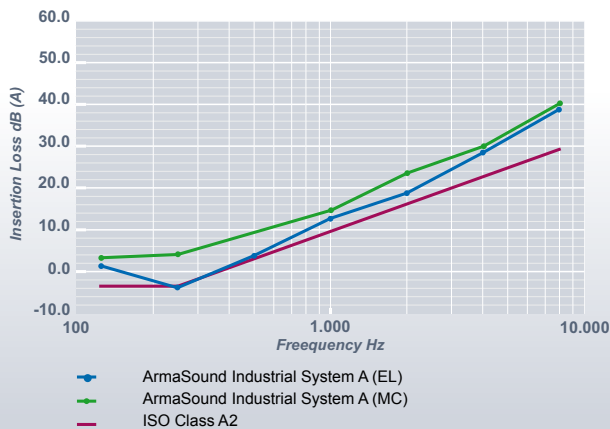
For more information and assistance on understanding ISO 15665, including a full calculation tool, see [www.armacell.com/uk](http://www.armacell.com/uk)

## Calculated broadband insertion loss (of measured insulation systems applied to pipes attached to various sources - acc.to ISO 15665)

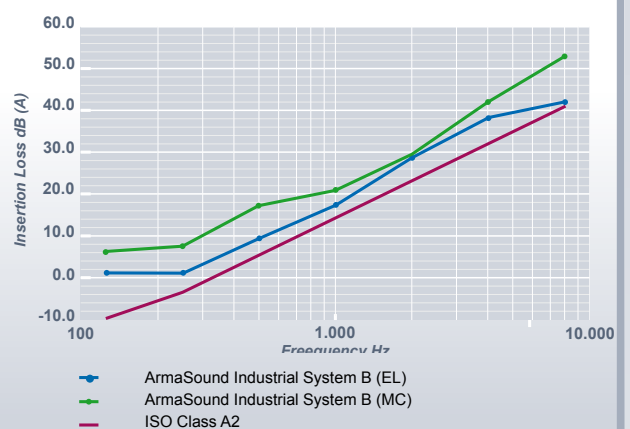
ISO 15665 Specification / Performance dB(A)	Control valve	Centrifugal compressor	Centrifugal pump	Reciprocating compressor
<b>ISO 15665 - Class A2</b>	14	10	4	5
<b>ArmaSound Industrial System A (EL)</b>	17	12	6	7
<b>ArmaSound Industrial System A (MC)</b>	21	17	12	13
<b>ISO 15665 - Class B2</b>	18	14	6	6
<b>ArmaSound Industrial System B (EL)</b>	22	17	10	11
<b>ArmaSound Industrial System B (MC)</b>	27	24	17	18
<b>ISO 15665 - Class C2</b>	24	20	11	10
<b>ArmaSound Industrial System C (EL)</b>	29	24	16	16
<b>ArmaSound Industrial System C (MC)</b>	32	28	18	19
<b>SHELL DEP - Class D2</b>	27	22	13	13
<b>ArmaSound Industrial System D (EL)</b>	27	23	13	13
<b>ArmaSound Industrial System D (MC)</b>	34	30	21	21

## Insertion loss results for ArmaSound Industrial Systems (measured to ISO 15665)

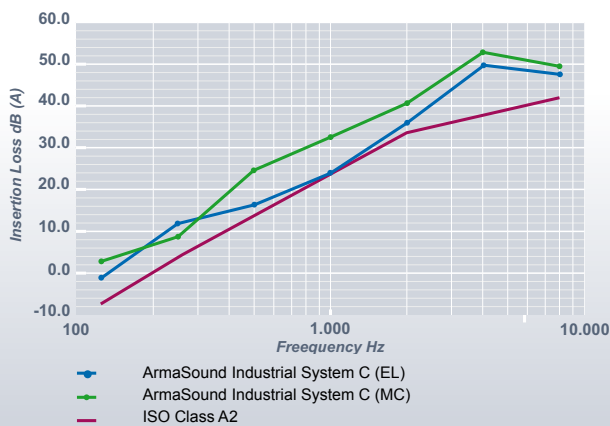
### ArmaSound Industrial System A (EL & MC)



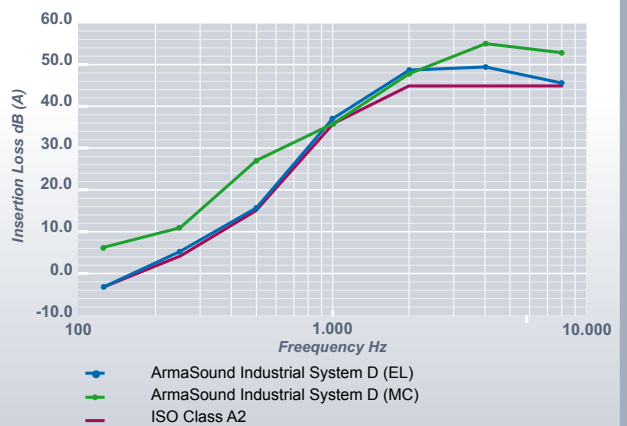
### ArmaSound Industrial System B (EL & MC)



### ArmaSound Industrial System C (EL & MC)



### ArmaSound Industrial System D (EL & MC)



The world is becoming noisier and noisier - life is becoming more and more hectic. Many noise sources cannot simply be switched off and this creates additional stress in our everyday lives. Noise is now one of the greatest environmental problems of our times. Noise protection is therefore becoming increasingly important in the workplace, in public buildings and, not least in residential buildings. Besides the prevention of sanitary problems noise protection provides a better quality of life free from the stress that noise causes.



## Components of ArmaSound Industrial Systems

### ▶ ARMAFLEX

Armaflex is the worlds leading flexible elastomeric insulation material. Combining an excellent thermal conductivity with a closed cell structure, Armaflex is renowned for its built-in water vapour barrier, its resistance to water ingress and its long term durability. Unlike other insulation materials Armaflex requires no external vapour barrier and will maintain its thermal properties over a long period of time. As a dust and fibre free material Armaflex has the ideal combination of properties that make it the thermal insulation material of choice for many large scale industrial and offshore projects.

### ▶ ARMASOUND RD 240

Delivering optimal performance at lower thicknesses than traditional materials, ArmaSound RD 240 is a uniquely advanced open cell acoustic insulation material. With a peak absorption frequency determined by the insulation thickness and the material density ArmaSound RD 240 can be engineered to target specific problem noise frequencies.

Thanks to a density much greater than traditional acoustic absorption materials, ArmaSound RD 240 is also suitable for some applications that may also call for an acoustic airborne noise barrier.

ArmaSound RD 240 provides a dust and fibre free solution that is suitable for use in a range of demanding environments.

### ▶ ARMASOUND BARRIER E

Vinyl sound barrier mat loaded with naturally occurring minerals. The product is free of lead, unrefined aromatic oils and bitumen. It is excellent at reducing the transmission of airborne sound and in enhancing the insertion loss performance of pipe insulation.

### ▶ ARMASOUND BARRIER T

Bitumen based, lead free, sound barrier mat ideal for use with metal claddings. It is excellent at reducing the transmission of airborne sound and in enhancing the insertion loss performance of pipe insulation.

### ▶ ARMA-CHEK R

Arma-Chek R is a particularly resilient, non metallic, covering system. Markedly reducing the corrosion and installation issues associated with metallic covering systems Arma-Chek R has been designed to work in harmony with Armaflex insulation, expanding and contracting as required. It is also used to enhance the insertion loss performance of our acoustic insulation systems.

### ▶ OKABELL

Okabell is a traditional sheet metal cladding system fabricated from hot-dip galvanized steel sheets, aluminium sheets or stainless austenitic steel sheets. Sheet metal claddings provide a very good protection against mechanical impact. Which types of sheet metal is used depends on the area of application in question, i.e. on the atmospheric conditions to which the cladding will be exposed.



All data and technical information are based on results achieved under typical application conditions. Recipients of this information should, in their own interest and responsibility, clarify with us in due time whether or not the data and information apply to the intended application area. Installation instructions are available in our Armaflex installation manual. Please consult our technical service before insulating stainless steels. Adhesive Armaflex 520 must be used to guarantee proper installation. For some new refrigerants the discharge temperature may exceed +105 °C, consult Technical Service for further information.