## THERMAL, ACOUSTIC AND FIRE PROTECTION

# Industrial Facilities

Insulating technical equipment is one of the simplest and most efficient measures to save energy in industrial processes. Armacell's best-in-class insulation systems ensure process stability, save energy, help to cut operating costs, reduce sound emissions and the risk of corrosion. Our thermal, acoustic, mechanical and fire protection solutions contribute towards a safer, more efficient and more sustainable industry. **Freeze energy costs and insulate your bottom line.** 

#### www.armacell.com



## SOLUTIONS ENABLING ENERGY SAVINGS.

We are the inventors of flexible foams for equipment insulation and a leading provider of engineered foams. Our lightweight thermal, acoustic and mechanical solutions create sustainable value for our customers. Innovation and entrepreneurship are an integral part of our DNA. We drive industry-leading solutions and aspire to launch new technologies using alternative resources or natural feedstock. Day in day out, our products significantly contribute to global energy efficiency and make a difference around the world.

In meeting the challenges of megatrends, such as energy efficiency, noise control, lightweighting, the globalisation of food and pharmaceutical supplies, our product solutions stand out in terms of functionality and ease of installation.

Armacell. Making a difference around the world.



## POWERING SUSTAINABILITY

The European Green Deal (EGD) provides for a mandatory reduction in greenhouse gas emissions of 55 percent by 2030 and increases the pressure on industry to take efficient measures to cut CO<sub>2</sub> emissions. According to recent studies by the European Industrial Insulation Foundation (EiiF), as much as 10 percent of the necessary CO<sub>2</sub> savings can be achieved by improving insulation or replacing damaged insulation.

Insulating process equipment is one of the simplest and most efficient measures to save energy in industry. Our insulation solutions reduce energy costs for the operators and tackle climate change by preventing CO<sub>2</sub> emissions. They ensure rapid amortisation and minimise the risk of downtime due to unplanned maintenance work. Even refurbishing while the facility remains operational is no sweat with our easy-to-install solutions.

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## PERFORMANCE, SAVINGS AND SAFETY

The demands made of industrial equipment insulation are diverse as they span different industries such as chemicals, pharmaceuticals, refineries and power generation as well as, food & beverage, textiles, semiconductor and automotive plants. However, stability and reliability are key, independent of the industry, as unscheduled downtime cannot be tolerated.

While the core purpose of insulation remains the same – performance and energy efficiency – the differences in operating conditions result in varying demands and the consideration of various insulation systems. Noise protection, extreme operating temperatures, mitigation of corrosion under insulation (CUI), mechanical protection, cleanroom environments and fire safety are key requirements which can only be fulfilled with innovative insulation systems.



# PROCESS STABILITY. KEEPING EQUIPMENT RUNNING.

Technical insulation keeps operations running, increases the efficiency of industrial processes and protects your employees.





Wenwei Holztrattner Project Manager at the insulation firm Batimat

"Our core business is consultation, planning and execution of technical insulation in the food, beverage and chemical industry. We have been relying on Armacell's technical insulation materials in our projects for many years. Quality and service are exactly right."

## **FOOD AND BEVERAGE**

#### MILEI (Leutkirch, Germany)

For almost five decades, MILEI in Leutkirch in the south of Germany has been making products from milk and whey. The new MILEI 2.0 building provides the company with one of the world's most modern facilities for producing functional, high-quality derivatives from milk and whey for the international food industry.

To insulate the process and fresh-water pipes in the new building, the insulation firm Batimat installed around 13,000 m AF/ArmaFlex<sup>®</sup> tubes and 5,000 m<sup>2</sup> ArmaFlex sheets as well as ArmaFix<sup>®</sup> pipe supports.

## AF/ArmaFlex and ArmaFix AF

STABLE PROCESSES ENSURE **HIGH PRODUCTIVITY** 



The most important aspect when planning industrial equipment is the production process itself. Technical insulation is crucial for the process to run correctly. It ensures that the liquids and gases in the pipes and vessels remain within the defined tolerances (temperature, viscosity, pressure

etc.). The temperature not only affects production stability and efficiency, it is also decisive for the quality of the products.



## OUR INSULATION SOLUTIONS

Insulating process equipment with ArmaFlex and ArmaGel<sup>®</sup> ensures that the plant functions reliably in the long term and increases its efficiency. In addition, our insulation materials require less maintenance, ensure low lifetime operating costs, and can extend the service life of mechanical equipment.

ArmaFlex and ArmaGel have excellent thermal insulation behaviour. Our ArmaGel products deliver up to five times higher thermal efficiency than traditional insulation materials, meaning that the required or desired insulation values can be achieved with extremely thin layers.

In order to prevent the risk of burns, accessible plant components must be insulated to ensure that their surface temperature does not exceed 60 °C.

ArmaGel rovides high insulation erformance at a fraction f the thickness of

#### ArmaFlex

is a highly flexible, closed-cell insulation material with outstanding thermal insulation behaviour.

# ENERGY EFFICIENCY. REDUCE COSTS AND CO<sub>2</sub>.

Insulating technical equipment is one of the simplest and most efficient measures to save energy and reduce CO<sub>2</sub> emissions in industry.



## WOOD PROCESSING

#### Pfleiderer plant in Novgorod, Russia.

In order to protect the production plant in the particleboard factory from unnecessary energy losses, plant components located outdoors were retrofitted with our precoated Arma-Chek Silver insulation. This significantly reduced the energy consumption of the drum dryers and other components. The 2-in-1 solution can be installed much faster than other systems - and time was of the essence in this demanding project.

## Arma-Chek<sup>®</sup> Silver



Although industrial equipment offers huge potential for saving energy, there is no legal requirement for a plant to do so. As the European Industrial Insulation Foundation (EiiF) has proven,

40 million tonnes of CO<sub>2</sub> could be saved throughout Europe every year if equipment was insulated according to VDI 4610, Class C. Realising this enormous energy-saving potential in industry would lower energy consumption by around 480 PJ, saving costs amounting to some 3.5 billion euros and reducing CO<sub>2</sub> emissions by 49 Mt.

## OUR ENERGY-SAVING SOLUTIONS

#### ArmaFlex

saves 140 times more energy than is required for its production, according to an independent life-cycle analysis. No other energy-saving measure pays off as fast. Our insulation solutions enable energy savings at comparatively low costs. Investments are generally recouped in less than a year and companies benefit from substantial energy- and cost-savings in the long term.

#### Highly profitable investment

Here is an example of the savings potential of a tank (diameter: 4 m, height: 16.5 m) with a medium temperature of 145 °C and an average ambient temperature of 10 °C: By insulating the full surface (50 mm HT/ArmaFlex and Arma-Chek R covering), 85 percent of energy can be saved compared to an insulation thickness of 5 mm. The costs would be recouped after just 4 ½ months. No other energy-saving measure pays off so quickly.





ENERGY EFFICIENCY



## LOW TOTAL INSTALLED COSTS

# PROTECTION AGAINST CORROSION UNDER INSULATION (CUI).

Corrosion costs the world economy around 3.4 percent of the global GDP annually. That's 2.5 trillion US dollars.



## REFINERY

#### KNPC Al-Zour refinery (Kuwait)

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When completed, the Al-Zour refinery will be one of the largest in the world. Latest technology will ensure that strict environmental regulations are met to protect the local surroundings while producing environmentally friendly products for global markets. ArmaFlex Class 0 insulation on plant components reduces energy losses, prevents condensation, and mitigates the risk of CUI. The ArmaFlex Protect passive fire protection inhibits the spread of fire and smoke to adjacent parts of the building.

ArmaFlex Class 0 and ArmaFlex Protect



Some 40 percent of the world's steel production is used to replace parts destroyed by corrosion. In Germany alone, corrosion destroys technology and infrastructure worth 75 billion euros every year. Oil and gas industries are not the only ones affected. Chemical,

pharmaceutical and food industries also suffer damage amounting to billions of euros annually. CUI is particularly insidious: if corrosion processes occur hidden beneath the insulation, they are often only noticed when extensive damage has already taken place. The choice of material determines whether the insulation minimises the risk of condensation and corrosion or favours corrosion processes.

## OUR SOLUTIONS

Our ArmaFlex and ArmaGel insulation materials were tested by InnCoa (Neustadt/Donau, Germany), an institute which is specialised in corrosion testing, and shown to offer an excellent degree of corrosion protection. ArmaGel's contribution to minimising the occurrence and spread of CUI was recently confirmed in a test carried out by the National Association of Corrosion Engineers (NACE) at the Southwest Research Institute (SwRI, San Antonio, Texas, USA).

ArmaGel is a hydrophobic (water-repellent) and breathable aerogel insulation.

#### ArmaFlex

is a closed-cell elastomeric foam with an integrated vapour barrier. Its high resistance to water vapour transmission prevents condensation forming on the surface of equipment and minimises moisture penetration into the insulation material.





CONDENSATION CONTROL



# SOUND INSULATION. A QUIETER ENVIRONMENT.

Compressors, pumps, motors, fans and valves generate considerable noise that is propagated through pipes.



## GAS PROCESSING

#### Etzel-Kavernenbetriebsgesellschaft (EKB), Etzel (Germany)

The Etzel salt dome in Friedeburg (North Germany) is one of the largest gas storage sites in Europe. The gas processing plant operated by the Etzel-Kavernenbetriebsgesellschaft (EKB) consists of various facilities for gas storage and withdrawal. To provide thermal-acoustic insulation on the pipework and other installations, employees of KAEFER Industrie GmbH (Bremen, Germany) installed Armacell's ArmaSound Industrial Systems.

## ArmaSound® Industrial Systems



**Reinhard Müller** Project Manager at KAEFER Industrie

"By installing the closed-cell ArmaFlex material and the non-metallic Arma-Chek cladding we were able to prevent the risk of corrosion under insulation (CUI). The ArmaSound Industrial Systems also have the great advantage of being quick and easy to install."





High noise levels, which can occur due to unprotected or inadequately insulated equipment, are not just annoying for employees, they can also be a health hazard. Noise

increases the risk of injuries at work and leads to a decline in concentration and individual performance.



NOISE PROTECTION



SOUND ABSORPTION



## THERMAL-ACOUSTIC SOLUTIONS

By combining acoustic and thermal insulation in a modular solution, ArmaSound Industrial Systems offer innovative sound protection constructions for a wide range of requirements. The systems allow you to combine various thermal (ArmaFlex/ArmaGel) and acoustic (ArmaSound) insulation materials and cladding materials (Arma-Chek R, Okabell® or glass-fibre reinforced plastic). Because of the thinner insulation thicknesses, they are lighter and more space efficient than traditional materials and need less complicated and lighter supporting structures. Depending on the specific requirements, our ArmaSound sound absorption foams and EVA/EPM massloaded barriers can also be installed as a standalone solution.

absorption across the complete frequency ermal range.

ArmaSound RD240

offers excellent sound

Arma-Chek R

is a non-metallic cladding which optimises the insertion loss performance of the system.

#### ArmaFlex

protects against thermal losses and delivers effective acoustic isolation.

ArmaSound Industrial Systems have been tested by renowned institutes and meet or exceed the requirements of the key noise control standards such as ISO 15665 classes A to C, class D of the Shell specification DEP 31.46.00.31, NORSOK R-004 (M-004) classes 6, 7 and 8 and ASTM E 1222.

ArmaSound Barrier E

is excellent at reducing transmission with ultra-thin thicknesses. The sound protection mat is recyclable and free of lead, halogen, phosphate and bitumen.

# CLADDINGS. PROTECT YOUR EQUIPMENT.

Technical insulation materials are clad to provide protection against mechanical impact, moisture, dirt, oil or chemicals.



# Ø

**Philipp Knierzinger** Managing Director of the insulation firm responsible for the project

"Especially in production areas where space is at a premium, Arma-Chek Silver is an ideal solution. Using the 2-in-1 product allowed us to save a great deal of time – a huge benefit when you're on such a tight schedule. And the result looks really good too."

## TEXTILE

#### Lenzing lyocell fibre plant, Lenzing (Austria)

With an annual capacity of 67,000 tonnes the Lenzing Grops's new lyocell fibre plant is four times as big as previous facilities and was constructed in record time. The pipeand ductwork of the complex air-handling systems had to be insulated on a very tight schedule. Unlike conventional insulation materials and claddings, Arma-Chek Silver can be installed in one work step. This allows considerable time-savings.

## Arma-Chek Silver



On equipment located outdoors, claddings and coatings provide protection against UV-rays, weathering and the increased risk of corrosion. In addition, they facilitate cleaning, which is paramount for installations in hygiene-

critical areas. Alongside sheet metal and stucco aluminium or PVC foils, alternative solutions made of flexible woven coverings or caoutchouc have become popular.

## CLADDINGS AND 2-IN-1 SOLUTIONS

#### Arma-Chek Silver, Arma-Chek D and IMO-certified Arma-Chek Juna

precovered, elastomeric insulation materials, which are installed in one work step, enabling significant time-, cost- and space-savings. When these much lighter coverings are used, it is not necessary to provide supporting and load-bearing structures, which are often needed for metal jackets.

#### Okabell

metal jackets are fabricated in various types of metal and design through to custom-made constructions. Electronically controlled production lines guarantee that the pipes, elbows, caps and end discs are 100 percent accurate to size.



is a non-metallic caoutchouc based cladding which retains flexibility and mitigates the risk of corrosion under insulation (CUI).





# EXTREME TEMPERATURES. THE HIGHEST DEMANDS.

Industrial processes often require extreme temperatures.





Today's chemical industry demands occupational safety, state-of-the-art thermal and acoustic solutions and a complete portfolio of cryogenic, dual-temperature and high-temperature solutions. For example,

did you know a typical day can see gases such as liquid natural gas (LNG), nitrogen, helium, oxygen and hydrogen being stored or transported at temperatures as low as -200 °C?



LOW TEMPERATURE



HIGH TEMPERATURE

## SOLUTIONS FOR EXTREME TEMPERATURES

HT/ArmaFlex High-temperature resistant elastomeric insulation for medium temperatures up to +150 °C.

#### ArmaGel HT

Next-generation aerogel insulation for pipework and equipment with an operating temperature of up to +650 °C.





ArmaGel DT Aerogel insulation material for low and dual-temperatures down to -196 °C.

# CLEANROOM. CLEAN AND HYGIENIC PRODUCTION.

Hygiene and cleanliness are paramount in many process industries.



#### THANNAGEOTICAE

#### Fresenius Kabi Labesfal S.A., Santiago de Besteiros (Portugal)

Labesfal S.A. is one of the top five generics producers in Portugal and since 2005 has been part of the German Fresenius Kabi group. To prevent products being contaminated, the construction materials used had to meet the stringent requirements for cleanroom technology. The air-conditioning ducts, ventilation pipes and filter boxes were insulated with ArmaFlex Ultima, which is based on Armacell's unique Armaprene technology.

## ArmaFlex Ultima



GMP-conform cleanrooms are standard in the pharmaceutical industry, medical and biotechnology and are also used in the food, semi-conductor, automotive and aerospace sector. In these industries it is crucial to ensure the lowest possible

levels of contamination. Ventilation and air-conditioning technology ensures that contamination is removed from the air either through a turbulent dilution flow or a low-turbulence displacement flow (laminar flow). The number of particles is controlled via the air flow, air humidity, air pressure and room temperature.

## OUR SOLUTIONS FOR CLEANROOMS

ArmaFlex products are dust- and fibrefree and provide protection against microorganisms. It is much more difficult for microbes to settle on the smooth, non-porous surface of the elastomeric insulation material than on an open-cell mineral fibre product. Because of their closed-cell structure and high resistance to water vapour transmission, our ArmaFlex insulation materials ensure reliable protection against condensation and moisture penetration.

> Our **dust**and fibre-free insulation protects against microorganismus

AF/ArmaFlex and SH/ArmaFlex are equipped with MICROBAN®. These antimicrobial additives offer proactive protection against harmful bacteria, mould and mildew.





## PROTECTION AGAINST MICROORGANISMS

# FIRE PROTECTION. THE TOP PRIORITY.

The real risk is not the fire but the consequential damage.



## **POWER GENERATION**

#### Linth-Limmern pumped-storage power plant, Switzerland

The new pumped-storage plant increases the performance of Linth-Limmern power stations many times over. At the heart of the mega project are the caverns which were blasted out of the solid rock. ENGIE Services AG from Zurich used halogen-free NH/ArmaFlex on the refrigeration equipment and ArmaFlex Protect for fire penetrations in walls and ceilings.

## NH/ArmaFlex and ArmaFlex Protect



Karl Podhradsky Overall Project Manager at ENGIE Services AG Zurich

"NH/ArmaFlex was installed on the cold installations. This meant that we could rule out the risk of aggressive substances forming in a fire and damaging the equipment. All penetrations were insulated with ArmaFlex Protect and sealed off in line with the regulations of the fire authorities."



Every year, fires destroy industrial assets worth billions. In Europe alone, they account for property damage amounting to 126 billion euros. Fire gases often cause greater damage than the fire itself. In major

incidents, the losses due to soot and corrosive gases make up over 50 percent of the total costs. In addition, there are often significant costs as a result of operational downtime.



## LOW SMOKE DENSITY IN A FIRE



## FIRE PROTECTION

## OUR FIRE PROTECTION SOLUTIONS

In a fire, halogen-free NH/ArmaFlex releases no corrosive gases which could form aggressive acids in combination with fire-fighting water. ArmaFlex Ultima is  $B_L$ -s1,d0 classified and develops 10 times less smoke than traditional elastomeric products. Our fire protection barrier ArmaFlex Protect and the ArmaProtect<sup>™</sup> System products have intumescent and ablative components which prevent fire spreading. The highly flexible ArmaFlex Protect also ensures effective thermal insulation and reliable condensation control.



# LONG-TERM RELIABILITY. SAFEGUARDING OPERATION.

Production downtime is the greatest business risk, no matter what the industry.



## **FOOD AND BEVERAGE**

#### Lindt (Aachen, Germany)

The chocolate factory in Aachen is the largest location of the international Lindt & Sprüngli Group and stands for growth. Whether for expanding production, renovating existing facilities or currently constructing a new refrigerated high-bay warehouse, the Lindt company has relied on cold insulation materials and passive fire protection solutions from Armacell for over 15 years.

AF/ArmaFlex, ArmaFix AF, HT/ArmaFlex SH/ArmaFlex, ArmaFlex Protect, Okabell



Udo Dohlen Owner and Managing Director of the insulation firm which carried out the work

"No other insulation material can be installed as simply, cleanly and reliably as ArmaFlex. We have been using the products very successfully for over 20 years. Armacell's system solutions ensure that process equipment can be operated reliably for years to come."



Just-in-time production, reducing stock levels and international supply chains mean that disruptions have far-reaching consequences and can threaten a company's livelihood. The COVID-19

pandemic has shown the fragility and growing vulnerability of our globalised and connected world.

## OUR SYSTEM SOLUTIONS

If condensation forms on technical equipment, the consequences are farreaching. Mould, corrosion, water dripping from suspended ceilings or downtime due to unscheduled maintenance work can soon result in enormous costs for industrial companies. We offer systems whose individual components are superbly coordinated with each other and which are tested as a complete system. To ensure professional workmanship, trained ArmaFlex installers can be certified and receive an extended warranty on AF/ArmaFlex products.

#### AF/ArmaFlex

offers superior performance at lower total installed cost. This material ensures that equipment is reliably protected against condensation and energy losses throughout its service life.

#### **ArmaFlex Protect**

enables pipe penetrations to be sealed off more simply than ever before, as well as providing effective thermal insulation and reliable condensation control.

#### ArmaFix AF

prevents thermal bridging and condensation, offering maximum reliability as well as quick and easy installation.



Arma-Chek Silver

is the ideal choice

in areas subject to

stress.

greater mechanical

# ARMACELL GOES BEYOND BETTER.

At Armacell, we are committed to creating an exceptional customer experience. We understand the challenges in today's industries and are here to help you complete your projects successfully. From the planning stage to the handover – our 360° service supports you throughout.

## Armacell Goes Beyond Better. Driving performance beyond the expected – Supporting you today and tomorrow.



## ARMACELL APPLICATION TRAINING

To ensure that our thermal and acoustic insulation materials are installed properly, Armacell has trained thousands of installers around the world. Special training centres have been set up at many locations and we also provide valuable support on site. Several thousand insulators attend courses on installing Armacell products every year and are awarded the ArmaFlex application certificate.

## ARMACELL ENERGY TEAM

Armacell's specialised energy team serves the oil & gas, petrochemical and power plants markets with a team of professionals around the globe for technical, calculation, application or testing and R&D support requirements related to our technical insulation systems.

## ARMWIN - PROFESSIONAL INSULATION CALCULATIONS

With our powerful ArmWin software you can carry out all common technical calculations - even on the building site, thanks to the app. You can easily determine the minimum insulation thickness required for condensation control, plus surface temperature, heat flow, temperature changes in flowing and stationary media, freezing times for water pipes and the most economical insulation thicknesses, i.e. those with the shortest pay-back periods.

## **BIM PLUG-IN FOR PLANNING TECHNICAL INSULATION**



The future of construction is digital: Business Information Modelling (BIM) allows mechanical equipment to be planned, built and operated digitally from design to commissioning, maintenance, demolition and disposal. Armacell's BIM plug-in is seamlessly integrated in the AutoDesk® Revit® programme and provides key product information. The software accesses the data required directly in the model and supports the user in choosing and configuring products.



ArmWin All technical insulation calculations in one tool.

## COMPANIES AROUND THE WORLD ARE RELYING ON OUR PROVEN SOLUTIONS

## Just a few of the successful projects:

## // Austria

Lenzing lyocell fibre plant, Lenzing

#### // France

Les Laboratoires Servier, Gidy & Bolbec Sanofi, Chilly-Mazarin BAPBAP Bières artisanales Parisiennes, Paris

#### // Germany

Lindt, Aachen MILEI, Leutkirch NXP, Hamburg VW Gläserne Manufaktur, Dresden Wacker Chemie, Burghausen Zeiss, Oberkochen

// Kuwait KNPC Al-Zour refinery

// Portugal Fresenius Kabi Labesfal S.A., Santiago de Besteiros

## // Russia

Pfleiderer, Novgorod

## // Saudi Arabia

Saudi Kayan Olefins plant

- // Serbia
  NIS Pančevo refinery
- // Spain Laboratorios Hipra Laboratorios Roche S.A
- // Switzerland

Linth-Limmern power plant CSL Behring, Lengnau Lonza, Visp Roche, Basel La Fromagerie Moléson, Orsonnes

- // Trinidad and Tobago AUM Complex
- // United States Pennsylvania Chemicals Port Arthur Ethylene Cracker

// Vietnam HyoSung Vina Chemical



## SMART SOLUTIONS FOR YOUR BUSINESS

**Enjoy the benefits of our excellent customer service.** All over the world, our customers rely on sales

representatives, technical consultants and applications engineers.

## Your project demands

**more**. You deserve the best solution. Get the original closed-cell thermal and acoustic solutions from Armacell.

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## ABOUT ARMACELL

As the inventors of flexible foam for equipment insulation and a leading provider of engineered foams, Armacell develops innovative and safe thermal, acoustic and mechanical solutions that create sustainable value for its customers. Armacell's products significantly contribute to global energy efficiency making a difference around the world every day. With 3,000 employees and 23 production plants in 15 countries, the company operates two main businesses, Advanced Insulation and Engineered Foams. Armacell focuses on insulation materials for technical equipment, high-performance foams for high-tech and lightweight applications and next generation aerogel blanket technology. For more information, please visit: www.armacell.com.

