

AF/Armaflex®

THE FLEXIBLE INSULATION WITH ANTIMICROBIAL PROTECTION

NEW

- Microban® technology

- Supervised
performance:

Euroclass B/B_L-s3,d0

$\lambda_{0\text{ °C}} \leq 0.033 \text{ W/(m} \cdot \text{K)}$

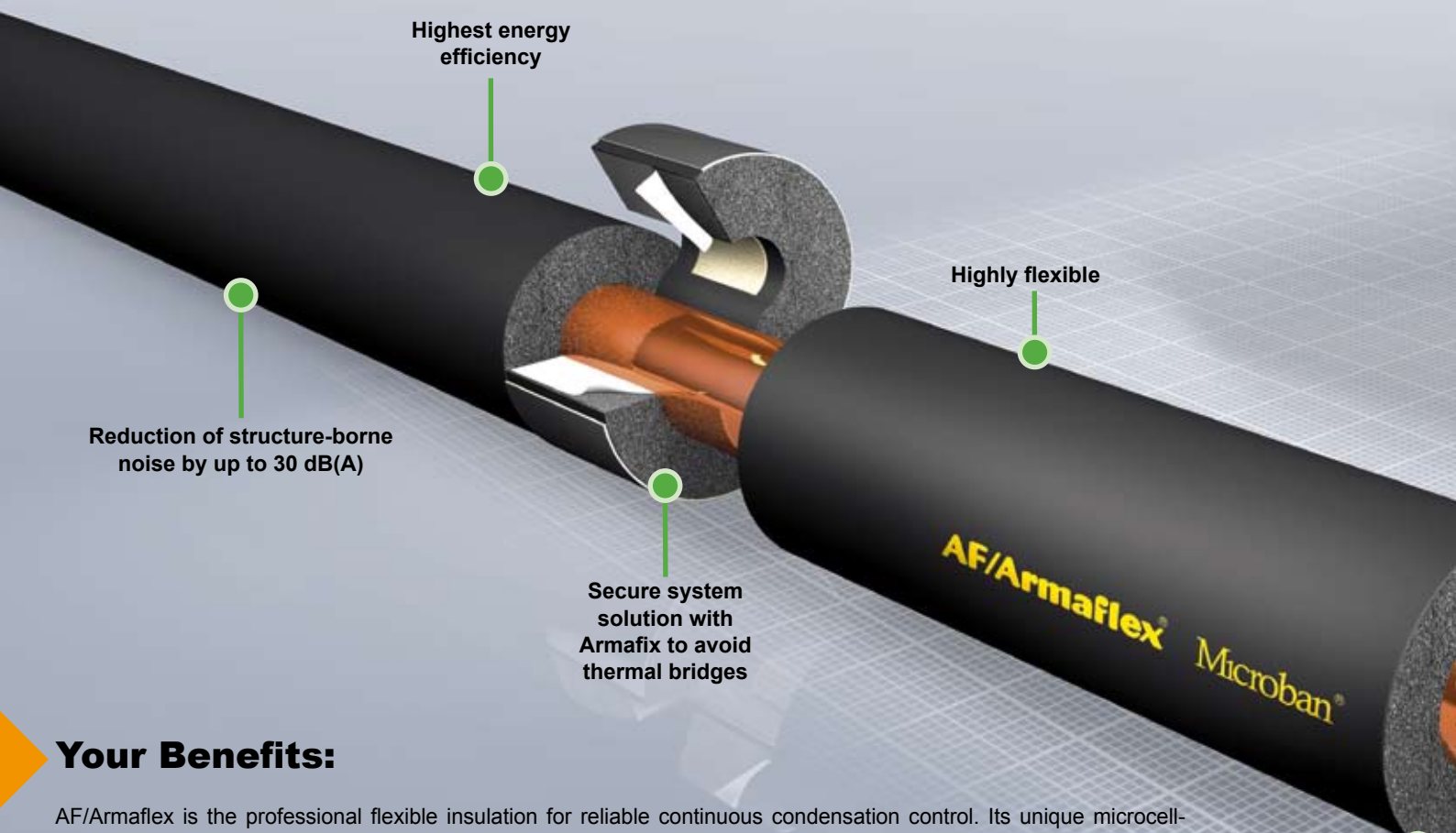
$\mu \geq 10,000$



AF/Armaflex® – the high-performance, energy-efficient insulation for use in air-conditioning, refrigeration and process facilities.

Now with Microban® Antimicrobial Product Protection for an added level of protection against microbes, mould and mildew.

Triple security: effective condensation control, active Microban® antimicrobial protection and excellent fire performance



Your Benefits:

AF/Armaflex is the professional flexible insulation for reliable continuous condensation control. Its unique microcell-structure makes the product easy to install. The optimal combination of a very low thermal conductivity and extremely high resistance to water vapour transmission prevents long-term energy losses and water vapour ingress and reduces the risk of under insulation corrosion. The built-in Microban® antimicrobial protection and the excellent fire performance make the product especially suitable for use in public buildings and process industries. The complete AF/Armaflex system family offers a secure and complete solution for all areas of application.



Refrigeration



Air conditioning



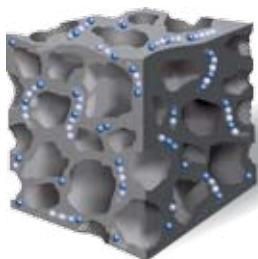
Ventilation



Fire penetration

▶ MICROBAN® - Active antimicrobial product protection

AF/Armaflex is the first flexible insulation material equipped with Microban® technology. When microbes come in contact with the insulation surface,



Microban® protection penetrates the cell wall of the micro-organism, disabling its ability to function, grow and reproduce. Because the protection is built in during the manufacturing process, it will not wash off or wear away. This gives AF/Armaflex products an added level of protection against mould and mildew. The new antimicrobial AF/Armaflex is therefore the ideal long-term solution for insulating ventilation or air-conditioning equipment in public buildings such as schools, hospitals, elderly homes, offices

and airports, as well as the mechanical systems in the pharmaceutical or food industries. It has an ideal ratio of insulation values and optimal installation properties due to its specific microcell structure.

Microban® is a registered trademark of Microban Products Company.



Closed microcell
structure

Contributes to
indoor air quality

Engineered wall thickness for
optimal protection against frost
and condensation



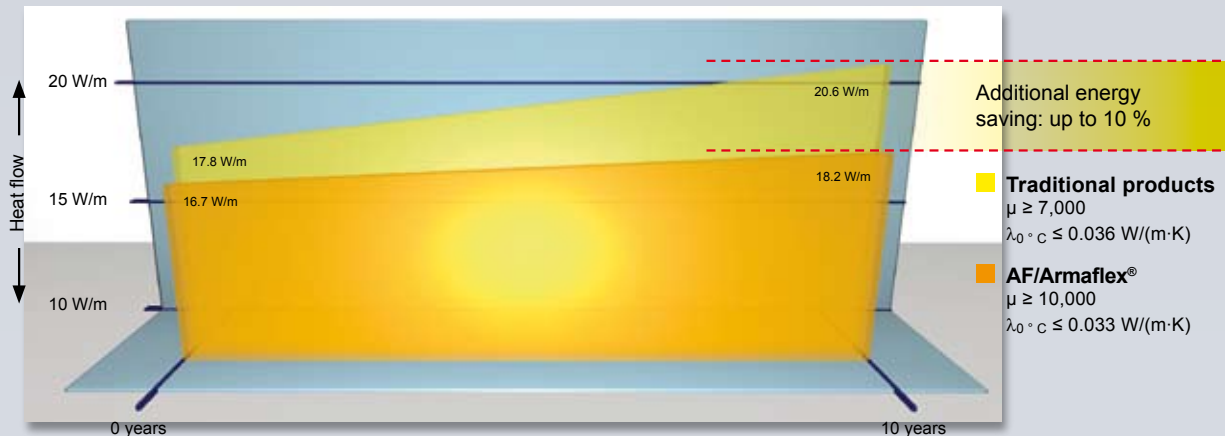
► Unique combination of externally
supervised properties:

- Euroclass B/B_L-s3,d0
- $\lambda_0 \text{ °C} \leq 0.033 \text{ W/(m} \cdot \text{K)}$
- $\mu \geq 10,000$

► Maximum energy efficiency

The combination of high μ -value ($\mu \geq 10,000$), low λ -value ($\lambda_{0\text{ °C}} \leq 0.033 \text{ W/(m·K)}$) and the engineered wall thickness of AF/Armaflex not only ensures reliable protection against condensation, but also meets the most stringent energy-saving regulations, contributing to an optimal energy efficiency of the installation. A recent LCA study carried out by

Armacell has proven that Armaflex saves 140 times more energy than used for its production. On average, 1 linear meter of Armaflex saves 65 liters of oil and 80 kg of CO₂ during its lifetime (estimated 20 years). The energy needed to produce Armaflex has been recovered after just 50 days.



	Maximum	Average	
Ambient temperature	26 °C	24 °C	Line temperature 2 °C
Relative humidity	65 %	60 %	Outer diameter of pipe = 88.9 mm
			Insulation thickness = 10 mm sheet

► Certification and independent supervision

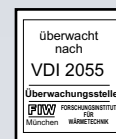
The supervised combination of its technical values makes AF/Armaflex unique: only when all properties of the system have been assured can we achieve the level of reliability that we expect from our products.

This system supervision is our own personal seal of quality. And your guarantee for safety and reliability. Therefore, all production processes and technical values for our products are constantly monitored by external bodies and

institutes. We support and participate in the development and implementation of new standards for quality and product control – so that you and your clients enjoy consistently high-quality products. Since AF/Armaflex is distributed throughout Europe, it does not just comply with national standards and controls but we are also thinking ahead, preparing for the future European product and testing standards.

Supervised

- **Euroclass B/B_L-s3, d0**
- $\lambda_{0\text{ °C}} \leq 0.033 \text{ W/(m·K)}$
- $\mu \geq 10,000$



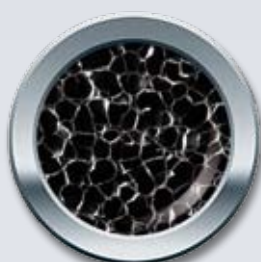
► Revolutionary foam technology with Microban® antimicrobial protection

AF/Armaflex®



Average cell size
0.136 mm²

traditional product



Average cell size
0.253 mm²

AF/Armaflex immediately stands out from traditional elastomerics in its appearance which is characterized by a much finer cell structure. This is the result of continual research and further development of the product properties which determine the quality. Your benefit: a combination of externally monitored insulation values consisting of a thermal conductivity of $\lambda_{0\text{ °C}} \leq 0.033 \text{ W/(m·K)}$ and a resistance to water vapour transmission of $\mu \geq 10,000$ which is still unique. The highest / lowest values of these need to be stated in order to make an insulation material calculable.

► Application Areas



Microbial contamination

According to recent studies, it is cited that people in industrialized countries spend around 90 % of their time indoors. An EPA* survey indicates that conditioned areas are frequently breeding havens for microbes and contamination. Indoor air can be up to 10 times more polluted than outdoor air. Thus, risks to health may be greater due to exposure to air pollution indoors, than outdoors.

Microbial pollution is a key element of indoor air pollution. Microbes, which can be found in and on HVAC systems, include stain and odor causing bacteria, mould and mildew. Excess moisture, in combination with the

dust and dirt which are normally present in most indoor spaces, provide sufficient nutrients to support extensive microbial growth. These microbes subsequently emit spores, cells, fragments and volatile organic compounds (VOC) into indoor air, thus possibly contributing to the well-known sick building syndrome. Mould and mildew additionally initiate the biological or chemical degradation of materials.

A recent publication of the World Health Organization (July, 2009) cites:

"When sufficient moisture is available, hundreds of species of bacteria and fungi

– particularly mould – pollute indoor air. The most important effects of exposure to these pollutants are the increased prevalence of respiratory symptoms, allergies and asthma, as well as disturbance of the immune system. Preventing (or minimizing) persistent dampness and microbial growth on interior surfaces and building structures is the most important means of avoiding harmful effects on health. [...] A selection of appropriate materials can prevent dirt accumulation, moisture penetration and mould growth."

* EPA: Environmental Protection Agency, US



AF/Armaflex is the ideal insulation material for HVAC and refrigeration systems in environments where highest levels of moisture control, hygiene and indoor air quality are required, such as process industries or public buildings, especially those hosting population groups particularly vulnerable due to their health status or age.



► **Health care facilities:**
hospitals, geriatrics, retirement homes, ...



► **Educational facilities:**
nurseries, schools, universities, academies, ...



► **Office buildings:**
business centres, banks, insurance companies, ...



► **Public areas:**
airports, train stations, congress halls, exhibition halls, ...



► **Commercial areas:**
shopping malls, supermarkets, ...



► **Process industry:**
food & beverage process industry, pharmaceutical industry, ...

AF/Armaflex®: A unique system solution to meet the highest demands

Product range:

Armacell is the only provider of flexible insulation materials, which offers a complete carefully considered and coordinated system solution for any professional insulation challenge:

AF/Armaflex tubes, sheets, tape and glue, Armafix AF pipe support, Armaflex Protect R-90 fire barrier as well as AF/Armaflex with Arma-Chek flexible covering systems. Especially handy:

The professional tangential cut of the AF/Armaflex self-seal tubes ensures a greater bonding area and more secure adhesion.

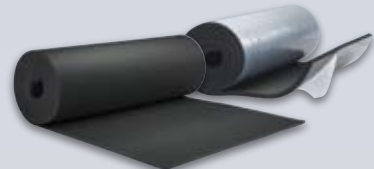
AF/Armaflex tubes standard



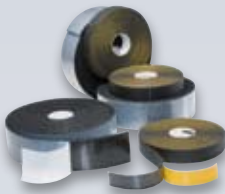
AF/Armaflex tubes self-adhesive



AF/Armaflex sheets



AF/Armaflex tape + strip



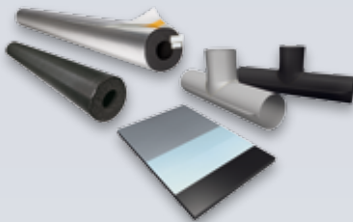
Armafix AF pipe support



LEED

The AF/Armaflex system makes a positive contribution to LEED certification

Arma-Chek covering systems



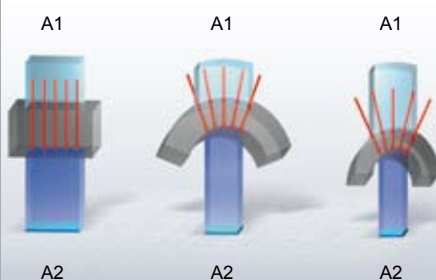
Accessories



Armaflex Protect R-90



Engineered wall thickness



One of the requirements for effectively preventing condensation is that the outer surface temperature of the insulation is always higher than or at least as high as the dew point temperature of the ambient air at every point on the insulated object. Because of the smaller heated surface area in direction of heat flow ($A1 > A2$), cylindrical insulating materials compress the heat flow inwards towards the object. Because of this build-up of heat, cylindrical insulating materials (tubes) can be thinner than insulation materials on flat surfaces (sheets) but still achieve a constant surface temperature.

When developing AF/Armaflex insulation tubes, Armacell took these physical properties into account. Consequently, the heat flow density on the surface of the tubes is the same.

The tubes are named accordingly: the insulation thicknesses are divided into groups that have a common code (e.g. AF-2 tubes. This type of tube has an insulating thickness of between 9.5 mm and 16 mm, depending on the dimensions of the pipe).

The advantage of this concept is that it saves calculating the insulation thickness for every individual pipe size: one calculation is enough!



Efficient low-temperature insulation prevents condensation and reduces energy losses. To achieve this, the thermal conductivity (λ) of the insulation material must be as low as possible. At the same time, the water vapour diffusion resistance factor (μ) must be as high as possible. A high μ -value on its own is useless. Therefore, Armacell has continued to improve the physical material properties of AF/Armaflex. By achieving the previously unattained combination of $\mu \geq 10,000$ und $\lambda_{0\text{ }^\circ\text{C}} \leq 0.033 \text{ W/(m}\cdot\text{K)}$ - tested and controlled by independent institutes - it has once again broken new ground. This makes the new AF/Armaflex the ideal solution to efficiently prevent energy loss, thus saving money in the long term, too.

Product range

AF/Armaflex Tubes, length 2 m, black.



Copper pipes	Steel pipes			Plastic pipes*	AF-1		AF-2		AF-3		AF-4		AF-5		AF-6	
Outside Ø mm	Inches	Outside Ø mm	Nom. size DN	Outside Ø mm	Ref. code	Nom. insulation thickness	Ref. code	Nom. insulation thickness	Ref. code	Nom. insulation thickness	Ref. code	Nom. insulation thickness	Ref. code	Nom. insulation thickness	Ref. code	Nom. insulation thickness
6		6			AF-1-006 2)	7.0	AF-2-006 2)	9.5								
8		8			AF-1-008 2)	7.0	AF-2-008 2)	10.0								
10	1/8	10.2	6		AF-1-010 2)	7.5	AF-2-010 2)	11.0	AF-3-010	12.5	AF-4-010	15.5				
12		12			AF-1-012 1)2)	7.5	AF-2-012 1)2)	11.0	AF-3-012	13.0	AF-4-012	16.0				
15	1/4	13.5	8	14	AF-1-015 1)2)	8.0	AF-2-015 1)2)	11.5	AF-3-015 1)	14.0	AF-4-015 1)	17.0	AF-5-015	25.0	AF-6-015	32.0
18	3/8	17.2	10		AF-1-018 1)2)	8.0	AF-2-018 1)2)	11.5	AF-3-018 1)	14.0	AF-4-018 1)	17.5	AF-5-018	25.0	AF-6-018	32.0
				20	AF-1-020	8.5	AF-2-020	12.0	AF-3-020	14.5	AF-4-020	18.0	AF-5-020	25.0		
22	1/2	21.3	15		AF-1-022 1)2)	8.5	AF-2-022 1)2)	12.0	AF-3-022 1)	14.5	AF-4-022 1)	18.0	AF-5-022	25.0	AF-6-022	33.5
25		25		25	AF-1-025	8.5	AF-2-025	12.5	AF-3-025	14.5	AF-4-025	18.5	AF-5-025	25.0		
28	3/4	26.9	20		AF-1-028 1)2)	8.5	AF-2-028 1)2)	12.5	AF-3-028 1)	15.5	AF-4-028 1)	19.0	AF-5-028	25.0	AF-6-028	35.0
		30			AF-1-030 1)	9.0	AF-2-030 1)	12.5	AF-3-030	15.5	AF-4-030	19.0	AF-5-030	26.0		
				32	AF-1-032	9.0	AF-2-032	13.0	AF-3-032	16.0	AF-4-032	19.5	AF-5-032	26.0		
35	1	33.7	25		AF-1-035 1)	9.0	AF-2-035 1)	13.0	AF-3-035 1)	16.0	AF-4-035 1)	19.5	AF-5-035	27.0	AF-6-035	35.0
		38			AF-1-038	9.0										
				40	AF-1-040	9.0	AF-2-040	13.5	AF-3-040	16.5	AF-4-040	20.5	AF-5-040	27.0		
42	1 1/4	42.4	32		AF-1-042 1)	9.0	AF-2-042 1)	13.5	AF-3-042 1)	16.5	AF-4-042 1)	20.5	AF-5-042	27.0	AF-6-042	36.5
		44.5			AF-1-045	9.0	AF-2-045	13.5			AF-4-045	20.5				
		48.3			AF-1-048 1)	9.0	AF-2-048 1)	13.5	AF-3-048 1)	16.5	AF-4-048 1)	21.0	AF-5-048	27.5	AF-6-048	37.5
				50	AF-1-050	9.0	AF-2-050	13.5	AF-3-050	17.0	AF-4-050	21.0	AF-5-050	28.0		
54		54			AF-1-054 1)	9.0	AF-2-054 1)	13.5	AF-3-054 1)	17.0	AF-4-054	21.0	AF-5-054	28.5	AF-6-054	38.0
		57			AF-1-057	9.0	AF-2-057	14.0	AF-3-057	17.0	AF-4-057	21.5			AF-6-057	38.5
	2	60.3	50		AF-1-060 1)	9.0	AF-2-060 1)	14.0	AF-3-060 1)	17.0	AF-4-060 1)	21.5	AF-5-060	29.0	AF-6-060	39.0
64		63.5		63	AF-1-064	10.0	AF-2-064 1)	14.0	AF-3-064	17.0	AF-4-064	21.5	AF-5-064	29.0	AF-6-064	39.5
70		70			AF-1-070	10.0	AF-2-070 1)	14.0	AF-3-070	17.5	AF-4-070 1)	22.0	AF-5-070	29.5	AF-6-070	40.0
76.1	2 1/2	76.1	65	75	AF-1-076 1)	10.0	AF-2-076 1)	14.0	AF-3-076 1)	17.5	AF-4-076 1)	22.0	AF-5-076	30.0	AF-6-076	40.5
80					AF-1-080	10.0	AF-2-080	14.5	AF-3-080	17.5	AF-4-080	22.5			AF-6-080	41.0
88.9	3	88.9	80		AF-1-089 1)	10.0	AF-2-089 1)	14.5	AF-3-089 1)	18.0	AF-4-089 1)	22.5	AF-5-089	30.5	AF-6-089	41.5
	3 1/2	101.6			AF-1-102	10.0	AF-2-102	14.5	AF-3-102	18.0	AF-4-102	23.0			AF-6-102	42.5
108					AF-1-108	10.0	AF-2-108	14.5	AF-3-108	18.0	AF-4-108	23.0	AF-5-108	31.0	AF-6-108	42.5
				110	AF-1-110	10.0	AF-2-110	15.0	AF-3-110	18.0	AF-4-110	23.0	AF-5-110	31.0		
	4	114.3	100		AF-1-114	10.0	AF-2-114	15.0	AF-3-114	18.5	AF-4-114	23.5	AF-5-114	31.5	AF-6-114	43.0
		125		125	AF-1-125	10.0	AF-2-125	15.0	AF-3-125	18.5	AF-4-125	23.5	AF-5-125	32.0		
133					AF-1-133	10.0	AF-2-133	15.5	AF-3-133	18.5	AF-4-133	24.0	AF-5-133	32.0	AF-6-133	44.0
	5	139.7	125		AF-1-140	10.0	AF-2-140	15.5	AF-3-140	19.0	AF-4-140	24.5	AF-5-140	32.0	AF-6-140	44.5
159				160	AF-1-160	10.0	AF-2-160	16.0	AF-3-160	19.0	AF-4-160	25.0	AF-5-160	32.0	AF-6-160	45.0
	6	168.3									AF-4-168	25.0	AF-5-168	32.0	AF-6-168	45.0
Tolerance					± 1.0 mm		± 1.0 mm		± 1.5 mm		± 1.5 mm		± 2.5 mm		± 3.0 mm	

¹⁾ also available as self-adhesive tube ²⁾ also available as continuous-length tubes

For the detailed product range please refer to the price list catalogue.

* not applicable for ABS plastic pipes



AF/Armaflex Sheets



Ref. code	Insulation thickness	Tolerance	Compatible with tube range *
AF-10MM	10 mm	± 1.0 mm	AF-1
AF-13MM	13 mm	± 1.0 mm	AF-1 / AF-2
AF-16MM	16 mm	± 1.0 mm	AF-2
AF-19MM	19 mm	± 1.0 mm	AF-3
AF-25MM	25 mm	± 1.0 mm	AF-4
AF-32MM	32 mm	± 2.0 mm	AF-5
AF-50MM	50 mm	± 2.0 mm	AF-6

Sheets are available in a standard and self-adhesive version, either as pieces or as continuous-length material.

*please consult the Armaflex Installation Instruction manual.

Supervised values:

Tubes AF-1 – AF-4 & sheets AF-10MM – AF-32MM:

Independently supervised
 $\mu \geq 10,000$ and $\lambda_{0\text{ }^{\circ}\text{C}} \leq 0.033 \text{ W/(m}\cdot\text{K)}$

Tubes AF-5 – AF-6 & sheets AF-50MM:

Independently supervised
 $\mu \geq 7,000$ and $\lambda_{0\text{ }^{\circ}\text{C}} \leq 0.036 \text{ W/(m}\cdot\text{K)}$
 Single certificates available
 $\mu \geq 10,000$ and $\lambda_{0\text{ }^{\circ}\text{C}} \leq 0.033 \text{ W/(m}\cdot\text{K)}$ for tubes

All AF/Armaflex tubes and sheets have Euroclass B/L-s3,d0 and come with Microban® antimicrobial protection

Technical Data

Brief description:	Highly-flexible, closed-cell insulation material with high water vapour diffusion resistance, low thermal conductivity and built-in Microban® antimicrobial protection.
Material:	Elastomeric foam based on synthetic rubber Self-adhesive coating: pressure-sensitive adhesive coating on modified acrylate basis with mesh structure. Covered with polyethylene foil.
Applications:	Insulation / protection for pipes, air ducts, vessels (incl. elbows, fittings, flanges etc.) of air-conditioning / refrigeration and process equipment to prevent condensation and save energy. Structure-borne noise reduction in service-water and waste-water installations.

Property	Value / Assessment									Test certificate *1	Supervision *2	Special remarks
Temperature range (Temperature limits) Max. line temperature Min. line temperature	+105 °C (flat surface and tape +85 °C) -50 °C (-200 °C) Our Customer Service Center should be consulted for applications with temperatures below -50 °C.									D 4594	●/O	Tested acc.to DIN EN 14706, DIN EN 14707 and DIN EN 14304
Thermal Conductivity λ_d [W/(m·K)] at various mean temperatures v_m [°C] Sheets, strips, tape (AF-10MM to AF-32MM) Tubes (AF-1 to AF-4) Tubes (AF-5 to AF-6) Sheets (AF-50MM)	-50	-30	-20	+/-0	+10	+20	+40	+70	+85	D 4455 D 4424	●/O	Tested acc. to DIN EN 12667 EN ISO 8497
	0.028	0.030	0.031	0.033	0.034	0.035	0.037	0.040	0.042			
	-	0.030	0.031	0.033	0.034	0.035	0.037	0.040	-			
	-	0.033	0.034	0.036	0.037	0.038	0.040	0.043	-			
	0.031	0.033	0.034	0.036	0.037	0.038	0.040	0.043	0.045			
Water vapour diffusion resistance factor μ Sheets (AF-10MM to AF-32MM) and tubes (AF-1 to AF-4) Sheets (AF-50MM) and tubes (AF-5 to AF-6)	$\geq 10,000$ $\geq 7,000$									D 4532 D 4426	●/O	Tested acc. to EN 12086 and EN 13469
Reaction to fire 1. Building material class	low flammability (B-s3, d0; B_L-s3, d0) *3 Z-56.269-768 und Z-56.269-3530									D 3334 D 4505	●/O ●/O	Tested acc. to DIN EN 13823 (DIN EN 13501-1)
2. Practical fire behaviour	self-extinguishing, does not drip, does not spread flames											
3. Fire resistance of structural element Wall penetrations Ceiling penetrations	$\leq R90$ (P-3849/5370 MPA BS) $\leq R90$ (P-3849/5370 MPA BS) For further information please contact our customer service.									D 2300		Tested acc. to DIN 4102, Part 11
Acoustic insulation Reduction of structure-borne sound transmission Sound absorption coefficient	Insulation effect up to 30 dB(A) up to 0.56									D 3660 D 2551		Tested acc. to DIN 52219 and DIN EN ISO 3822-1 Tested acc. to EN ISO 20354
Dimensions and limit deviations	in accordance with prEN 14304, table 1									D 4594		Tested acc. to EN 822, EN 823, EN 13467
AGI Designation Code Tubes Sheets	36.12.01.06.04/06 *4 36.07.01.02.04 *4											Tested acc. to AGI Q 143-1
Storage Storage life	Self-adhesive tapes, self-adhesive sheets, tubes, strips: 1 year									Can be stored in dry, clean rooms at normal relative humidity (50 % to 70 %) and ambient temperature (0 °C – 35 °C).		
Microban® antimicrobial protection	No fungal growth observed									Tested acc. to ASTM G21 and ASTM 1338		

- * 1 Further documents such as test certificates, approvals and the like can be requested using the registration number given.
 * 2 ●: Supervised according to VDI 2055, certificate no.: 6V121 (D4446) and official supervision by testing institute (fire behaviour or euroclass).
 O: Own in-factory monitoring according to or following prEN 14304
 * 3 The building materials classification is valid on metal or solid, mineral surfaces.
 * 4 The AGI Designation code will be replaced by the CE description code as soon as EN 14304 is available.

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. For outside use, AF/Armaflex should be protected within 3 days, eg. with Armafinish 99.