

ARMACELL SOLUTIONS

Supermarket

Supermarkets and grocery stores are pillars of our society and are constantly looking for ways to improve the shopper's experience and adapt to new shopping landscapes. With tight margins and high overhead, supermarket corporations as well as mom and pop shops each need to find strategies to keep costs down. Controlling the cost of refrigeration and optimizing energy use is one way this is achieved. Armacell has new Supermarket Solutions in store for the grocery market.

www.armacell.us



 **armacell**[®]
MAKING A DIFFERENCE AROUND THE WORLD



PRODUCT
SPOTLIGHT

TRUST THE ORIGINAL

Insuguard Pipe Saddles

Insuguard® is the patented, easy-to-install pipe saddle for HVAC/R applications. Insuguard is today's most practical and economical solution to standardize pipe installations, improve appearance and completely eliminate premature insulation tears, costly leaks and loss of refrigerated merchandise caused by inadequate suspension systems.

- // The original innovative design
- // Field tested and installed for over 15 years
- // Specified by leading supermarket and retail chains
- // Ask for the product trusted by the industry

www.armacell.us | www.insuguard.com



Don't be
fooled by
imitations.



armacell®

Insuguard®



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ABOUT ARMACELL

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. Day in and day out, our products significantly contribute to global energy efficiency, urbanization, lightweighting, the globalization of food supplies and acoustic comfort. Our product solutions stand out in terms of functionality and ease of installation.

// Passionate

Dedicated and professionally-minded employees with an entrepreneurial spirit are our greatest asset. They share a common set of core values: customer experience, commitment, empowerment and accountability, integrity and sustainability.

Armacell.

Making a difference around the world.

300+
active patents

24
production facilities
in 16 countries on
4 continents

3,100
employees worldwide
representing
70 different
nationalities



SOLUTIONS

ENABLING ENERGY SAVINGS

// Innovative

We develop new technologies and focus on products that deliver superior technical performance. Now in its seventh generation, ArmaFlex® is the original flexible elastomeric foam insulation material for superior condensation control and thermal performance. Our most recent product launches include ArmaFlex Ultra, the first elastomeric insulation Classified by UL to UL 723 at 25/50.



// Consumer-centric

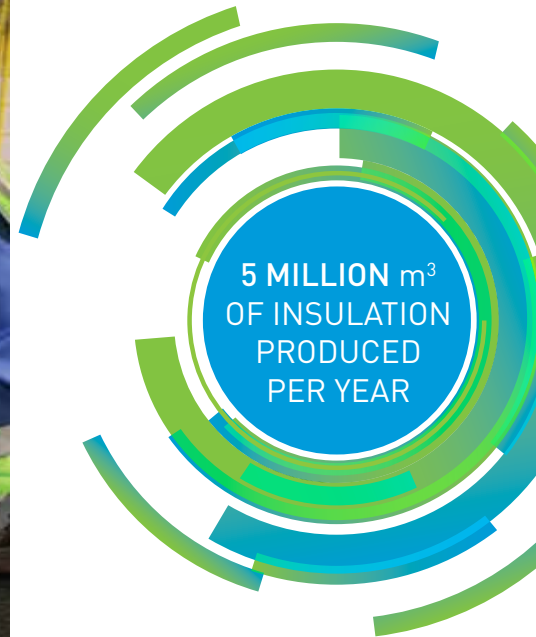
We create genuine value for our customers, value them as partners, and are committed to developing solutions tailored to their requirements. The outcome is added value for our business partners and, most significantly, energy savings and a longer working life for their critical equipment.



140 x MORE
ENERGY
SAVED

// Sustainable

We dedicate our business activities to advancing and optimizing energy efficiency for equipment and to closing the loop to achieve a more sustainable use of resources. Our ArmaFlex insulation saves 140 times more energy than is required for its production and prevents the emission of several million tons of CO₂ per year.





SUPERMARKET SOLUTIONS

Supermarkets and grocery stores are a \$6.8 billion industry that has seen slow but steady growth in the past five years. Recent events have also shown how essential this industry is to American well-being. However, supermarkets operate on very low profit margins, about 1-2% of sales, with very high overhead. By far a grocery store's highest expense is product inventory (food) at around 75%. Next is labor at about 10% of its expenditure.

That doesn't leave much left over for all the other costs of running and maintaining a business. While energy costs are only about 2% of revenue, 56% of a supermarket's total electricity load is refrigeration. The EPA estimates a 10% reduction in energy usage is equivalent to increasing net profit margins by 16%!

There are more than 38,000 supermarkets in the US and each one has on average of 10 walk-in cooler or freezer units. These refrigeration units must run 24/7; obviously there's no turning them down at night when the store is closed, so finding strategies to save energy starts with the design of the system.

ENVIRONMENTAL HISTORY

To understand the challenges of refrigeration technology, we need to look back at the Montreal Protocol of 1987. When scientists began to track the alarming depletion of the ozone layer, the international community met to create a treaty designed to phase out the use of ozone-depleting substances like chlorofluorocarbons (CFCs), commonly used as refrigerants and propellants. Next on the list were hydrochlorofluorocarbons



The average US
Supermarket is
50,000 ft²

(HCFCs) to be reduced by 2015. This spurred the measurement of a refrigerant's ozone-depleting potential or ODP. Hydrochlorofluorocarbon (HFC) refrigerants like R-22 were developed that have a low ODP of 0.05 compared to CFCs which have an ODP of 1. Unfortunately HFCs have other concerns in that they are greenhouse gasses that contribute to global warming. Therefore the GWP or global warming potential is also calculated. To balance all this potential, a third score of total equivalent warming impact (TEWI) is used to verify a refrigerant's overall sustainability. Supermarkets use the TEWI score to help gauge the aggregate climate impact of a refrigeration system.

The need to find low-GWP alternatives has led to the emergence of hydrofluoroolefins (HFOs) and so-called natural refrigerants like CO₂, propane, butane and ammonia. One downside is that with the exception of CO₂, these refrigerants are flammable, and NFPA, ASHRAE and other building and life safety codes must govern the safe use of these systems.

REFRIGERATION SYSTEMS

Supermarkets use several types of refrigeration cases, cooler rooms and freezers. There are the medium cooling, horizontal, open cases where cooled produce, meats and cheeses are displayed at about 35-38°F. These are the least energy efficient as all the air curtain



cooling is released into the store. Usually at the back of the store you'll find upright refrigerators with doors where dairy products are kept at 38°F, but these are just the front ends of much larger cold-rooms behind the main shopping floor. Most stores have aisle and aisles of upright freezers where the coldest items are kept anywhere from -5 to -24°F. All of these display units are operated by refrigeration plants either in the back rooms or on the roof.

Direct expansion (DX) and secondary loop (SN) systems are common in supermarket design. One difference between the two types of systems is the amount of refrigerant used. Because DX systems require twice as much refrigerant and due to environmental concerns and regulatory pressures, SN systems are gaining in popularity. DX systems also rely on the refrigerant changing from liquid to vapor as it boils entering the evaporator. There is no change of state of the coolant in SN refrigeration.

A traditional DX system consists of compressors, condensers, expansion valves and evaporators. The system operates at high pressure to maintain around 100°F of constant temperature using a refrigerant vapor expansion and compression cycle. When the system expels the cold air at the display cases, it gains heat at the same time. Liquid refrigerant boils at a low temperature turning to superheated vapor at the end of the evaporators. The compressor will pump the superheated vapors from evaporators on the low-pressure side and compress to high-pressure side of compressor to engage the compression cycle.

Condensers cool the refrigerant back into a liquid and sends it to a receiver. The liquid flows through thermostatic expansion valves (TXV) that meter the flow of refrigerant from



the high-pressure side to the low-pressure side and back to the compressor which create the refrigeration cycle.

A secondary system includes the primary DX system and a secondary SN system. The SN system incorporates a hydronic, or fluid-circulating process that removes the need for DX evaporators for hydronic heat exchangers in the cases and coolers. The coolant used in a SN system does not need to change state into a vapor and any heat absorbed by the coolant is transferred to the chiller which serves as the evaporator for the DX side. A benefit of the SN system is that it reduces the total amount of refrigerant in stores and makes it easier to find refrigerant leaks to the chiller and condenser. Also it reduces the install cost because lower cost Type M copper or plastic piping can be used to circulate the coolant as compared to the more expensive L-copper used in DX.

ENERGY SAVINGS TRENDS

The energy efficiency and safety of a refrigeration system depends on its optimal performance. The EPA estimates that a typical large supermarket refrigeration system holds about 4,000 pounds of refrigerant and has an annual leak rate of about 25% or 1,000 pounds. Not only does this make the system need constant maintenance, but it exemplifies the concern for higher OPD refrigerants being released into the environment. Couple that with possible flammability of some coolants, and supermarkets need to do all they can to ensure the security of their systems.

Many of those leaks happen at the long sections of piping and dozens of TXV connections in a DX system. Alternatively SN systems use only one TXV at the chiller and much less piping, reducing the opportunities for leaks and lowering installation and maintenance costs.

Other technology includes distributed systems that have all the mechanicals at or near the cases they serve. Smaller self-contained propane units contain only a small refrigerant charge (about 5.3 ounces per refrigerant circuit) and have a low leak rate of about 2%. Depending on the size, a store using only self-contained refrigeration equipment would only need 110 pounds of propane. That's a significant refrigerant reduction!

Uncertainty regarding which refrigerants might be on the next phase-out list means supermarkets have to make smart choices today. And they want to. Many supermarket leaders are pledging to go to net-zero buildings with low TEWI refrigeration scores. As shopping and shoppers change, the grocery store experience will look different in the future. Since younger generations want to live in walkable urban areas, we may see the influx of smaller intown markets and fewer suburban megamarkets. We'll definitely see more closed cases for energy efficiency and freshness.

HEADS UP

Another important design point for supermarkets is right overhead. Most refrigerant piping is usually suspended in the open ceilings of the store. If it is insulated, the suspension system must carry the load without compressing or damaging the insulation. If insulation is torn or crushed the thermal integrity of the system is compromised and condensation and dripping may occur, causing damage to products below or dangerous puddles which could become a liability if a customer falls. Factory-made metal saddles and installer-fabricated saddles themselves have been known to work their way loose and fall to the aisles below, another problem for supermarket management.

A well-designed pipe suspension or mounting system protects the insulated pipe by spreading the load over a wider area, avoiding insulation compression from the combined pipe and fluid weight and prevents tearing and damage to the insulation and/or vapor retarder caused by thermal linear expansion and vibration. Considering the product and installation characteristics during the planning phase of the pipe system is critical to ensure a good design and avoid unwanted issues.

The 1-piece Insuguard product line is engineered for HVAC/R DX systems for strut applications only, while Insuguard Multi is designed for HVAC/R and SN systems that can accommodate multiple supporting systems like Clevis, H-beam, I-beam, steel angle or even floor mounts. Because installation requires no tools, the installer simply clicks Insuguard into place for struts or uses Insuguard Multi adapters to connect to other types of suspension or mounting

system, regardless of size. Pipe movement is accommodated without compromising the insulation or displacing the saddle, with a design that includes rounded edges that curve away from the pipe at both ends. While eliminating insulation tear-off is critical, both saddles also protect liquid lines inside the high laterals walls that totally isolate the piping from the support system, which will eliminate the risk of costly refrigerant leaks.

Incorporating the ArmaFix® EcoLight pipe supports eliminate the crush point where the saddle meets the insulation. A PET core supports the pipe, keeping the insulation thickness constant and preventing a thermal bridge at the fixing point. These two support products keep the piping insulated and secure, giving grocers one less thing to worry about.

INSULATION FOR SUPERMARKETS

The refrigeration systems in supermarkets need to function at top performance to attain the energy-efficiency that they need, which means they require the proper insulation. Armacell's insulation systems are ideal for insulating miles of liquid and suction lines, chilled water piping, chillers and cooling tanks. Insulating pipes, refrigeration lines or HVAC cooling systems not only promotes energy efficiency, but it also prevents condensation on below-ambient temperature surfaces—a critical issue for supermarkets and grocery stores.

Specifying Armacell Solutions for supermarkets is prudent for several reasons. Armacell uses a fiber-free, formaldehyde-free, low VOC formulation for its foam insulation, which makes it an excellent option for any environment, eliminating particulate that can jeopardize air quality and equipment. A closed-cell structure also prevents moisture ingress and naturally resists the growth of mold and mildew with anti-microbial protection of Micoban®. Most importantly, the flexible nature of Armacell's insulation means it installs easily in tight spaces in floors, walls or ceilings. You can count on Armacell insulation retaining its thermal integrity over time, lasting well into your future. ■



SUPERMARKET BUILDINGS RELY ON OUR PROVEN SOLUTIONS

PROJECTS WON

- **Brookshire's Food & Pharmacy** –
Winnsboro, TX
- **Caseys General Stores,
Distribution Center** –
Springfield, MO
- **Costco Wholesale** –
Charlotte, NC
Chicago, IL
Dallas, GA
Denver, CO
East Lyme, CT
Pflugerville, TX
St Cloud, MN
Seattle, WA
- **Food Lion Grocery Store** –
Marshall, VA
Salisbury, MD
Summerville, SC
- **Harris Teeter Supermarket** –
Fayetteville, NC
- **H-E-B Grocery** –
Dripping Springs, TX
Fredericksburg, TX
Round Rock, TX
- **Hy-Vee** –
Cedar Rapids, IA
Springfield, MO
St Paul, MN
- **Jewel-Osco Supermarket** –
St Louis, MO
- **King Soopers Supermarket** –
Denver, CO
- **Kroger** –
Columbus, OH
Lawrenceville, GA
Sylvania, OH
- **Meijer Supermarket** –
Blissfield, MI
Detroit, MI
Indianapolis, IN
Stevens Point, WI
- **Publix Super Market** –
Atlanta, GA
Clearwater, FL
Madison, AL
- **Rouses Supermarket** –
Lake Charles, LA
- **Safeway** –
Denver, CO
Gig Harbor, WA
Oakland, CA
- **Sam's Club** –
Denver, CO
Sanford, FL
- **Target Superstore** –
Kissimmee, FL
- **Village Beach Market** –
Vero Beach, FL
- **Walmart Supercenter** –
Adrian, MI - Detroit, MI
Clanton, AL
Elgin, TX
Portland, OR
Manor, TX
North Logan, UT
- **Wegmans Food Market** –
Medford, NY
Rochester, NY
South Riding, VA
- **Whole Foods Market** –
Denver, CO
East Harbor, MD

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.



STAKEHOLDER: MECHANICAL ENGINEERS

Specifiers Hold the Keys to Project Success

At Armacell, we know that the specifier is the key to a successful mechanical insulation system. We believe that providing the mechanical engineer or system designer with the knowledge and tools to make the right selection in the design phase is fundamental to the durability and energy efficiency of any HVAC or plumbing project. Mechanical system designers can have a significant impact on occupant health and must take steps during the design and

construction phases to ensure efficient system performance, condensation control, long-lasting thermal protection, acoustic benefits and healthier indoor air quality. Armacell's Specification team is here to help Mechanical Engineers and Specifiers with any insulation project. Their full-time job is to support you in any way that helps simplify the HVAC-R and acoustic specification process.

Engineer USP / Value Proposition

- Tailored Solutions for Code Compliance, Performance and Budget
- Trusted Protection for System and Design
- Simple, Safe and Efficient System Integrity
- Drag & Drop Specification Package by Division
- Backed by an Industry Leader with over 60 years' industry experience and a 15-year warranty*

Armacell has a comprehensive Solutions Portfolio designed to meet the needs of your application challenges.

Choose the Supermarket Solutions Package that best meets the performance level and budget of your equipment system.

Application / System Type		SM1 Solution Package	SM2 Solution Package
	Core Performance Requirements	Superior Performance	High Performance
Specification	Master Specification Link	SM1 Project Specification Link	SM2 Project Specification Link
Air Plenum Piping and Duct Insulation	<ul style="list-style-type: none"> • Class A - Flame-spread 0-25, smoke developed 50 • UL Classified to UL 723 (Listed and Labeled) • Energy Efficient & Low Total Install Costs • Low Dust or Fiber Emitting Properties • Mold and Mildew Resistance • Tough & Durable • Compliant to all State and City Building Codes 	<ul style="list-style-type: none"> • ArmaFlex Ultra Pipe Insulation • ArmaFlex Ultra Lap Seal Insulation • ArmaFlex Ultra Sheet/Roll Insulation • ArmaFlex Ultra Fittings 	<ul style="list-style-type: none"> • ArmaFlex Ultra Pipe Insulation • ArmaFlex Ultra Lap Seal Insulation • ArmaFlex Ultra Sheet/Roll Insulation • ArmaFlex Ultra Fittings
HVAC, Refrigeration & Mechanical Piping	<ul style="list-style-type: none"> • Class A - Flame-spread 0-25, smoke developed 0-450 • Energy Efficient & Low Total Install Costs • Low Dust or Fiber Emitting Properties • Mold and Mildew Resistance • Tough & Durable • Compliant to all State and City Building Codes 	<ul style="list-style-type: none"> • ArmaFlex Ultra Pipe Insulation • ArmaFlex Ultra Lap Seal Insulation • ArmaFlex Ultra Sheet/Roll Insulation • ArmaFlex Ultra Fittings • ArmaFlex Shield Pipe Insulation 	<ul style="list-style-type: none"> • AP ArmaFlex Pipe Insulation • AP ArmaFlex Lap Seal Insulation • AP ArmaFlex Sheet/Roll Insulation • AP ArmaFlex Fittings
Plumbing	<ul style="list-style-type: none"> • Class A - Flame-spread 0-25, smoke developed 0-450 • Energy Efficient & Low Total Install Costs • Low Dust or Fiber Emitting Properties • Mold and Mildew Resistance • Tough & Durable • Compliant to all State and City Building Codes 	<ul style="list-style-type: none"> • Tundra Insulation (Canada) • IMCOA SS Insulation or Tubolit SS Insulation • PE Fittings 	<ul style="list-style-type: none"> • Tundra Insulation (Canada) • IMCOA SS Insulation or Tubolit SS Insulation • PE Fittings
Accessories & Supports	<ul style="list-style-type: none"> • Class A - Flame-spread 0-25, smoke developed 0-450 • Energy Efficient & Low Total Install Costs • Low Dust or Fiber Emitting Properties • Mold and Mildew Resistance • Tough & Durable • Compliant to all State and City Building Codes 	<ul style="list-style-type: none"> • Insuguard Multi and/or Insuguard saddles and shields • ArmaFix Ecolight Pipe Supports • Armacell Insulation Tape • Armacell 520 Adhesives 	<ul style="list-style-type: none"> • Insuguard Multi and/or Insuguard saddles and shields • ArmaFix Ecolight Pipe Supports • Armacell Insulation Tape • Armacell 520 Adhesives
Warranty		• 15-Year Limited Warranty	• 10-Year Limited Warranty
Support Documents		SM1 Solution Package - Document Link	SM2 Solution Package - Document Link



STAKEHOLDER: CONTRACTOR

Installers Make it Happen

Armacell understands the importance of the insulation contractor in the selection and proper installation of mechanical insulation products for equipment, pipes and ducts. Insulation contractors routinely make critical decisions that can – for better or for worse – affect the outcome of the project. These decisions must take into account a variety of factors, including building codes, specific application challenges, insulation capability, as well as time and budget constraints.

We strive to help insulation contractors rise to the challenge of their job in a couple of ways. First, our Technical Managers and Installation Specialists, all of whom are experts in the selection and application of all our foam materials, are fully prepared to respond to any technical questions that may arise. Second, we work closely with an extensive network of distributors so that they can provide a quick response on pricing and availability of our products.

Contractor USP / Value Proposition

- Tailored Solutions for Code Compliance, Performance and Budget
- System and Performance Integrity - Virtually maintenance free
- One system to Support, Insulate and Protect
- Backed by an Industry Leader and a 15-year warranty*
- AQIP Factory Training, Field Support and On-Call Technical Support
- National Distribution Network

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STAKEHOLDER: DISTRIBUTORS

Committed to your Success

Distributors and Wholesalers want and need suppliers who are willing to work with them as partners. As a partner, a supplier should be able to provide both the goods and services that enhance the distributorship's growth and helps it adapt as the business climate changes. It's this partnership that inspires confidence and trust in the supplier.

That's what Armacell brings to each one of its distributor/wholesaler relationships. It is a business philosophy that dates back

to 1954 with the introduction of ArmaFlex. Today with six manufacturing operations in the North America, and 24 manufacturing facilities worldwide, Armacell has the capacity and logistics network to reliably meet the inventory demands of distributors. Our product knowledge, innovation and research continue to make us the global leader in elastomeric foam production. We are experts in the industry and are poised to support our distributors in their success.

Distributor USP / Value Proposition

- Tailored Solutions for Code Compliance, Performance and Budget
- Single Sourced Solution
- Job-site Direct Shipping
- Broadest Insulation and Accessory Portfolio
- AQIP Factory Training, Field Support and On-Call Technical Support provided
- Backed by a Leader with over 60 years' industry experience and a 15-year warranty*
- Dedicated Support Teams to support your staff and customers

Armacell has a comprehensive Solutions Portfolio designed to meet the needs of your application challenges.

Choose the Supermarket Solutions Package that best meets the performance level and budget of your equipment system.

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AT YOUR SERVICE

At Armacell, we are committed to creating an exceptional customer experience. We understand today's Supermarket trends and challenges and share know-how based on our extensive experience to help you implement your project successfully. We do all we can to give you peace of mind while managing your projects.



ARMAFLEX APPLICATION TRAININGS

To ensure that our insulation materials are installed properly, Armacell has trained thousands of installers around the world. Special training centers 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 Armacell Qualified Installer Program (AQIP) application certificate.

Valuable tips and tricks

Learn to install ArmaFlex more reliably and faster than you do today.

ARMWIN – PROFESSIONAL INSULATION CALCULATIONS

With our powerful ArmWin software, you can carry out all common technical calculations in HVAC applications. You can easily determine the minimum insulation thickness required for condensation control, as well as surface temperature, heat flow, temperature changes in flowing and stationary media, freezing times for water pipes and the most economical insulation thickness.

ArmWin

All-in-one technical
insulation calculations tool.



AT YOUR SERVICE



SPECIFICATION SUPPORT

It is challenging to keep up with changing building codes and evolving materials technology. Armacell employs a team of full-time specification experts dedicated to providing Engineers and Specifiers solutions for complex mechanical systems. They can review and update your specs, advise on new innovations and recommend the best insulation solution for your project.

Lunch & Learn

Providing PDH credits for onsite seminars

EXPERT TECHNICAL SUPPORT

Have a question? We have the most experienced Technical support in the industry and they are ready to take your call. Speak to experts with decades of experience who can answer your technical concerns or offer product advice.

On call

Give our Technical Manager a call if you have questions.



You'll find a wealth of information on our website www.armacell.us. Access our KNOWLEDGE CENTER for document downloads, installation videos, FAQ's and more. Visit the RESOURCES section for content tailored especially to Mechanical Engineers, Insulation Contractors, Distributor / Wholesalers and much more.

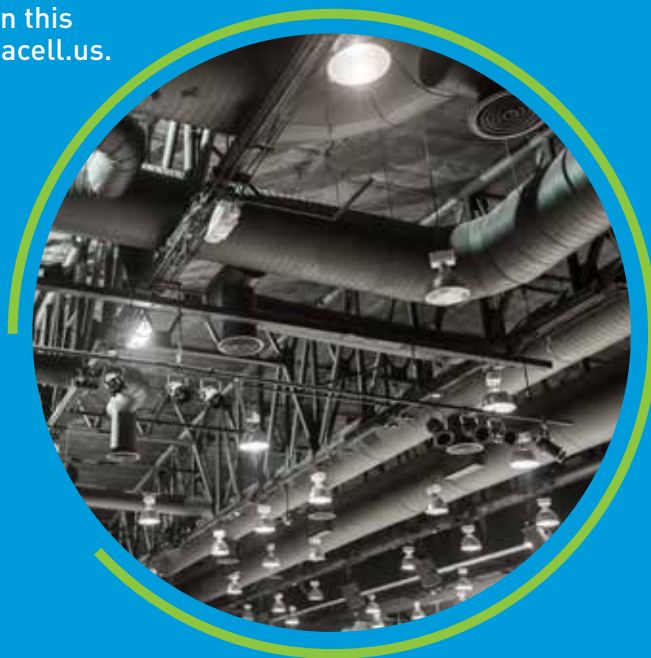
QUICK REFERENCE

Quick links to the Technical Data Sheet for the products offered in this e-book. If you need other products or information visit www.armacell.us.



Click on the product names to jump quickly to the data sheet.

- ArmaFlex Ultra
- AP ArmaFlex Tubes
- AP ArmaFlex Black LapSeal
- AP ArmaFlex Sheet/Roll
- AP ArmaFlex Duct
- ArmaFlex Shield
- ArmaFlex Fittings
- ArmaFlex Tape
- ArmaFlex 520 Adhesive
- ProFlex Tube Sheet and Roll
- Tubolit Tube Sheet and Roll
- Tundra Tube Sheet and Roll
- ImcoaTube Sheet and Roll
- Insuguard Pipe Hangers
- ArmaFix EcoLight Pipe Supports



IRON / COPPER PIPE SIZE CHART

Choose sheet and roll insulation for pipes larger than 10", mechanical systems, chillers, larger surfaces, tanks and fittings. Available in regular and self-adhering for both interior and exterior applications.

Nominal Insulation ID	Fits Pipe Size				Actual Insulation ID ^{1,2}			
	Copper Nom Size & ID (Types K,L,M)	Copper Nom Size & OD (ACR)	Iron / PVC IPS	DN ³	Min ID (in)	Max ID (in)	Min ID (mm)	Max ID (mm)
1/4"	-	1/4"	-		0.293	0.355	7.4	9.0
3/8"	1/4"	3/8"	1/8"	6	0.420	0.500	10.7	12.7
1/2"	3/8"	1/2"	1/4"	8	0.560	0.640	14.2	16.3
5/8"	1/2"	5/8"	3/8"	10	0.710	0.790	18.0	20.1
3/4"	5/8"	3/4"	-	-	0.810	0.910	20.6	23.1
7/8"	3/4"	7/8"	1/2"	15	0.940	1.050	23.9	26.7
1-1/8"	1"	1 1/8"	3/4"	20	1.200	1.310	30.5	33.3
1-3/8"	1-1/4"	1 3/8"	1"	25	1.450	1.570	36.8	39.9
1-5/8"	1-1/2"	1 5/8"	1-1/4"	32	1.710	1.830	43.4	46.5
1-1/2"	-	-	1-1/2"	40	1.970	2.090	50.0	53.1
2-1/8"	2"	2 1/8"	-	-	2.220	2.340	56.4	59.4
2"	-	-	2"	50	2.580	2.780	65.5	70.6
2-5/8"	2-1/2"	2 5/8"	-	-	2.720	2.880	69.1	73.2
2-1/2"	-	-	2-1/2"	65	3.080	3.280	78.2	83.3
3-1/8"	3"	3 1/8"	-	-	3.230	3.390	82.0	86.1
3"	-	-	3"	80	3.700	3.900	94.0	99.1
3-5/8"	3-1/2"	3 5/8"	-	-	3.740	3.880	95.0	98.6
4-1/8"	4"	4 1/8"	3-1/2"	90	4.250	4.420	108.0	112.3
4"	-	-	4"	100	4.750	4.950	120.7	125.7
5"	-	-	5"	125	5.810	6.010	147.6	152.7
6"	-	-	6"	150	6.880	7.080	174.8	179.8
8"	-	-	8"	200	8.880	9.080	225.6	230.6
10"	-	-	10"	250	11.005	11.205	279.5	284.6

1. ID tolerances are typical values and may differ depending on the product and wall thickness.

2. Insulation ID is sized larger than the pipe OD to fit over copper pipe couplings. When properly installed, a gap between the insulation and pipe will not adversely effect the insulation performance.

3. DN, diametre nominel, is equivalent to NPS sizes in metric dimensions.

NOTE: See installation guide for proper installation instructions.

WEB: www.armacell.us > Knowledge Center > Document Downloads > Mechanical Insulation > Installation Manuals

SOLUTIONS PRODUCTS

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Tubes



AP ArmaFlex® White and Black Tubes

Original flexible, closed cell elastomeric tubes in black and white



ArmaFlex® Shield

Continuous coil pipe insulation with durable, protective coating



Imcoa®, Tubolit®, Tundra®

Economical polyethylene insulation for plumbing lines, in semi-slit and self-seal closure



AP ArmaFlex® Black LapSeal

Self-sealing tube insulation with reinforced lap seal



ArmaFlex® Ultra & LapSeal

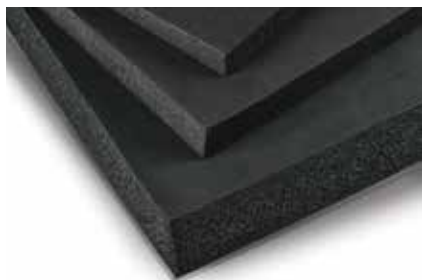
The first elastomeric pipe insulation
Classified by UL to UL 723 at 25/50



ProFlex® Tubes & LapSeal

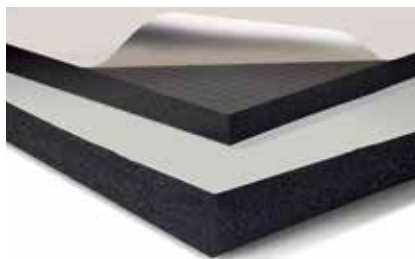
Economical flexible foam insulation for HVAC/R applications

Sheet and Roll



AP ArmaFlex® & AP ArmaFlex® FS

Original fiber-free insulation for thermal applications



AP ArmaFlex® SA & AP ArmaFlex® FS SA

Fiber-free insulation for thermal applications in self-adhering format



ArmaFlex® Ultra

The first elastomeric insulation Classified by UL to UL 723 at 25/50



ProFlex®

Economical flexible foam insulation for HVAC/R applications

Duct Liner and Wrap



ArmaFlex® Ultra Duct Liner

The first elastomeric duct liner Classified by UL to UL 723 at 25/50



ArmaFlex® Ultra Duct Wrap

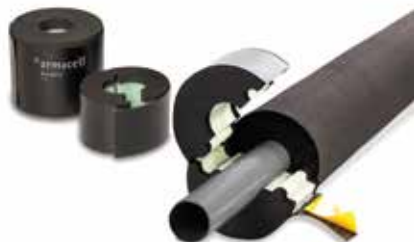
The first elastomeric duct wrap Classified by UL to UL 723 at 25/50

SOLUTIONS PRODUCTS

14/SOLUTIONS PRODUCTS



Accessories



Armafix® EcoLight Pipe Support

Insulated pipe support with self-adhesive closure



AP ArmaFlex® Insulation Tape

Pressure sensitive foam tape for insulating pipes and fittings



Insuguard® & Insuguard Multi

Easy-to-use, tool-free pipe support systems that install with 1 click



ArmaFlex® Pre-fabricated Fittings

Made to order fittings for T's, Elbows, P Traps and more



ArmaFlex® Black LapSeal Tape

Low profile tape for AP ArmaFlex Black LapSeal end seams



PE Fittings

Pre-fabricated T's and Elbows made of polyethylene

Adhesives and Coatings



520 Adhesive & 520 Black

Recommended adhesive specially formulated for ArmaFlex insulation



520 BLV & Low VOC Spray Adhesive

Low VOC adhesive alternatives



WB Finish

Latex-based, indoor/outdoor, UV-resistant coating for ArmaFlex insulation

OUTDOOR USE:

Painting with WB Finish or other protective jacketing is required to prevent damage to the insulation in exterior applications and to comply with the insulation protection sections of the International Energy Conservation Code (IECC) and ASHRAE 90.1.

OTHER GREAT ARMACELL PRODUCTS AVAILABLE

www.armacell.us

ARMACELL HAS THE SOLUTIONS

For more information about our **Supermarket Solutions Packages**, click on the package number to be linked to the package's technical data.



SUPERMARKET SOLUTIONS PORTFOLIO PACKAGES

	SM1	SM2
	Solution Package	Solution Package
Application		
Specification	Core Performance Requirements	Superior Performance
	Master Specification Link	SM1 Project Specification Link
Air Plenum Piping and Duct Insulation	<ul style="list-style-type: none">• Class A - Flame-spread 0-25, smoke developed 50• UL Classified to UL 723 (Listed and Labeled)• Energy Efficient & Low Total Install Costs• Low Dust or Fiber Emitting Properties• Mold and Mildew Resistance• Tough & Durable• Compliant to all State and City Building Codes	<ul style="list-style-type: none">• ArmaFlex Ultra Pipe Insulation• ArmaFlex Ultra Lap Seal Insulation• ArmaFlex Ultra Sheet/Roll Insulation• ArmaFlex Ultra Fittings
HVAC, Refrigeration & Mechanical Piping	<ul style="list-style-type: none">• Class A - Flame-spread 0-25, smoke developed 0-450• Energy Efficient & Low Total Install Costs• Low Dust or Fiber Emitting Properties• Mold and Mildew Resistance• Tough & Durable• Compliant to all State and City Building Codes	<ul style="list-style-type: none">• AP ArmaFlex Pipe Insulation• AP ArmaFlex Lap Seal Insulation• AP ArmaFlex Sheet/Roll Insulation• AP ArmaFlex Fittings
Plumbing	<ul style="list-style-type: none">• Class A - Flame-spread 0-25, smoke developed 0-450• Energy Efficient & Low Total Install Costs• Low Dust or Fiber Emitting Properties• Mold and Mildew Resistance• Tough & Durable• Compliant to all State and City Building Codes	<ul style="list-style-type: none">• Tundra Insulation (Canada)• IMCOA SS Insulation or Tubolit SS Insulation• PE Fittings
Accessories & Supports	<ul style="list-style-type: none">• Class A - Flame-spread 0-25, smoke developed 0-450• Energy Efficient & Low Total Install Costs• Low Dust or Fiber Emitting Properties• Mold and Mildew Resistance• Tough & Durable• Compliant to all State and City Building Codes	<ul style="list-style-type: none">• Insuguard Multi and/or Insuguard saddles and shields• ArmaFix Ecolight Pipe Supports• Armacell Insulation Tape• Armacell 520 Adhesives
Warranty		
Support Documents		

WARRANTIES

**15-YEAR
LIMITED WARRANTY:**

**Superior Performance
Package-Products**



**10-YEAR
LIMITED WARRANTY:**

**High Performance
Package-Products**



BASIC TERMS AND CONDITIONS FOR SOLUTION PORTFOLIO WARRANTY

- All applicable products defined within the Solution Portfolio must be installed to satisfy the system warranty for the defined package.
- This Warranty applies only to the products noted as the approved system components. Armacell will take no responsibility for any labor or other costs associated with the removal, repair, replacement or disposal of the defective Product materials.
- Product installation must be completed by an AQIP trained installer and installed in accordance with Armacell's North American Application Manual, and all other written and technical specifications of Armacell.
- Any defective Product is not discarded, destroyed or altered before inspection by Armacell, or rendered defective or damaged by modifications not made by Armacell, acts of God such as fires, explosions, hurricanes, tornados or earthquakes or by materials installed or stored near the Products.
- Owner/Contractor agrees to permit inspection of the Product installation at the Location at time of install and then at various times throughout the warranty term by Armacell and its representatives upon reasonable request during standard business hours.
- A jobsite inspection by Armacell or one of its appointed representatives will be required to validate package compliance and finalize the warranty request.
- Certificate of Warranty to be issued to the Installing Contractor for the identified project and will be effective from time of purchased.

Full Warranty Details will be provided at time of certificate issuance

All data and technical information are based on results achieved under typical application conditions. It is the customer's responsibility to verify if the product is suitable for the intended application. The responsibility for professional and correct installation and compliance with relevant building regulations lies with the customer. By ordering/receiving product you accept the Armacell General Terms and Conditions of Sale applicable in the region. Please request a copy if you have not received these.

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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 3,100 employees and 24 production plants in 16 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.us

