

CASE STUDY

Flexalen for cooling network



Thermaflex Enables Carbon-Free Cooling for Luxury Resort Island Soneva Secret

Thermaflex Flexalen pre-insulated piping systems in the Maldives' Haa Dhaalu Atoll. Carbon-free cooling network for Soneva Secret, including island villas, overwater villas and central facilities.

Soneva Secret

The newly opened exclusive resort Soneva Secret 2024, is the most remote and ultra-luxe destination in the region. Found in Haa Dhaalu, the Maldives. The vision builds on what Soneva is famous for: sustainability, bespoke service and nature-inspired design.

Project Goal

Soneva Secret aims to achieve extreme robust, sustainable, and **carbon-free** cooling infrastructure, by leveraging **solar energy**. On the most remote developed island in the Maldives, deploying a direct solar-powered cooling infrastructure capable of providing continuous comfort in every accommodation, even during nights and cloud cover period, requires smart engineering. Such as heat load calculations, chiller plant design, thermal storage sizing, optimal cooling network design and an ideal level of flexibility and pre fabrication.

Solutions

Together with the client, consultant and various suppliers, an entirely new concept was developed enabling cost effective and sustainable cooling, using **floating solar fields**, a **central chiller plant**, **ice storage**, and a **flexible distribution network**. Partnering with Soneva's Sustainable Projects Team, energy and sustainability consultant **XCO2**, chiller plant supplier **DAIKIN**, and contractor **YONSAN Engineering**, Thermaflex provided a flexible chilled water distribution network, connecting the central chiller plant with each individual villa and building.

Our **Cradle to Cradle Certified®** Flexalen®600 flexible pre-insulated piping system, enabled quick installation and maintenance free chilled water network throughout the island. Flexalen pipes are **flexible and lightweight**, hence easier to handle and requiring 80% less fittings compared to rigid pipe. Installation training was provided to ensure smooth implementation.



Project Process

The implementation of this new concept involved a meticulously planned and executed project process, Thermaflex provided expertise and end-to-end support from solution creation to project planning and implementation, managed by our sales manager of this project – [Thomas van den Groenendaal](#).

The project commenced in July 2021 and concluded in March 2024. Thermaflex delivered 2,300 meters of **Flexalen®600** single and double pipes, insulated tees, risers and valves, which were shipped in 5 containers. Logistics planning played a crucial role in ensuring timely delivery of materials and equipment to the site. The Flexalen operations team in the Netherlands had it covered.

Compared to conventional pipes, Flexalen pre-insulated **PB-1** pipe, prefabs, fittings, were new to the installation team, our technical expert [Jelmar van Beek](#) provided **on-site training** in pipe handling, electrofusion welding and cover integrity, to ensure smooth implementation. Installation was completed within the strict project timeline by an exceptional installation crew from YONSAN Engineering.



Results & Benefits

The project includes a **1,260 kW** chilled and sub-zero water cooling plant, with **3,000 kWh** ice storage, **510 kW** chilled water distribution network, comprising 2 zones.

The solution yielded significant **cost savings**, both in capital and operational expenditure compared to conventional cooling infrastructure. Main contributors to the long-term return on investment are the following:

- Thermal storage offers a remarkable 10-fold reduction in lifetime costs compared to Li-ion based electrical storage solutions.
- While conventional AC systems face short lifespans in tropical climates, central chillers and district cooling networks are engineered for service lives exceeding 25 years.
- Harnessing and direct utilization of solar energy delivers lower electricity expenses compared to diesel-generated power, ensuring cost-effectiveness and sustainability.

Conclusion

The successful implementation of a pioneering solar-powered cooling infrastructure, showcasing the collaborative efforts of all stakeholders. This project not only realized the **world's first carbon-free cooling resort island**, but also provided Soneva Secret with a robust, sustainable, and efficient cooling infrastructure. Central cooling solution allows many island resorts and communities to move away from Diesel power or Li Ion storage, which can be replaced by solar panels and ice storage.

This project serves as both an inspiration and blueprint for **future resort** developments, aiming for low carbon, low maintenance and high return cooling, with a primary focus on guest comfort and environmental responsibility. It sets a new standard where **sustainability and luxury** converge.




Contractor quotes

"Let me express my gratitude for the incredible support throughout the entire THERMAFLEX installation process. This was my first time working with this material, and I must say, the design and component integration for the distribution were brilliant. The product is incredibly user-friendly, flexible, and easy to work with. Additionally, Jelmar, you've been exceptionally attentive and supportive throughout. Thank you so much for everything."

Dasum, Installer at Yonsan Engineering

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