Excellence in Flow+

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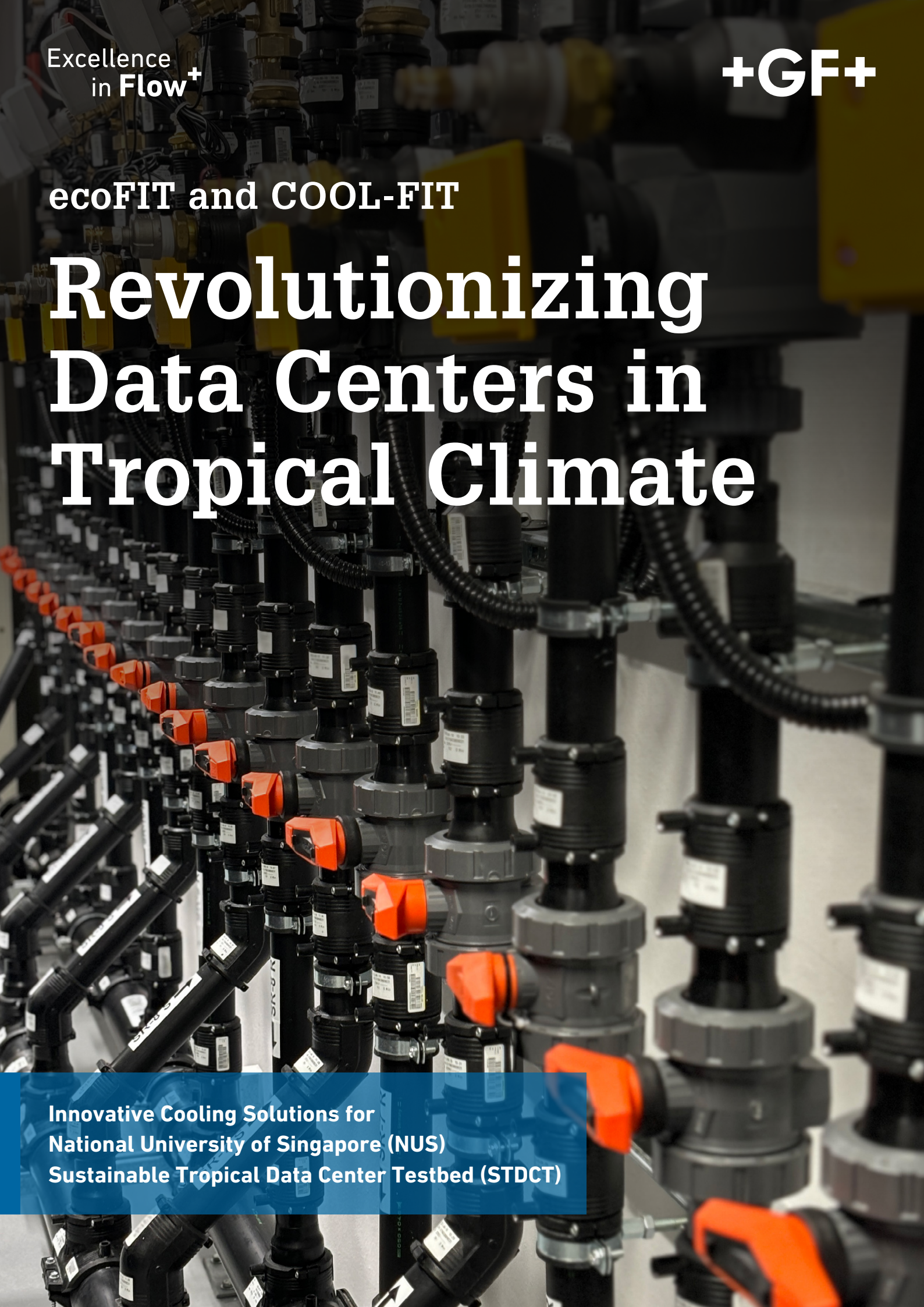
ecoFIT and COOL-FIT

Revolutionizing Data Centers in Tropical Climate



Innovative Cooling Solutions for
National University of Singapore (NUS)
Sustainable Tropical Data Center Testbed (STDCT)

Innovative Cooling Solutions: GF Piping Systems support NUS' Sustainable Tropical Data Center Testbed

To address the rising energy demands of data centers, the National University of Singapore (NUS) has launched the STDCT, a facility simulating operational conditions to develop and evaluate efficient cooling methods. As part of the initiative, NUS is using advanced piping materials for piping systems for heat rejection and cooling circulation loops, including indirect evaporative cooling, direct-to-chip liquid cooling, and air-cooled system, while also tackling corrosion challenges faced by metal materials in tropical climates.

Project background

Supported by the National Research Foundation and technology leaders, the STDCT is the world's first dedicated testbed for data center cooling solutions tailored to high temperature and humidity. Through several advanced initiatives, the project, which is hosted at the College of Design and Engineering in NUS, aims to find sustainable cooling solutions to achieve a reduction in energy consumption by up to 40%, compared to traditional air-cooled data centers. In this integrated effort, NUS STDCT deployed with GF Piping System's products for chilled water and direct-to-chip liquid cooling systems for production-level computing tasks or applications, efficiently rejecting waste heat via an indirect evaporative cooling system.

Technical solution

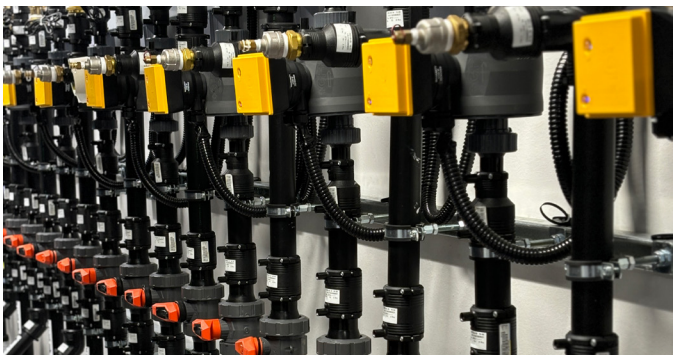
GF Piping Systems provides advanced thermoplastic solutions to meet the stringent requirements of cooling in tropical data centers. The primary piping system for chilled water transport, COOL-FIT, is pre-insulated with high density polyethylene to maintain stable fluid temperatures, minimize heat loss and effectively prevent rusting in warm, moist conditions. Its lightweight design and smooth inner surfaces ensure optimal fluid flow. For condenser water pathways, ecoFIT offers robust heat dissipation capabilities, ensuring reliable cooling performance. Additionally, the in-rack manifolds for Direct-to-chip Liquid Cooling constructed from PVDF facilitate efficient cooling at the IT rack level. The prefabrication of these components enhances joint reliability, ensuring a streamlined deployment process. By incorporating these products, GF supports a future-ready approach to data center infrastructure.

Achieved improvement

The NUS STDCT installation showcases the transformative potential of thermoplastic piping in tropical data centers, highlighting their role in efficient and reliable cooling loops. The use of non-metallic materials ensures energy savings, durability, and enhanced performance. This collaboration sets a new standard for sustainable data center cooling, underscoring GF Piping Systems' commitment to innovation and sustainability.

Learn more about how thermoplastics can enhance your data center operations.

Learn more



The manifold wall at STDCT plays a key role in optimizing flow for direct-to-chip (D2C) liquid cooling by ensuring balanced, efficient, and easily monitored coolant distribution.

Ensuring stable temperatures for the chilled water lines with pre-insulated PE piping system COOL-FIT

Benefits

- **Long-lasting and corrosion-free in high-humidity conditions.**
- **Reduced operational energy.**
- **Easier and faster installation with high joint reliability, reducing leakage.**
- **Minimal upkeep, lowering total cost of ownership.**
- **Excellent thermal insulation properties compared to traditional metallic pipes with foam insulation, reducing energy loss.**
- **Greater design flexibility and customization, enabling engineers to create tailored solutions without compromising performance.**

Visit our webpage to get in touch with your local specialist:
www.gfps.com/our-locations

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