

Tough requirements for insulation in heavy industrial environments

>> CORROSION UNDER INSULATION

One of the greatest challenges of insulation in marine, offshore and heavy industrial environments is presented by the issue of corrosion under insulation (C.U.I). The traditional approach within these extreme environments has been to specify open cell fibrous materials clad with a metal covering.

Under these especially harsh conditions, system failure is regularly encountered. Over time cladding systems rust and fall apart exposing the porous insulation material within. With the water vapour barrier breached the open cell insulation material becomes sodden, dramatically increasing the risk of corrosion. As moisture migrates through the insulation it causes damage to the pipe through corrosion.

Although salt water proves particularly aggressive any form of moisture within an open cell insulation will attack pipes. The cost of replacing corroded pipes can run into the millions and often require processes to be taken offline for significant periods of time.

>> REGULAR INSPECTION

Insulation installed on heavy industrial applications should be inspected and evaluated on a regular basis. When the insulation in situ is of the open cell type these inspection regimes often result in the replacement of all insulation at significant cost purely to slow the rate of pipe corrosion.

>> EXPOSURE TO AGGRESSIVE AGENTS

In industrial applications pipework insulation and claddings are often exposed to UV, grease, oil and chemical attack.

>> EXPERT INSTALLATION

Specialised insulation contractors are required to install any insulation on heavy industrial projects.

>> INSULATION OF EQUIPMENT

All valves, flanges and other unusual shapes must be insulated. This proves particularly difficult when using traditional materials.

>> CLADDING OF INSULATION

It is standard practice when insulating in a heavy industrial environment to fully clad the insulation. Traditionally applied cladding systems often create in of themselves considerable risk on site (the requirement to weld metal can, for instance, generate potentially dangerous sparks).

>> NOISE REDUCTION

Production processes - particularly in the offshore environment - create a serious noise hazard.



Protect Your Investment with professional insulation and covering systems

For over 50 years Armaflex has been the leading brand of elastomeric insulation. Repeatedly revolutionising the insulation industry, Armaflex differs from other traditional insulation types by virtue of its in built water vapour barrier. This has implications when it comes to the covering and cladding requirements for Armaflex.

Whereas traditional insulation types must incorporate a water vapour barrier into their covering systems this is not a requirement for Armaflex with its built in water vapour barrier. Whilst some of the Arma-Chek systems do indeed offer an exceptional water vapour barrier this was not the foremost priority in their development.

Arma-Chek systems are designed to be particularly resilient against damage caused by mechanical impact, adverse weather and chemical attack.

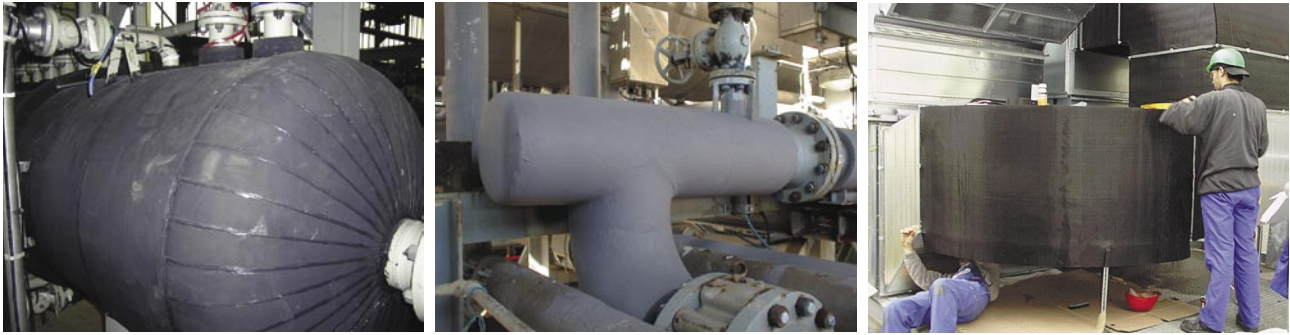
Arma-Chek systems are specifically designed to help reduce the risk of C.U.I in:

- >> Offshore applications
- >> Marine and ship building
- >> Petrochemical industries
- >> Energy plants & storage facilities
- >> Cryogenic Applications (LNG)

In all industries the client demand is for a tough exterior surface to protect the insulation against mechanical impact and Arma-Chek systems are the ideal choice:

- 1 Significantly minimising the risk of corrosion under insulation.
- 2 Increasing the insulation life expectancy by up to 40% compared with traditional materials.
- 3 Reducing the frequency and cost of monitoring and maintenance periods.
- 4 Representing a highly reliable and cost effective covering system.
- 5 Simplifying application with no need for specialised installation equipment.
- 6 Reducing safety risks during the application process.
- 7 Offering enhanced noise level reductions (particularly when used in combination with ArmaSound)
- 8 Providing exceptionally high resistance against UV, oil, chemical and extreme weather.
- 9 Meeting international standards.





Arma-Chek® Covering Systems

Universally applicable, yet designed specifically to work in harmony with Armaflex materials, Arma-Chek coverings are flexible and non-metallic. Easy to install on site, they are suitable as an alternative to metallic surfaces.

As non-metallic systems with no risk of surface corrosion, Arma-Chek systems experience an enhanced life expectancy and require significantly less monitoring and maintenance compared to metallic systems.

Arma-Chek R

The high performance non metallic covering system, designed for offshore and heavy industry, which provides extra security to your investment.

When integrated with an Armaflex substrate, an Arma-Chek R system offers an exceptional resistance against salt water, mechanical impact and UV damage.

Often specified as an alternative to metallic claddings, the non-metallic nature of Arma-Chek R eliminates the risk of galvanic corrosion.

Arma-Chek T

The easy to apply, reliable solution for irregular shapes and hard to access areas.

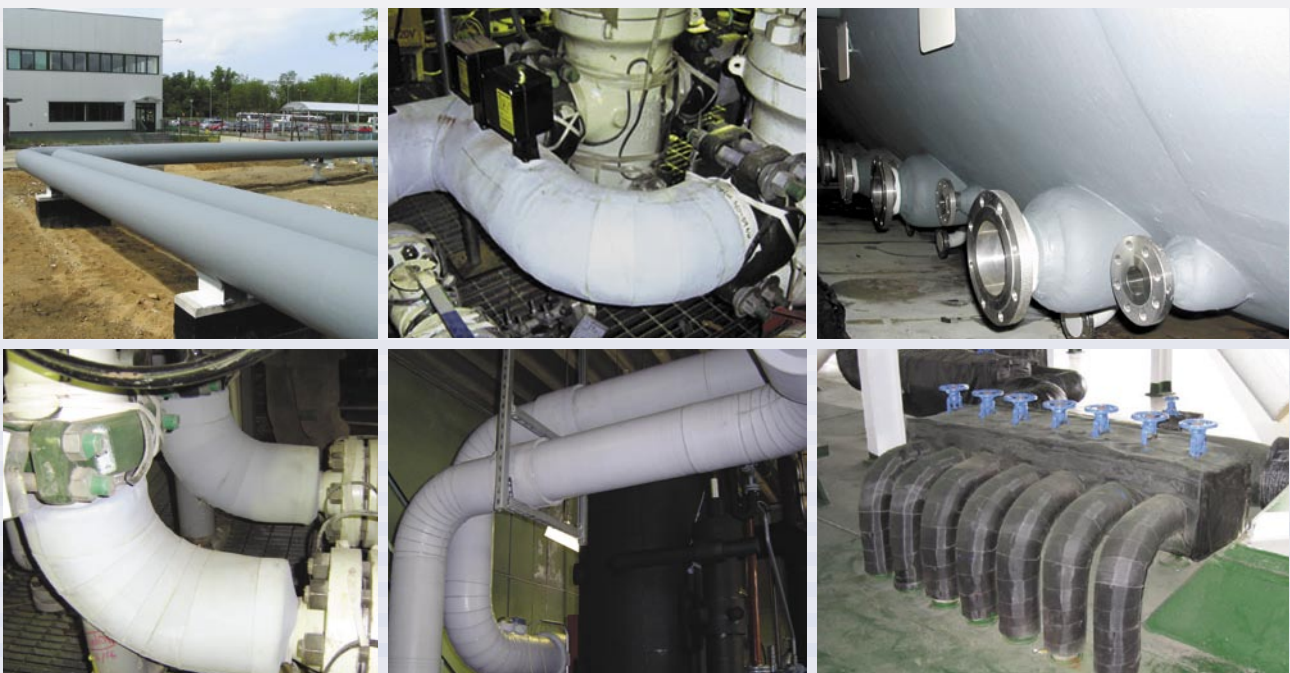
Arma-Chek T is a non-metallic, flexible insulation and covering system developed for the harsh environments of the oil, gas and petrochemical industries. Arma-Chek T is widely used for onshore and offshore applications. It offers the most reliable and time effective solution for irregular shapes and hard to access areas.

The Armaflex substrate is covered with a durable terpolymer paint with an embedded layer of mat glass fibre.

Arma-Chek D

The lightweight and easy to apply insulation system resistant to mechanical impact.

Designed for a diverse range of onshore and maritime applications, this black woven glass fibre covering for Armaflex substrate offers good resistance to UV, mechanical impact and under insulation corrosion when integrated into an Armaflex system. Arma-Chek D remains flexible in a moving environment and will not stain or mark.





Armaflex® Protects Your Investment

With its exceptional, inbuilt, water vapour barrier Armaflex is particularly effective at preventing moisture ingress and ensuring long term thermal efficiency. The thermal properties of Armaflex will not rapidly deteriorate over time as other insulation materials may and, by keeping moisture as far from the pipe surface as possible, Armaflex reduces the risk of expensive under insulation corrosion.

The in built water vapour of Armaflex comes from its closed cell structure. Armaflex comprises thousands of interconnected closed cells, each with an inherent resistance to water ingress. As such the vapour barrier of Armaflex cannot be compromised by surface punctures or tears.

In addition Armaflex is dust and fibre free. It will not emit any particles or fibres, even when cut into shapes and fittings.

Armaflex can be easily and cost effectively fabricated into valve and flange boxes on site, allowing for the protection of these vulnerable components and the creation of a fully sealed system at significantly reduced cost.

Where industries have specific requirements Armaflex is often available in specialized variants which meet the need. This includes a high temperature Armaflex suitable for use on heating and process lines in excess of 105 degrees. All Armaflex variants are manufactured to the highest levels of quality making Armaflex a product that can truly protect your investment.



Acoustic Systems in Industrial environments

When working in industrial environments noise is a major hazard to employees.

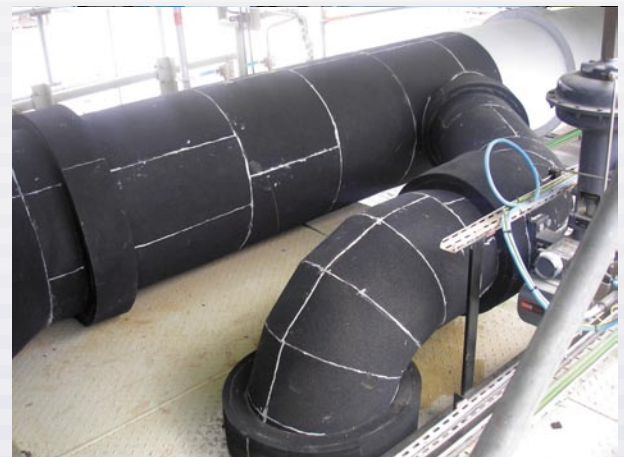
Increasingly government legislation requires organisations to take measures to lower noise levels in working environments. This legislation covers most industrial environments.

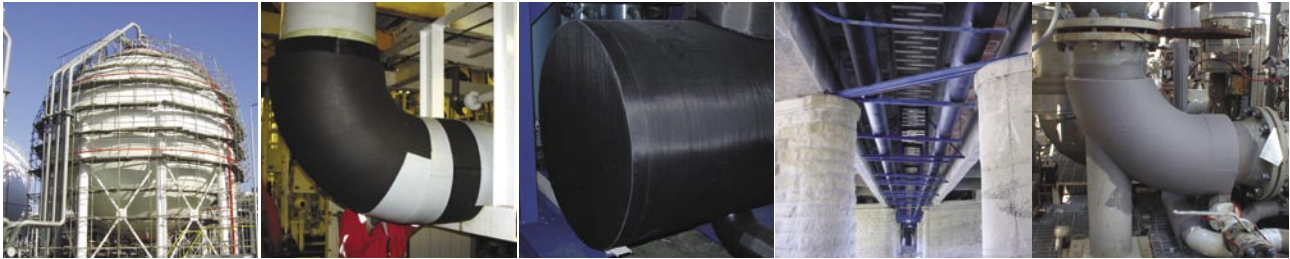
Recent years have seen the creation and implementation of industry wide standards such as ISO 15665 – “Acoustic Insulation for pipes, valves and flanges”. Adhering to the recommendations given in these standards is the best way of demonstrating an attempt to reduce noise levels in an industrial environment.

ArmaSound Industrial Systems

The acoustic insulation systems that minimise the risk of under insulation condensation.

ArmaSound Industrial Systems represent a sandwich construction comprising different layers of Armaflex, ArmaSound 240 and Arma-Chek R, each with a specific thermal or acoustic objective. Each system is designed to satisfy a particular ISO 15665 classification in order to give a significant noise reduction whilst simultaneously minimising heat losses, preventing moisture ingress and avoiding under insulation corrosion.





Samples of **industrial projects around the globe**

Project	Country (of construction)	Products
Snohvit	Belgium	AF/Armaflex
	Spain	AF/Armaflex
	Norway	AF/Armaflex
Sea Rose (FPSO)	Korea	NH/Armaflex - Arma-Chek R
	Canada	NH/Armaflex - Arma-Chek
	Norway	AF/Armaflex - Arma-Chek T
Thunder Horse (Platform)	Korea	NH/Armaflex - HT/Armaflex - Arma-Chek R
Shah Deniz Platform	Singapore	HT/Armaflex
Central Azeri Platform	Azerbaijan	Class O Armaflex
Panyu (FPSO)	China	Class 1 Armaflex - NH/Armaflex - Arma-Chek D
	Germany	Arma-Chek D
Bozhong 25-1 FPSO	China	Class1 Armaflex
Exxon South Venture	Canada	NH/Armaflex - Arma-Chek T
BP Atlantis Platform	Korea	NH/Armaflex - Arma-Chek R
Marathon Oil - Alpha Platform	Ireland	ArmaSound Industrial System C (EL)
Sangochal Terminal	Azerbaijan	ArmaSound Industrial System A & B (EL)
Sakhalin2 LUN-A / PA-B Platforms	Korea	HT/Armaflex - AF/Armaflex - ArmaSound - Arma-Chek R
BP Greater Plutonio FPSO	Korea	HT/Armaflex - Arma-Chek R
Sable FPSO	Korea	NH/Armaflex
Agbami FPSO	Korea	NH/Armaflex
ICE CLASS VESSEL	Korea	NH Armaflex
Chevron Tengiz	Kazachstan	HT/Armaflex
Exxon Sakhalin1	Russia	NH/Armaflex
US Navy T-AKE	USA	NH/Armaflex
Belanak FPSO	China	NH/Armaflex - Arma-Chek R
CFD FPSO	China	Class 1 Armaflex
Stena RoRo	China	NH/Armaflex
South Sea Kaituo FPSO	China	Class 1 Armaflex
Shengli platform CB25/26/20A	China	Class 1 Armaflex - Arma-Chek D
PetroChina ZY3 platform	China	Class 1 Armaflex - Arma-Chek D
NLNG Plus Nigeria	Japan	HT/Armaflex
Sakhalin2 LNG Terminal	Japan	NH/Armaflex

Professional *Technical Knowledge* at your Service

ArmaPlus tec. is the technical service from Armacell. Dedicated to using our knowledge to your advantage, ArmaPlus continues to offer the full range of Armacell product technical information and provide technical calculations, specification support and expert applications advice.



>> Technical Calculation

Giving you the tools to make project decisions.

- **ArmWin AS** - the powerful technical calculation program - available both online and on your desktop.
- **Bespoke Calculations** - tailored advice to meet your specific design requirements



>> Specification & Design Support

Committed to supporting your specification from its earliest steps through to its final implementation.

- **Bespoke specifications** - including thickness calculations and design recommendations - based on your specific design requirements from our experienced team.
- **Application specifications** - providing detailed application procedure descriptions and an inspection list (punch sheet) for surveyer - all relevant to your specific project requirements.



>> Application & Project Site Support

Renowned for its expert applications advice, ArmaPlus tec. builds upon our existing reputation for excellence.

- **Application videos and application guides** - our expert application specialists have developed a range of easy to follow applications guides for standard applications as well as for special application areas with special needs.
- **Certified application trainings** - our experienced applications specialists regularly conduct expert training courses which demonstrate first hand the application of Armaflex.
- **Application Advice and support** - Our ArmaPlus team operates a premium applications and advice support service specifically tailored to individual installation concerns*.



>> Technical Advice & Information Service

Armacell gives all customers a comprehensive range of; technical datasheets, material safety data sheets, project reports, important Armacell news articles and technical information pieces

- **Standard Technical Bulletins, FAQ and Best Practice Guides** - offering detailed advice and assistance available online 24 hours a day.
- www.armacell.com/mo - Provides all relevant certificates, product information, technical data sheets and informing about insulation requirements and backgrounds.
- **ArmaPlus tec. Line** - Our in house technical teams will answer not only technical product related enquiries but also provide specific project support.

* This service is offered only as a premium. Contact your local Armacell representative for more details.



Armacell - The Global Leader for Advanced Insulation and Engineered Foams

With globally integrated R&D and 20 manufacturing facilities worldwide, Armacell has the ability to service global markets through continuous innovation and unmatched production capacity to meet demand anywhere.



- Melbourne, Australia
- Thimister-Clermont, Belgium
- Pindamonhangaba, SP, Brazil
- Panyu, China
- SuZhou, China
- Friesenhofen, Germany
- Muenster, Germany
- Zeulenroda, Germany
- Pune, India
- Trezzano, Italy
- Sroda Slaska, Poland
- Begur, Spain
- Pfaffnau, Switzerland
- Bangkok, Thailand
- Oldham, UK
- Atlanta (GA), USA
- Mebane (NC), USA
- Conover (NC), USA
- South Holland (IL), USA
- Spencer (WV), USA

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All pictures in this brochure are from projects where Armaflex and Arma-Chek have been installed. For more information please visit www.armacell.com/mo-references.