Information for Armacell’s Business Partners

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Dear Business Partners,

Although construction activity improved noticeably in many countries in 2011, we look back on a difficult business year. While the Asia-Pacific market is growing steadily, some European markets – such as Spain, Portugal and Italy – shrank further. At the same time, we had to contend with an unprecedented explosion in costs: we experienced the sharpest price increase for raw materials which our industry has ever recorded. And it is already foreseeable that raw materials prices will rise still further in 2012. We will continue to reduce our process costs through optimization measures and will concentrate even more on our core business of flexible technical insulation materials.

The quality of our products is our greatest asset. Not only design engineers rely on it when specifying our products, but also millions of installers in their daily work. We have to continuously earn the trust given to us as the market leader worldwide. We do this, on the one hand, by providing our business partners with a high degree of reliability and guidance. For example, we are the first manufacturer of flexible technical insulation materials to offer CE-certified products since the beginning of the year. On the other hand, we support the insulation sector by launching innovative new product solutions and thus opening up new business potential for our customers. We already have some interesting projects in the pipeline for 2012. Prepare to be surprised!

Yours Stephan Kessel
CEO Armacell International
Cover story

Sustainable energy revolution focuses on energy efficiency and renewable energies

The reactor catastrophe in Fukushima has shattered trust in nuclear power throughout the world and led many countries to rethink their energy policy. Just three months after the nuclear incident, Germany committed itself to phasing out nuclear energy by the year 2022. At the same time, greenhouse gas emissions are to be reduced by 40 % by 2020 and 55 % by 2030. With these ambitious goals Germany is leading the way in the international community of states.

Energy revolution is necessary and technologically feasible

Fossil fuel deposits are finite and will be exhausted in the foreseeable future. The carbon dioxide released when they are used promotes global warming and leads to climate changes worldwide. Nuclear energy has turned out not to be a sustainable alternative. An uncontrollable residual risk is associated with the technology and the issue of radioactive waste storage has still not been resolved. On the other side of the equation, the energy demand remains high in the western industrial nations and there is a growing hunger for energy in the newly industrialized countries.

A future-viable, sustainable energy supply is one of the greatest societal challenges of our time. The energy revolution must be based on the following components: increasing energy efficiency and developing renewable energies. In this context, climate protection, security of supply and economic viability must be reconciled with each other. A secure supply can – at least in the next decades – only be ensured through the parallel use of conventional energy resources.

Increasing energy efficiency

From an economic point of view, programmes to increase energy efficiency are the most appropriate way towards an energy revolution. Using energy-efficient technologies can save valuable resources (fossil fuels, electricity from nuclear power). Experts believe that, in the short term at least, twice as much can be achieved through energy-saving measures as by developing renewable energy sources. Many of the measures pay off in the near term, i.e. the investments have been recovered after just a few years. One of the simplest, most cost effective and efficient energy-saving measures is the optimal insulation of mechanical equipment – this is true both for the building sector and for industry. As a recent study by Ecofys, an internationally leading consultancy in renewable energy and energy efficiency, has shown, the insulation of industrial plant is not usually economically designed. The use of optimized insulation systems allows energy savings of up to 45 %. In industry these investments have often paid off after just a few months. Unlike in the case of buildings or transport, there is as yet no energy-saving programme for the industrial sector. In October 2009, leading insulation manufacturers and insulators founded the EiiF (European Industrial Insulation Foundation) to draw attention to the enormous potential for energy and CO₂ savings and to bring about changes in industry.

Developing renewable energies

The aim of a sustainable energy supply is to replace finite fuels (oil, gas, uranium) with renewable resources such as solar energy, wind power, geothermal energy, biomass, hydropower or ocean thermal energy. The conditions for the various energies differ from country to country and therefore cross-border concepts which take seasonal fluctuations into account are to be recommended. In recent years, increasingly efficient technologies for generating energy have been developed, however there is a lack of cost-effective storage technologies. The aim is to link the generation, transport and storage of renewable energies

*Primary energy consumption worldwide*

*in millions of tonnes of oil equivalent*  
(Source: BP Statistical Review of World Energy June 2011)
intelligently. Obviously the precept of energy efficiency also applies to renewable energies. Here, too, optimal insulation – of the pipes of solar thermal systems, for example – plays a crucial role in ensuring that as little of the solar gain as possible is lost.

Ensuring security of supply

By the year 2020, the proportion of renewable energy in the final energy consumption of the European Union should amount to 18%; by 2050, 80% of the electricity generated should be derived from renewable energies. Securing the energy supply is at the top of the political agenda in the EU member states in order to prevent ‘the lights going out’ over Europe.

Natural gas is relatively low emission, but depends to a great extent on imports and holds risks as far as the price is concerned. To increase the security of supply and reduce the dependence on the major natural gas providers (Russia and the CIS countries), natural gas is stored on a large scale in underground caverns and liquid natural gas (LNG) is becoming more and more important. By cooling natural gas down to -162 °C it is reduced to one six-hundredth of its volume and can be transported economically by LNG tankers. In this way, natural gas can be provided by regions which are not connected to Europe by pipelines. This reduces the dependence on individual supplier countries and increases the security of continuous supply.

Armacell’s customers are well positioned for the energy revolution. Armaflex insulation materials for mechanical equipment in buildings and industry have proven themselves millions of times all over the world. The company provides a wide range of product solutions – from pre-insulated solar pipes to special cryogenic insulation systems for LNG technology. As the energy-saving sector the insulation industry is spearheading the energy revolution.

(Malte Witt)
Armaflex Duct: The flexible air duct insulation with an attractive silver finish

Armaflex products have proved their value for insulating air ducts throughout the world. Whereas in the past different materials were sold for this application area in the different markets, Arma-cell now offers Armaflex Duct, a new product specially developed for this purpose. Armaflex Duct protects air ducts against unnecessary energy losses. The closed-cell structure prevents condensation forming on the surface of the duct and protects the insulation against moisture ingress. Like all Armaflex products, Armaflex Duct has good noise absorption properties. Furthermore, the insulation material reduces breakout noise and decreases the transmission of structure-borne noise into the building.

Highly flexible and easy to install
The highly flexible, dust- and fibre-free material can be installed much more easily and quickly than traditional insulation materials. The self-adhesive version in particular allows considerable cost savings during the installation process. The attractive aluminium facing is easy to clean and at the same time protects the elastomeric insulation material against mechanical impact. In addition, the embossed facing with the product logo serves as a practical measuring and cutting aid when installing the material.

Armaflex Duct is supplied as a 1.5 metre-wide endless sheet in the insulation thicknesses 9, 15, 19, 25 and 32 mm. The product will be available as standard or self-adhesive material with and without an aluminium facing in many European countries from April.

Monarch #2003: New high-density technical foam
A new addition to the Monarch range is a neoprene-based technical foam with a high density. The material was developed for applications requiring not only the fine-cell surface typical for block foams, but also high tensile and tear strength and low compression set. The closed-cell Monarch foams are used for gaskets in the automotive industry and other sectors and for expansion joints in the construction industry. The product was launched in the USA in November.

ArmaFORM PET AC 200: Foam core with higher density
Armacell has added a product with a density of 200 kg/m³ to its range of PET foam cores. ArmaFORM PET AC 200 features high compression and peel strength and improved screw retention strength compared to other PET foam cores available from Arma-cell. Foam cores with high densities are used in particular where very high loads have to be borne, for example in the vicinity of motors and engines in boatbuilding or rail vehicle construction. Furthermore, ArmaFORM PET AC 200 is also suitable for the construction of ship hulls, where the foam is used for cross-walls and cross-beams.
ArmaPlus: New digital services

ArmaPlus e-News: Company news by email
Since the beginning of the year, we have been providing a new email news service to keep our business partners up to date with the latest developments. In the ArmaPlus e-News we report on new products, market trends, news from within the company and exciting projects. Many of our business partners have already registered at www.armacell.com and now receive news from the company on a regular basis.

ArmaPlus MultiMedia – the Armacell YouTube Channel
Videos provide an interesting opportunity to present important product information in film form. The Internet allows content to be published simply and accessed quickly. Since the beginning of 2011, Armacell has been using YouTube, the international video portal, for this purpose and has installed its own video channel. Under Armacell MultiMedia professional installers will find a multi-part series on how to install Armaflex products correctly, for example.

In a product video, Armacell compares the time needed for applying the new Arma-Chek Silver with that for installing traditional metal claddings. And the latest addition: a video on the new Armaflex Cryogenic Systems, which is likely to interest plant operators, design engineers and installers alike. The content is updated regularly, so it is worth looking in frequently.

QR code leads straight to further information on Armacell website
Armacell is now using QR codes in its product literature in many countries. These black and white pixel boxes can be scanned by smart phones and will lead directly to further content (e.g. installation tips) on the relevant webpages. QR stands for quick response and meanwhile the codes are used throughout the world in advertisements, brochures and print media to provide additional information in seconds.

Armacell module for BIM Revit® 2012
In the USA, Armacell is the first manufacturer of elastomeric insulation materials to offer a specially developed BIM module for designing mechanical insulation in buildings. Building Information Modelling (BIM) brings a completely new quality to building design, construction and maintenance. The 3-D tool creates a digital representation of a physical building and is used by architects and design engineers for design purposes, by building contractors for construction work and by building owners for facility management. Many companies in the USA already work with BIM systems and the Revit® MEP software has established itself as the standard in the field of building services engineering. The object-oriented development tool not only increases speed, accuracy and efficiency, it also makes it much easier for the trades involved in the construction of the building to collaborate.

The Armacell Insulation BIM module is a custom application for BIM Revit® MEP users to download into their system. Once integrated into their system, BIM users have the ranges, physical properties, product descriptions, applications and uses for Armacell products at their fingertips to include in their drawings and calculations.

The Armacell BIM module for Autodesk® Revit® 2012 can be downloaded from the US website (www.armacell.com/us), where a video for loading and using the program is also available.

Theresa R. Mitchell
Does Armaflex meet the high hygiene requirements of the food and beverage industry?

Extremely high hygiene standards apply in the food and beverage industry. The insulation materials used should be protected against contamination by micro-organisms and prevent biofilms developing.

As closed-celled, fibre-free materials, all Armaflex products have passive protection against micro-organisms. In fibre-based insulation materials dust and dirt particles can easily settle and then in combination with moisture provide an ideal breeding ground for mould and other microbes. However, it is much more difficult for germs to settle on the non-porous surface of an elastomeric material and find the nutrients they need to grow. The smooth surface is easy to clean and the plastic foam does not release fibres or particles which could get into the production process. In addition, unlike open-cell materials, due to its closed-microcell structure and high resistance to water vapour transmission, Armaflex has reliable protection against condensation and moisture ingress. This ‘built-in’ vapour retarder is not concentrated on a thin foil which could easily be damaged; the resistance to water vapour transmission is built up throughout the entire insulation thickness. Because of these qualities, Armaflex insulation materials offer passive antimicrobial protection.

Active antimicrobial protection provides added security

Armacell further increases this security by equipping its premium products with active protection against bacteria, mould and mildew. Antimicrobially-active Microban® additives are built into the Armaflex products during the manufacturing process. These additives penetrate the cell walls of the microbes and disable important cell functions. As a result, the micro-organism is unable to function and can no longer grow or multiply. The Microban® technology inhibits the growth of microbes, mould and mildew on the insulation throughout its service life. Because the insulation material is equipped with this protection directly at the manufacturing stage, it cannot wash or wear off. The antimicrobial behaviour of the Armaflex insulation materials has been tested in accordance with ASTM G21 and ASTM 1338 and no fungal growth was detected.

Due to the active antimicrobial protection, the Armacell products AF/- and SH/Armaflex are especially suitable for applications in the food, beverage and pharmaceutical industries. They have been used many times in process industries in which cleanroom conditions prevail.

( Georgios Eleftheriadis)

In the food industry technical insulation materials are usually clad with stainless steel for cleaning purposes, e.g. water or steam blasting. If unsuitable products are used here, ‘microbial time bombs’ can develop unnoticed under the covering.
In November 2011, Armacell adopted a Code of Conduct, which commits all employees worldwide to behave ethically. The Code of Conduct is based on values and principles which are valid throughout the Armacell group and provides a benchmark against which all business activities must be evaluated. Each individual Armacell employee is personally responsible for doing the right thing: behaving legally and honestly towards business partners, colleagues and the general public.

The Armacell Code of Conduct is based on six fundamental corporate values: mutual esteem, individual responsibility, integrity, customer orientation, quality consciousness and sustainability. But it not only defines binding standards of behaviour for all Armacell employees, it also indicates how they should be implemented.

Y-strainers filter out particles which could contaminate or block pipes. To ensure trouble-free operation, the fittings must be cleaned regularly. Therefore, insulator Kwang Re Chung and Hee Jun Yang, application specialist at Armatech Corporation (Armacell’s distributor in Seoul, South Korea), have designed a removable insulation cover:

‘Correctly installed Armaflex insulation provides effective condensation control on the Y-strainers of refrigeration and air-conditioning systems. We recommend the insulation concept suggested by Armacell, but do not glue the front disc. Our experience has shown that this part of the insulation is cut open for cleaning purposes and not re-glued properly afterwards. As a result, condensation occurs.

In order to make maintenance work easier, we use a removable insulation cover. The cover is not glued to the insulation layer beneath, but is laid around the insulated strainer like a “blanket” and equipped with a zipper at the back. The plastic zipper is glued to the seam edges using Armaflex Adhesive 520. For cleaning purposes the cover can simply be opened, removed and then closed securely again.’

Dedicated and professional employees are Armacell’s greatest asset. In this context, and in an increasingly complex global environment, values which are anchored in the corporate culture provide important guidance and a good basis for business success. They form the foundation for the professional behaviour of each individual employee and for employees’ relationships to Armacell’s business partners. Armacell’s customers benefit from the high quality of the company’s products and through collaboration with Armacell employees who are committed and take responsibility for their work.

(Susan Heuer)
Saving time and money with pre-covered insulation systems

Insulation on industrial plant often has to meet high demands. Therefore, coverings are installed to protect the insulation materials against mechanical impact, moisture, dirt, oil or production chemicals.

Traditionally, sheet metal, coarse-grain aluminium foils or rigid plastics, such as PVC, are used as covering materials. Apart from these commonly used materials, alternative solutions made of flexible, woven fibres or rubber have now also been available for some years. They are rot-resistant and offer high mechanical stability whilst still retaining a certain degree of flexibility.

Quick-to-install 2-in-1 solutions

Some of these systems are also provided as 2-in-1 products, i.e. as factory-covered insulation materials. Using these products saves a considerable amount of time, and therefore money. Unlike traditional insulation materials and coverings, Arma-Chek Silver and Arma-Chek D can be installed in one work step. Arma-Chek Silver is now also provided as pre-fabricated elbows and T-pieces. These shaped pieces take a particularly long time to fabricate. Another key benefit is the direct connection to the adjoining insulation which rules out the risk of water penetrating at these points.

The fact that flexible coverings can be installed much faster than traditional metal claddings is demonstrated in the new Arma-Chek Silver Video on www.youtube.com.

CE marking for technical insulation materials

In August 2012, the time will finally arrive when only technical insulation products which comply with the European product standards and bear the CE mark may be sold in Europe. A mandatory framework will then apply for the key product features of technical insulation materials – such as thermal conductivity, resistance to water vapour transmission, fire behaviour, tolerances etc. The transparency achieved will allow specifiers, distributors and installers to make a quick and direct comparison between the products on offer.

European fire classification

One important change is that the national fire classifications which have applied so far, such as the German B1 and B2 fire classes or the Spanish M1, will be replaced by standardized European fire classes. The new classification uses the seven fire classes A to F which are already valid for other construction products. For pipe insulation a subscripted ‘L’ (for ‘linear products’) will be added. Another new feature is the information on smoke development and burning droplets, which will be marked with ‘s’ and ‘d’ respectively.

Since the beginning of 2012, Armacell is the first manufacturer of flexible technical insulation materials to provide CE-certified products. The insulation plant in Münster was successfully certified in November 2011. In the European fire test, the majority of the Armaflex products achieve the class B/B₁-s3, d0, the best possible fire class for elastomeric insulation materials.

(Georgios Eleftheriadis)
Higher insulation level in cold applications pays off

It is now common knowledge that considerable energy savings can be achieved through optimized insulation. Investments in the insulation of the building service equipment pay off particularly quickly. This is not only the case for heating, but also for refrigeration and air-conditioning technology.

Armacell Study

Today, the insulation of cold pipes is mainly aimed at preventing condensation. Therefore, it is common practice to determine insulation thicknesses solely from the perspective of condensation control.

As a rule, insulation thicknesses of 6 to at most 13 mm are used. Yet, as the results of a recent study carried out by Armacell show, much higher energy and CO₂ savings are possible when greater insulation thicknesses are used. The objective of the study was to find an optimal, thus also cost-effective insulation thickness for various types of plant. For this purpose, Armacell determined the savings which are achieved through higher levels of insulation – i.e. insulation thicknesses which go beyond condensation control insulation (usually 9mm). These savings were then compared with the investment costs. The subject of the investigation were variously-complex building air-conditioning systems with different cooling demands and typical refrigeration systems which are used in supermarkets for storing and selling foodstuffs.

Costs for optimal insulation thicknesses are amortized

Irrespective of the complexity of the system and the cooling demand, in air-conditioning applications an optimal insulation thickness of 15.5 to 25.0 mm was determined for chilled water pipes. The higher investment for the thicker layer of insulation pays for itself in the course of the service life, allowing considerable financial savings after a few years. For the refrigerant pipes of refrigeration systems an even higher level of insulation pays off. For these pipes Armacell recommends Class O Armaflex 32mm as the optimal insulation thickness. The higher investment costs have been amortized after just 7 to 9 months!

Considerable potential for CO₂ savings

The results are also remarkable from an environmental point of view. CO₂ emissions from the systems investigated can be reduced by several tonnes annually just by insulating the pipes optimally. These findings allow generalizations about the environmental performance of the insulation material: per installed cubic metre of Armaflex, the use of optimal insulation thicknesses allows annual CO₂ savings of approx. 1,150 kg in the operation of air-conditioning systems, approx. 1,900 kg in the operation of refrigeration systems with a line temperature of -5 °C and approx. 2,550 kg in the operation of refrigeration systems with a line temperature of -36 °C.

While there are no legal requirements regarding the insulation level used in cold applications in many countries, in Spain the RITE (Reglamento de Instalaciones Térmicas de los Edificios) for the chilled-water pipes of air-conditioning systems already stipulates insulation thicknesses of at least 20 – 40 mm (depending on the pipe diameter).
New Armacell Training Course in Oldham, UK

Armacell UK provides a free of charge accredited installer training course once a month from our Oldham plant, details of which can be found in the ArmaPlus pages of our website.

In addition to applications training, our technical support service is also available Monday to Friday from 9am to 5pm
Tel: 0161 287 7038.

All European Armacell insulation plants environmentally certified

Following the successful ISO 14001 registration of the Armacell site in Sroda Slaska (Poland) in June last year, all European insulation plants now bear this internationally recognized environmental seal of approval. The ISO 14001 standard defines all the globally accepted requirements for an environmental management system; registration is carried out by third-party authorities. Since its introduction in 1996, the ISO 14001 has established itself as the internationally accepted standard for environmental management.

FEF/PEF Interest Group (CEFEP)

The vast majority of European manufacturers of elastomeric and polyethylene products for technical insulation have now joined forces to form the European FEF and PEF Interest Group (CEFEP). CEFEP was founded at the initiative of Armacell and other leading insulation manufacturers and represents the industry on important European and national committees. The manufacturers had already introduced the RAL FEF/PEF Quality Mark to provide reliable guidance for the user in March last year.

Armacell opens warehouses in Russia

Following the opening of its first central warehouse in the Russian capital in June 2010, the insulation manufacturer has set up a further distribution warehouse in Novosibirsk (Siberia). In Moscow Armacell stores its wide variety of products for the Russian market on a floor space of 1,200 m². The new warehouse in Siberia has enabled the company to offer business partners in this region even shorter delivery times. With these investments Armacell is further strengthening its position on the Russian market.
Armaflex installation training in Central Europe

In many Central European countries, Armacell now offers installation courses which are meeting with great success. In the first half of 2011 alone, over 100 installers took part in the 13 seminars held in five countries.

Providing these courses is the first step towards introducing the Armaflex System Warranty in the markets. With this concept Armacell aims to increase quality and reliability in the installation of its insulation materials.

### Personnel

On 1 November 2011, Denis van Roey took over the position of Chief Financial Officer (CFO) of the Armacell Group worldwide. Denis van Roey has more than 24 years of experience in Finance in several international companies such as Deloitte and Heidelberger Zement. He has worked for Armacell for 8 years, first as Finance Manager of Armacell Benelux S.A., then as Director Group Controlling at the headquarters in Münster. On Armacell’s Management Board he is responsible for the areas of Finance and Accounting, Controlling, IT, Legal Affairs and Patents.

Armacell has appointed Bernard O’Neill to the new position of IMPS Director. Bernie O’Neill has over 30 years’ experience in the international oil and gas industry and has worked for companies such as Kaefer, Cape PLC and, most recently, Therm Shield. He has been the head of Armacell’s global Engineered Systems Team since July 2011.

Tom Mix joined Armacell as Business Director, Insulation North America, in April 2011. Before moving to Armacell, he worked for Aeroglide (now Bühler Aeroglide), the market leader for thermal processing equipment, for almost 20 years. Here Danish-born Tom Mix most recently served as Senior Vice President, Worldwide Sales.

In July 2011, Klaus Peerenboom succeeded Giel Vaessen as Business Director Europe North, thus also assuming responsibility for the Benelux, Scandinavian and Baltic markets. Klaus Peerenboom joined Armacell in 2010 and as Sales & Market Manager was initially responsible for the German market.

### Armacell’s trade fair activities 2012

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<td>Chillventa</td>
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For all trade fairs see: www.armacell.com
District heating pipework (Geneva, Switzerland)

More heat from waste: HT/Armaflex in the heating plant of Geneva’s public utilities company

Whereas in the past waste incineration plants were seen as notorious polluters, today they conserve the environment through the clean production of district heat and electricity. Since 2002, the waste heat from Geneva’s Les Cheneviers incineration plant has been fed into a district heating network which supplies around 40,000 inhabitants. In spring 2011, the pipework was extended from the heating plant of Services industrielles de Genève (SIG) to the Aux Franchises district.

High-temperature insulation with HT/Armaflex
The pipework consists of two lines each with a feed and return. The four main pipes first run through the car park beneath the SIG building and from there are laid underground as distribution pipes. Caliqua AG Basel, a subsidiary of the Swiss company Cofely, used HT/Armaflex to insulate the pipes, which have a line temperature of 90 to 125 °C. The high-temperature insulation material is suitable for systems with high or dual temperatures and maintains its technical properties at temperatures up to +150 °C (up to +175 °C in the short term).

The Geneva-based insulation firm Werner Isolations SA fulfilled the client’s requirement that the surface temperature must not exceed 28 °C with an insulation thickness of 50 mm. The fact that the insulation was to be clad had to be allowed for in the calculations. The surface temperature increases due to the aluminium cladding. The tolerated increase of 10 % was not exceeded.

Special-size Armaflex sheets
For this demanding project Armacell produced a special version of the HT/Armaflex roll material which was 1 m wide and 5 m long. This format had the advantage that three pipe sections could be insulated with one roll. Two employees spent around 1 ½ months installing the 1,600 m² of Armaflex sheet material. The insulation materials were supplied by Regisol AG from Busswil.

Jacques Schlup, owner of the insulation firm Werner Isolations SA (Geneva):

‘In this project we would have run into real space problems with other insulation materials because the pipework was directly beneath the ceiling of the underground car park. But a calculation with the ArmWin programme soon showed us that the requirements for the surface temperature could be met with a 50 mm thick HT/Armaflex insulation. As we have many years of experience in installing Armaflex, the tight schedule wasn’t a problem either. Of course, it was great to be able to get the special-size sheets and that we had hardly any wastage.’
Dalian LNG Project (China)

Armaflex Cryogenic Systems in China’s largest LNG plant

After the nuclear reactor catastrophe in Japan, China is also relying more and more on natural gas for its energy supply. To meet the growing demand for energy, the state is investing billions in the construction of natural gas pipelines and LNG terminals. In summer 2007, CNPC, China’s largest state-owned oil and gas company, began to build its first LNG plant in Nianyu Bay near the port of Dalian with a total investment of over 1 billion euros. The result is the country’s largest LNG port.

LNG plants require high-performance insulation materials

So that natural gas can be transported economically, it is cooled down to its condensation temperature of -162 °C, thus reducing its volume to one six-hundredth. This cryotechnical process requires high-performance insulation systems to keep the energy losses during liquefaction, storage and regasification as low as possible.

Cost-effective insulation systems for low temperatures

The Beijing-based consultant engineering firm, China Huanqiu Contracting & Engineering Corporation (HQCEC), specified the new Armaflex Cryogenic Systems to insulate the cryogenic pipework and other installations in the Dalian LNG terminal.

The flexible multilayer systems for temperatures ranging from -200 to +125 °C ensure exceptional thermal insulation, reduce the risk of corrosion under insulation (CUI) and allow significant cost savings during the installation process. Armaflex Cryogenic Systems maintain their flexibility even at extremely low temperatures. With Armaflex LTD Armacell has succeeded in producing a diene terpolymer with a glass transition temperature which is lower than ever previously achieved. It ensures that vibrations and impact are absorbed and the risk of cracking as a result of extreme temperatures cycles is significantly reduced. A key advantage of the cryogenic foams is that, unlike insulation materials made of rigid foams, these systems need neither additional expansion joints nor vapour barriers. This allows great reductions in installation costs compared to traditional insulation materials.

Local project support

In the Dalian project, all LNG process and vaporization pipes (including pumps, valves and other fittings) were insulated with the multilayer system. In total, Da Shun Petrochemical Engineering Company (DPEC) from Dongying (Shandong Province) installed 15,000 m² of Armaflex LTD, 27,000 m² of Armaflex LT sheets and 3,000 m of Armaflex tubes. Throughout the specification and installation phase of this highly demanding project, the 80 employees of DPEC were supported by five teams of Armacell application specialists. The insulation work on the pipeline, which is around 7 km long, was carried out from January to September 2011.

(Scott Fang, Merlin Sha)
In September last year, USNS William McLean was the twelfth of fourteen new cargo ships to be delivered to the US Navy. The ships are in effect ‘floating superstores’ which transport everything from ice cream to ammunition.

**Complex challenges for the technical insulation**
The onboard mechanical systems are as diverse as the cargo itself. Apart from the HVAC systems for the crew, the ships also have large refrigeration and freezer units for storing the foodstuffs.

When selecting the insulation materials, not only the diverse operating temperatures had to be taken into account, but also the regulatory requirements of the US Navy, which stipulate that the construction materials used must have low flame spread and low smoke gas and toxic emissions.

### Halogen-free insulation with NH/Armaflex
The insulation specialists Performance Contracting Inc. (PCI) of San Diego (California) were commissioned to specify and install the technical insulation materials. PCI specified mainly NH/Armaflex, the proven elastomeric insulation material for particularly high safety requirements. The product does not contain chlorides, bromides or PVC. It has low smoke gas emissions and displays good practical fire behaviour. NH/Armaflex is FM- and UL-approved, IMO-certified and fulfils the strict requirements of the US Navy’s EB 4013 specification.

### Quick and easy to install
Apart from their good technical properties, Armaflex insulation materials are characterized by their unrivalled ease of installation, which is an enormous benefit particularly in tight spots. Installation is even faster with self-adhesive materials. Using the self-adhesive NH/Armaflex sheets enables PCI to stay within the narrow timeslot for insulation work in the building schedule. PCI now uses mainly NH/Armaflex for mechanical installations in many projects as a system with the Armafix NH pipe hanger.

**System pipe support to prevent thermal bridging**
The pipe support for cold applications, which is coordinated with the NH/Armaflex range, provides optimum security in the sensitive area of the pipe bracket. Armafix thermally isolates the pipe from the bracket and thus prevents thermal bridges and condensation. The Armafix pipe support consists of Armaflex in which compression-proof PUR/PIR segments are embedded. PCI has used several hundred Armafix NH pipe supports on various cold lines on the T-AKE cargo ships.

*(Scott Sinclair)*