Certificate No:
TAF00001KZ

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Class A and B Penetration

with type designation(s)
System Armaflex Protect

Issued to
Armacell GmbH
Münster, Nordrhein-Westfalen, Germany

is found to comply with
DNV rules for classification – Ships
DNV offshore standards
DNV class programme DNV-CP-0165 – Type approval – Cable and pipe penetrations
DNV statutory interpretations DNV-SI-0364 – SOLAS interpretations, Edition July 2021

Application :

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV.

Issued at **Hamburg** on **2021-12-22**
This Certificate is valid until **2026-12-21**.
DNV local station: **Essen**

Approval Engineer: **Hagen Markus**

for **DNV**

Olaf Drews
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.

Product description

Pipe penetration system for single pipes fitted with a layer of continuous approved pipe insulation type “ArmaFlex”.

“ArmaFlex” insulation is made of closed-cell elastomeric foam based on synthetic rubber with a density of 45-65 kg/m^3. Minimum thickness acc. to tables in the certificate.

In the area of the division penetration the continuous pipe insulation is replaced by local insulation of type “ArmaFlex Protect” with a length of 1.000 mm, preferable 500 mm each side of the bulkhead or deck.

“ArmaFlex Protect” is made of closed-cell elastomeric foam based on synthetic rubber with intumescent additives with a density of 134-240 kg/m^3.

Branches, elbows, couplings or pipe supports shall also be insulated by “ArmaFlex Protect” with the same insulation length as for straight pipes.

This includes an overbuilding of the “ArmaFix pipe support” with “ArmaFlex” Protect in cases where the “ArmaFix pipe support” is located in the area of the “ArmaFlex Protect” partition without any restrictions of the distance to the division.

Design variation of pipe penetrations

This type approval includes two designs of pipe penetration:
- Conventional design with steel sleeve
- Non-conventional design without steel sleeve

Details conventional design

The penetration consists of a circular steel sleeve, with a minimum length of 100mm, welded to the bulkhead or deck opening. The steel sleeve insulation positioned on the upper (non-insulated) side of the deck.
The insulation material shall be of approved type with a density with at least 66 kg/m3 and thickness of 30 mm or equivalent.

Application/Limitation

The sealing system of type “System ArmaFlex Protect” is type approved for penetrating of A-60 class bulkheads and decks, “General application”, i.e. no limitation on the positioning.

Extent of application is to be considered and accepted for each case/project.

For A-0, A-15 and A-30 applications, the penetration shall be insulated as for A60 and the division is to be fitted with A-60 insulation for a minimum distance of 200 mm around the penetration.

Branches, elbows, pipe couplings and pipe supports shall also be provided with “ArmaFlex Protect” along the required minimum insulation length on both sides of the penetration.

For application on offshore structures the requirements specified in the applicable DNV Offshore Rules may have to be observed.

A 60 Bulkhead
Pipe penetration - Conventional design

Pipe material	Pipe outer diameter [mm]	ArmaFlex Protect	ArmaFlex	Sika Firesil Marine N	Steel sleeve
		Average thickness [mm]	Minimum thickness [mm]	Maximum thickness [mm]	Wall thickness [mm]
Steel	≥15 - ≤89	19 - 25	13+/-1,5	≤9,5	2,9 – 4,0
Copper	≥12 - ≤54	19 - 25		≤10,9	2,9 – 4,0
Multilayer composite pipes (PE-Xc/Al/PE-Xc)	≥16 - ≤32	20 - 25		≤9,7	3,6

A 60 Bulkhead
Pipe penetration - Non-conventional design

Pipe material	Pipe outer diameter [mm]	ArmaFlex Protect	ArmaFlex	Sika Firesil Marine N
		Average thickness [mm]	Minimum thickness [mm]	Average thickness [mm]
Steel	≥15 - ≤89	19 – 25	13+/-1,5	8
Copper	≥15 - ≤54	19 - 25		
Multilayer composite pipes (PE-Xc/Al/PE-Xc)	≥16 - ≤20	20		

A 60 Deck
Pipe penetration - Conventional design

Pipe material	Pipe outer diameter [mm]	ArmaFlex Protect	ArmaFlex	Sika Firesil Marine N	Steel sleeve
		Average thickness [mm]	Minimum thickness [mm]	Average thickness [mm]	Wall thickness [mm]
Steel	≥15 - ≤89	19 – 25	13+/-1,5	≤11	2,9 – 4,0
Copper	≥15 - ≤54	19 - 25			2,9 – 3,6
Multilayer composite pipes (PE-Xc/Al/PE-Xc)	≥16 - ≤20	20		≤10	3,6

A 60 Deck
Pipe penetration - Non-conventional design

Pipe material	Pipe outer diameter [mm]	ArmaFlex Protect	ArmaFlex	Sika Firesil Marine N
		Average thickness [mm]	Minimum thickness [mm]	Average thickness [mm]
Steel	≥15 - ≤89	19 – 25	13+/-1,5	8
Copper	≥15 - ≤54	19 - 25		
Multilayer composite pipes (PE-Xc/Al/PE-Xc)	≥16 - ≤20	20		

Approved piping systems and installation areas
The pipe insulation material is classified as combustible material.

The application of the insulation material is limited with respect to piping systems and installation areas as follows (ref. SOLAS II-2/Reg. 5.3.1.1):

- cold service systems[1], no limitation.
- other piping systems, limited to cargo areas, mail rooms, baggage rooms and refrigerated compartments of service spaces, and exterior locations

Note
[1] Piping for hot or cold sanitary water is not considered “cold service system”.

Water and or gas tightness, Installation at tank boundaries
Not approved.

Installation
Each product shall be supplied with its manual for installation and maintenance.

A 60 Bulkhead

A 60 Deck

Drawing No.	Title	
A-MD001-A	"Side View" insulated copper, steel and multi-layer composite pipes Deck A-60	Penetration **with sleeve** – insulated pipes made of copper up to 54mm, steel pipes up to 88,9mm and composite pipes up to 20mm
A-MD-004	"Side View" insulated copper steel and multi-layer composite pipes Deck A-60	Penetration **without** sleeve – insulated pipes made of copper up to 54mm, steel up to 88.9 and composite pipes up to 20mm

Type Approval documentation

Tests carried out

Tested according to IMO Res. MSC.307(88) – 2010 FTP Code:

Annex 1 - Part 3	Test for "A", "B" and "F" Class divisions – A.III Pipe and duct penetrations

Marking of product

Scope	Components sealing system		
	Sealing material	ArmaFlex Protect	ArmaFlex
Manufacturer name	Sika Services AG	Armacell GmbH	
Type designation	Sika Firesil Marine N	ArmaFlex Protect	AF/ArmaFlex

Periodical assessment

For retention of the Type Approval, a DNV Surveyor shall perform periodical assessment to verify that the conditions for the Type Approval are complied with. Refer to the Class Programme DNV - CP-0338, Sec.4.

To check the validity of this certificate, please look it up in https://approvalfinder.dnv.com

End of certificate