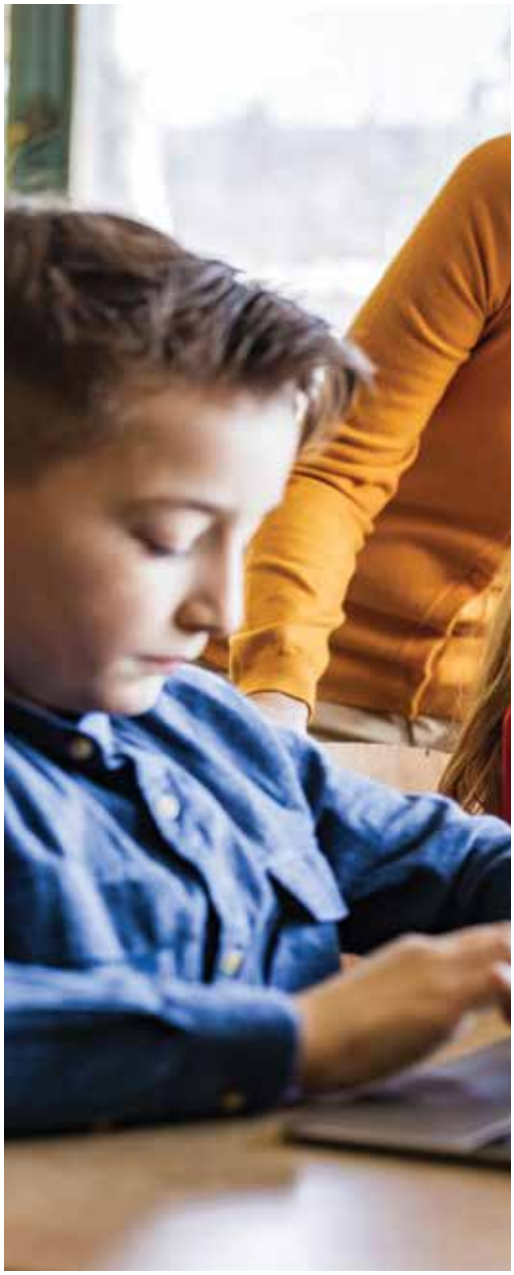
PROJECT REFERENCE

Education Excellence

Specifying Armacell solutions for a school or university building's mechanical systems is fundamentally smart. Either in construction or renovation, our insulation products and accessories are trusted by schools around the world. The fiber-free, formaldehyde-free, and low VOC formulation in our foam insulation provides energy efficiency, protects against condensation, and preserves indoor air quality making it the correct choice for any learning environment. **Armacell in action.**

www.armacell.us



armacell®

MAKING A DIFFERENCE AROUND THE WORLD

Armacell in Academics

A Study of Properly Insulating Mechanical Systems

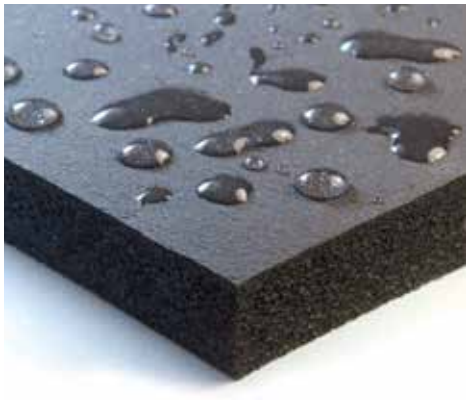
Schools and universities represent 12% of nonresidential building construction in the United States. Whether the students are K-12 or scholars in higher learning, all educational buildings need to have high-performing HVAC and plumbing systems. Installing insulation on chilled water systems, HVAC ducts, boilers, or plumbing piping is a simple facility upgrade that can improve energy performance, control condensation, protect indoor air quality (IAQ), and provide acoustic control creating a more effective learning environment. Armacell's innovative insulation solutions for schools and universities make us first in our class.

COMPREHENSIVE ENERGY EFFICIENCY

In a typical school building, heating, cooling, and lighting account for nearly 70% of all energy use. Even though this energy use accounts for only 4% of a school district expenditure, it's an area where administration can easily make improvements in energy efficiency by insulating or upgrading mechanical systems. Avoiding inefficiencies and unnecessary maintenance can be achieved by properly insulating ducts, vessels, boilers, and pipes to help reduce energy waste. Even with proven benefits, adoption of newer HVAC and plumbing technologies in education facility construction can be slow due to budget constraints. This hesitancy to upgrading older systems has recently been offset through targeted legislature and government policies which focus on energy use in schools. These include the Infrastructure Investment and Jobs Act (IIJA), American Rescue Plan Act (ARP), the 2021 Coronavirus Response and Relief Supplemental Appropriations Act (CRRSAA), the Inflation Reduction Act, and the recent Build America, Buy America Act (BABAA). Additionally, applicable U.S. Department of Education Infrastructure Grant Program may provide tens of billions of dollars in new funding to U.S. K-12 public schools for facility and transportation improvements. Strategic use of this funding can help remedy historic school systems, reduce energy expenditures, and help schools lead the nation in solving the climate crisis.

CONDENSATION CONTROL

Cold-water and air-handling systems on education campuses are prone to moisture issues as both systems are likely to develop condensation problems if not insulated or if the insulation is not sized or installed correctly. Controlling condensation is critical because moisture can compromise a mechanical system and its insulation, leading to thermal loss and costly repairs. In the event that there is a moisture issue, even a small 4% moisture ingress can reduce insulation effectiveness by 70%! Even worse, if this moisture goes unnoticed, corrosion under insulation (CUI) erodes the pipe surface over time, causing pipe failure or resulting in need for replacement – an unnecessary hit to schools' budgets and tight resources. This is why it is critical for education facilities to focus their attention on controlling condensation on their systems. A closed-cell foam insulation product has the structure to prevent moisture from wicking and does not require a separate moisture-vapor retarder.



Armacell's AP ArmaFlex solutions are also made with exclusive Microban® antimicrobial protection to resist mold and mildew growth.

INDOOR AIR QUALITY

Preserving IAQ in schools is mandatory which is why they require a contaminant and fiber-free environment. IAQ is especially important in ductwork, where fibrous material can get caught up in the air stream exposing school occupants to airborne particulates. Insulation on ductwork can either help defend against or contribute to indoor air-quality problems. This is particularly true of school air-handling systems in which the insulation needs to resist moisture while ensuring that the air passing over it remains mold-, dust- and fiber-free for students. The same requirements also apply to insulation used over hot and cold piping systems inside education facilities. While insulation's primary purpose is thermal efficiency, the wrong product could particulate fibers or off-gas volatile organic compounds (VOCs) into the indoor air, creating poor breathing conditions. Other insulation materials can absorb moisture, supporting the growth of mold and mildew. Any of these problems will significantly degrade the indoor learning environment so it is important to choose an insulation solution that is Greenguard® Gold Certified, has low VOCs, no off-gassing, and is fiber-free and non-particulating to protect IAQ in schools.

THE SOUND OF SILENCE

Many acoustical problems can arise in classrooms such as background noise, loud voices, reverberation, and mechanical disturbances. As 60% of classroom activities utilize spoken communication, it is easy to understand that noise can be distracting enough to cause speech intelligibility for students trying to listen to instruction. In the U.S. alone, classrooms can typically have speech intelligibility ratings up to 75%, which means every fourth word is not heard or understood. Children with learning disabilities or those who speak English as a second language are especially at risk for not being able to hear effectively if classrooms, auditoriums, libraries, and even hallways are not quiet. This is a communication concern that must diligently be addressed through soundproofing advances and acoustical solutions like elastomeric foam insulation and mechanical thermal decoupling acoustical tape, to ensure learning transfer is occurring in quieter classrooms.

AIR, FIRE, AND SMOKE PROTECTION

Armacell continuously works to improve our products with advanced testing standards to ensure they meet strict building codes, and state codes and regulations, as well as the requirements from organizations like the International Energy Conservation Code (IECC) and ASHRAE, which develop model building codes and performance standards. For school applications requiring flame and smoke ratings, many of our solutions are plenum-rated and meet ASTM E 84 at 25/50 for up to 2" thicknesses. ArmaFlex Ultra® is the first elastomeric insulation Classified by UL to UL 723 at flame/smoke rating of less than 25/50. While our products meet many compliance standards it is important to note that building codes can vary from state to state

and municipality, so specifiers and installers should be sure to select products that are compliant in their region.

SUCCESSFUL SCHOOL PROJECTS

Facility: Apex Friendship Elementary School
Location: Apex, NC
Products: AP ArmaFlex®

Construction of a new 121,736 square foot elementary school on the existing campus of the Apex Friendship High School and the Apex Friendship Middle School. The school will have a core capacity of 800 students housing grades K-5. ArmaFlex 1-1/2 inch sheets and tube insulation was selected to insulate HVAC vessels, piping and ducts for equipment efficiency, condensation control, and acoustic performance.

Facility: Kūlanihākoʻi High School
Location: Kihei, HI
Products: AP ArmaFlex

New construction of 87,000 square foot high school to support over 800 southern Maui students. The new campus includes an administration building, two classroom buildings, a library, cafeteria, gymnasium and locker room, basketball court and a playfield. The opening is anticipated for fall 2023. AP ArmaFlex was selected to insulate the HVAC central piping systems due to its low water permeability and condensation prevention even in high humidity climates.

Facility: Massachusetts Institute of Technology (MIT)
Location: Cambridge, MA
Products: AP ArmaFlex Black Lap Seal

The demolition of Building 44 to create the Schwarzman College of Computing, which will serve as a hub for research and innovation in computer science, AI, data science, and related fields. This 165,000 square feet facility should hold around 50 faculty members and house offices, classrooms, labs, and collaborative study spaces. MIT is targeting to achieve LEED® Gold certification through the U.S. Green Building Council/Green Building Certification ("USGBC/GBCI") using the New Construction and Major Renovation (LEED-NC) rating system. Design plans include incorporating high performance building design measures that target a 60 percent reduction in energy cost as well as extensive "green" roof systems. AP/ArmaFlex Black Lap Seal was selected to insulate the HVAC central piping due to its thermal efficiency and energy conservation performance that will help MIT achieve their certification goals.

Facility: Princeton University
Location: Princeton, NJ
Products: AP ArmaFlex Black Lap Seal

New construction of two buildings on campus with four wings of residential halls housing over 1,000 students and totaling over 485,000 square feet. In addition, half of the new dorms will have "green" roofs, and some will have outdoor terraces that will help the university achieve their Sustainability Plan goals which include seeking LEED Gold certification and achieving net-zero carbon emissions by 2046. AP ArmaFlex Black Lap Seal was specified to insulate central piping on HVAC systems to promote energy efficiency.

Facility: Southern Connecticut State University
Location: New Haven, CT
Products: ArmaFlex Ultra and AP ArmaFlex

Out-of-ground construction of new 64,628 square foot SCSU School of Business facility, an environmentally sustainable structure with an emphasis on energy efficiency. This facility is expected to be the first building constructed by the state of Connecticut that will be Net Zero Energy (NZE) in terms of its carbon footprint. Solar panels will generate 90 percent of the building's needs and during the course of a year, the amount of renewable energy created on-site will be equal to the total amount of energy used by the building. Similarly, ArmaFlex insulation which was specified to insulate the refrigerant piping and HVAC vessels on this project, is equally energy efficiency and actually saves 150 times more greenhouse gas emissions than are caused while it is being produced. ArmaFlex® Ultra was also used on this project and selected for HVAC ducts to meet the required maximum 25/50 flame-spread/smoke development indexes per ASTM E 84 and classified by UL to UL 723 at flame/smoke rating of less than 25/50.

ARMACELL HAS ANSWERS

Bringing more than half a century of science, expertise, and innovation to foam technology, Armacell has the expertise to create specialized solutions to meet the strict requirements of the education industry. Our advanced insulation product portfolio includes a variety of school building solutions to support HVAC applications, cold lines and chilled water lines, mechanical systems, chillers, boilers, UV, and high temperature areas, and also includes accessories like pipe hangers, adhesives, and tape. Armacell's Solutions Packages offer a wide range of products tailored to code-compliance, performance, and budget. ■

Did You Know...

Public schools were only created in the 17th century?
The Boston Latin School was the very **first public school** opened in the United States in **1635**, and to this day, it remains the nation's oldest public school.

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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 26 production plants in 18 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

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