Data Centers

The data center is changing, becoming more versatile and more powerful. With this transformation, the demand for data centers with more processing power is driving the move to improved cooling strategies with better energy efficiency. Armacell's insulation products are providing relief to cooling systems in this fast-paced industry.

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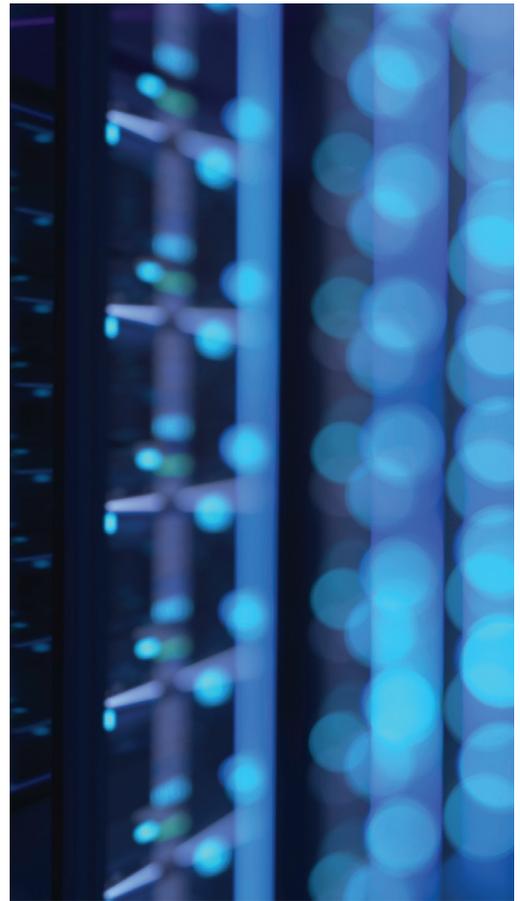
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MAKING A DIFFERENCE AROUND THE WORLD

DATA CENTER SOLUTIONS

Today's technology companies are deploying higher-density systems and more specialized machine learning tools, like Artificial Intelligence, which require more efficient cooling processes. Data center managers need new cooling systems, especially liquid or cold water based designs, which can benefit from installing smart insulation solutions to help save energy, control condensation and provide cooling that server rooms require.

RISING TEMPERATURES AND TRENDS

As much as 40% of the total operational costs for a data center come from the energy needed to cool the massive amounts of electronic equipment. Computer servers housed in data centers generate vast amounts of heat so keeping the system cool is essential. With CPUs needing over 200 watts and GPUs hitting 300 watts of power, air cooling systems in data centers are becoming insufficient. Liquid cooling systems are gaining popularity and are thousands of times more efficient at heat removal.

Data usage is forecasted to keep growing and tech giants are all-in for new tools to infuse their products with efficiency. Social media and e-commerce companies are also on similar trajectories. Due to high-density chip designs and increasing rack densities, these companies will require ongoing innovation and will rely on data center providers with experience in advanced cooling designs to meet these higher demands.

The **Google** data center in Lenoir, North Carolina is larger than

8 FOOTBALL FIELDS!
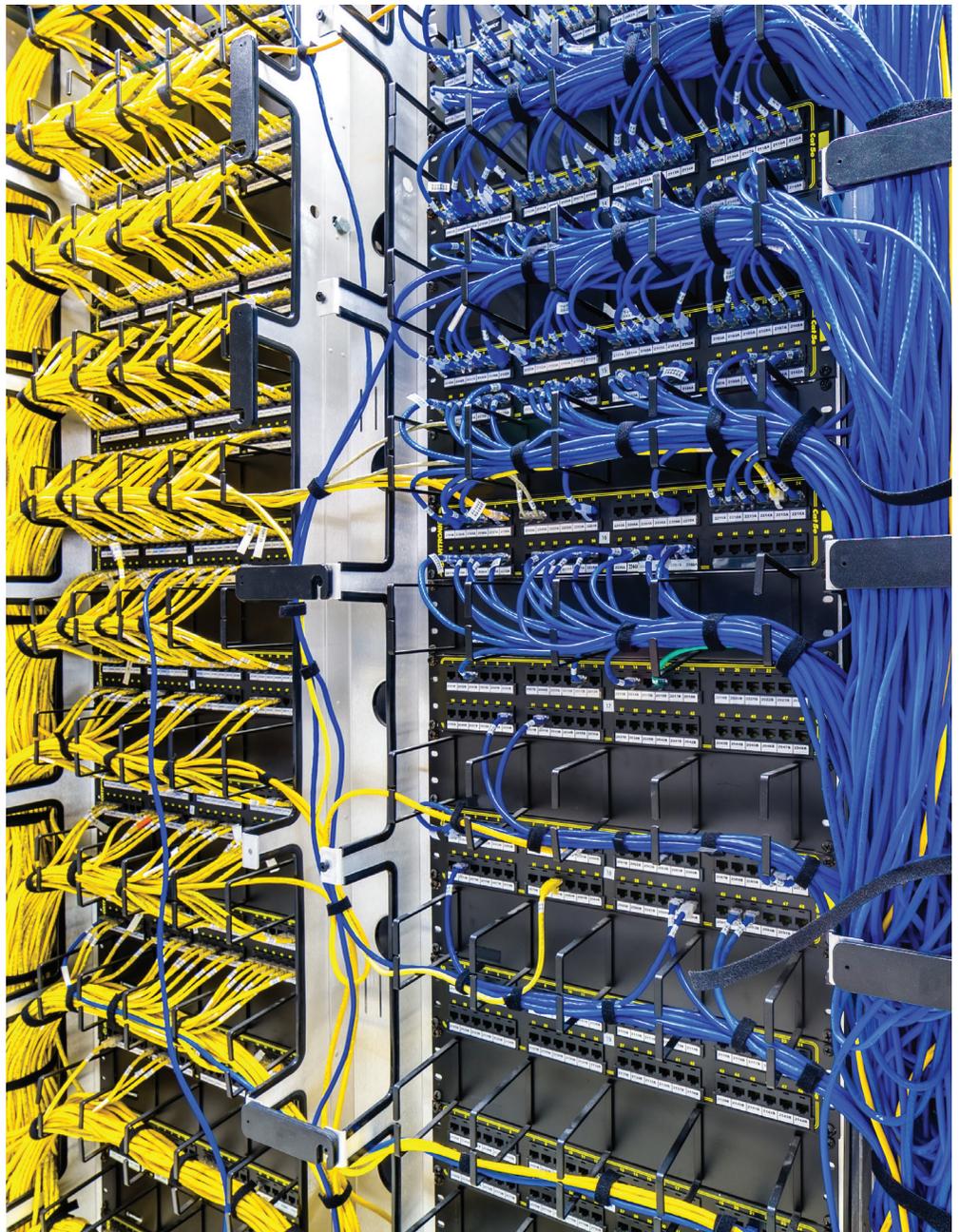
DECODING COOLING METHODS

There are two traditional ways to cool a data center: air-based cooling and liquid-based cooling. The most common air-based cooling methods use "cold aisle/hot aisle" orientation. This involves facing the cold sides of each server cabinet away from the hot sides of the next row of servers. This creates a convection system where the cabinet cools itself. Another method uses "Hot Aisle Containment" or "Cold Aisle Containment" where either the hot aisle air or cold aisle air is enclosed and captured, turning the rest of the room
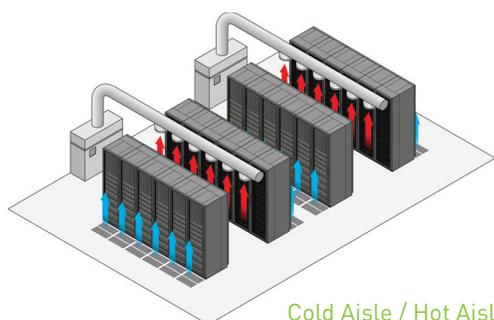
Cold Aisle / Hot Aisle Configuration

into a return air plenum. Hot aisle containment can provide 40% more savings than the cold aisle/hot aisle configuration alone.

The legacy floor based cooling method relies on delivering a small quantity of cooled conditioned air that mixes with

the larger volume of air in the space to reach the desired temperature. This system worked wonders decades ago when information technology equipment (ITE) densities were low, but with increasing servers in smaller spaces, this method will soon be obsolete.

Evaporative cooling is a traditional technology that can be used to cool servers as well. Also known as swamp cooling, this method uses the process of evaporating water on wet pads to bring the temperature down in a room. The term swamp cooling is not by accident however, as this type of system creates higher humidity levels which should be avoided around ITE.

Liquid-based methods are increasing in popularity for data center managers. In one type of liquid-based cooling, water flows through pipes and cooling tower pumps chilling the hot side of the cabinet to decrease the temperature.

Another and more recent liquid-based cooling method is known as liquid immersion cooling where a special type of liquid coolant, which does not conduct electricity and will not damage the components, flows across the hot components to cool it down. Yes, the servers are fully emerged in this dielectric fluid!

SOFTWARE AND HARDWARE INNOVATIONS

Data centers can use 75% more cooling than actually required and there is little risk management in the process. Introducing AI technology is a recent innovation most data center managers are considering to drive system intelligence and personalization. A smart assistant utilizing machine learning and cooling robots in the cabinets can reduce costs because it lets data center managers know when and how much cooling is truly needed. AI can read CPU and GPU temperatures and processes data in real time helping data centers become more efficient.

INSULATION FOR INFORMATION MANAGEMENT

The one thing all of these cooling methods have in common is the need for proper insulation. Armacell's ArmaFlex® closed-cell foam insulation is a rubber-based flexible material ideal for insulating chilled water piping, chillers, cooling tanks and air handlers. Insulating pipes, refrigeration lines or cooling systems not only promotes energy efficiency, but it also prevents condensation on below-ambient temperature surfaces—a critical issue for data center management.

Specifying ArmaFlex for data centers is a smart move. Armacell uses a fiber-free, formaldehyde-free, low VOC formulation for its foam insulation, making it an excellent option for the data center environment, eliminating particulate that can damage sensitive servers. Its closed-cell structure also prevents moisture ingress and naturally resists growth of mold and mildew. The flexible nature of elastomeric insulation means it installs easily in tight spaces in floors, walls or ceilings. You can count on ArmaFlex insulation retaining its thermal integrity over time, lasting well into the digital age. ∎

AI technology and machine learning can help data centers become more efficient

For more information about the ArmaFlex family of products, visit **www.armacell.us**
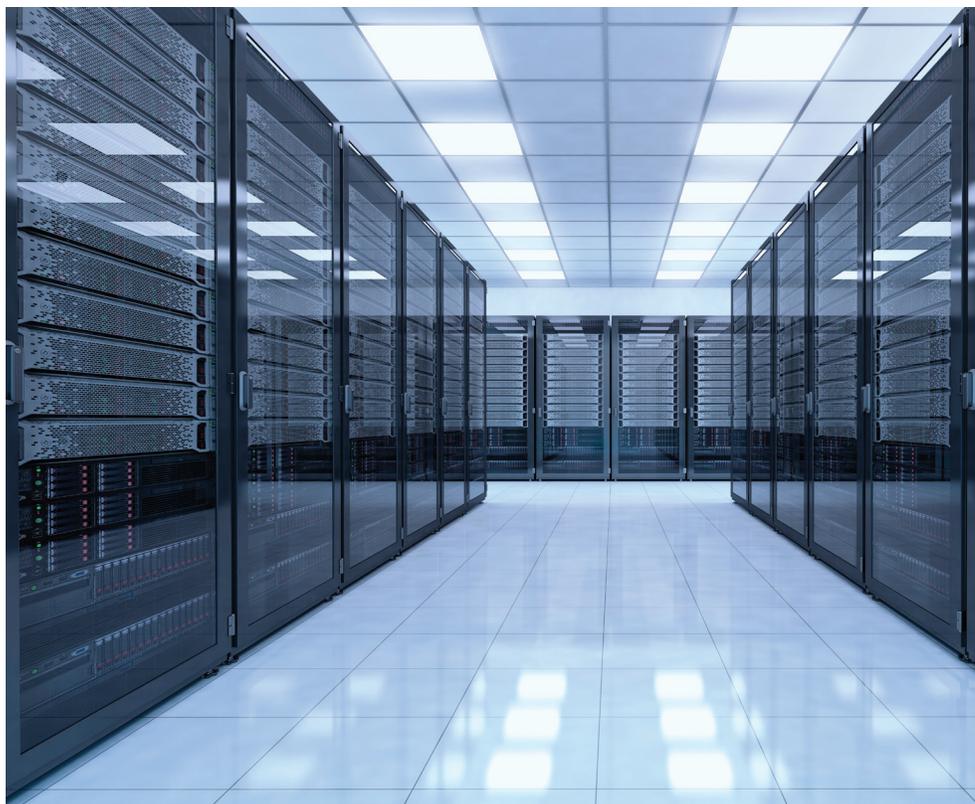
DATA CENTERS AROUND THE NATION ARE RELYING ON OUR PROVEN SOLUTIONS

PROJECTS WON

- **Arkansas State University Campus Queretaro** – Queretaro, Mexico
- **Ashburn Nexus Data Center - Building 1** – Ashburn, VA
- **Cerner Three Trails Corporate Campus Phases 3-14** – Kansas City, MO
- **CloudHQ Data Center - Building LC2 and Office** – Ashburn, VA
- **CoreSite CH2 Data Center - Phase 1** – Chicago, IL
- **Digital Realty Data Center & Office Building 1** – Totowa, NJ
- **Equinix Data Center** – Kent, WA
- **Facebook Data Center** – Eagle Mountain, UT
- **Facebook Data Center** – Gallatin, TN
- **Facebook Data Center - Phase 3** – Sandston, VA
- **Facebook Data Center - Buildings 6 and 7** – Prineville, OR
- **Facebook Data Center** – Sandy Springs, GA

- **Facebook Data Center** – Huntsville, AL
- **Google Data Center** – Stevenson, AL
- **Google Data Center** – Midlothian, TX
- **Google Data Center Expansion - Building 1** – Monks Corner, SC
- **Microsoft Data Center - Phase 1** – Goodyear, AZ
- **Microsoft Data Center - Phase 1** – Cumming, IA
- **QTS Data Center - Building 2** – Hillsboro, OR
- **RagingWire Data Center** – Santa Clara, CA
- **Remington Data Center - Building 1** – Remington, VA
- **Sentinel Data Centers** – Sterling, VA
- **Switch, The Citadel Data Center - Phase 1-3** – Sparks, NV
- **Vesta Data Center** – Queretaro, Mexico

SMART SOLUTIONS FOR YOUR BUSINESS

Armacell's Solutions Portfolio groups insulation products into comprehensive packages aimed at making the specification of the right insulation for mechanical systems easier than ever before. Mechanical engineers, insulation contractors, building owners, or distributors can easily identify the best insulation products for use in an air plenum, on HVAC/R mechanical piping, chilled, or plumbing – the key places where insulation is critical to the performance of the equipment. Packages offer two levels of cost and service: High and Superior Performance with a 10- or 15-year warranty.

ABOUT ARMACELL

As the inventor of flexible foam for equipment insulation and a leading provider of engineered foams, Armacell develops innovative and safe thermal 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 more than 3,300 employees and 27 production plants in 19 countries, the company operates two main businesses, Advanced Insulation and Engineered Foams. Armacell focuses on insulation materials for technical equipment, high-performance foams for acoustic and lightweight applications, recycled PET products, next-generation aerogel technology and passive fire protection systems.

For more information, please visit:
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