

CASE STUDY

Flexalen® for heating network and geothermal water transportation



Geothermal wells renovation with Flexalen® 600 & PU SL pre-insulated pipes

A sustainable geothermal water supply network was developed using pre-insulated polybutene-1 pipes, which benefited recreational facilities at the Top-Therme complex in Topusko, Croatia.

A Destination for Relaxation and Sustainability

Located in the municipality of Topusko, around 100 km south of Zagreb, **Top-Therme** is a leading wellness retreat. The area is known for its **geothermal water**, ranked third in Europe for quality. The resort is also celebrated for its commitment to well-being and eco-conscious practices.

Project Goal

This project aimed to renovate the geothermal wells that supply Top-Therme Hotels. Drilled decades ago, the four wells collectively provide around 175 litres per second. However, to improve efficiency and support sustainability, **modern upgrades** were necessary.

Overview of the wells:

- **"TEB-1"** (near the library), with a capacity of about 15-17 l/s, is directly connected to the health and regeneration center, which has indoor and outdoor pools.
- **"TEB-4"** (behind the Hotel Petrova Gora), with a capacity of 100 l/s, has a source water temperature of around 68°C.
- **"TEB-2 and 3"** which have higher temperatures.

The thermal water originates from volcanic sources. It reaches temperatures between 68°C and 72°C, cooling to 27-34°C by the time it arrives at the pools. Restoring these systems supports Topusko's vision of becoming a smart thermal municipality powered by renewable resources.



Why **Flexalen®**?

In geothermal applications, pipe materials must endure harsh conditions, including high mineral and gas content. **Flexalen® polybutene-1 (PB-1)** pipes excel in these environments thanks to:

- Outstanding chemical resistance.
- Fast and easy installation.
- A strong track record in geothermal systems.

These benefits enabled the creation of a highly reliable water transport network that meets the resort's high standards.



Project Scope

The project involved extensive improvements across multiple facilities, including two hotels, therapy centres, and thermal pools. These facilities rely on geothermal energy for heating and therapy.

Previously, used geothermal water was simply discharged into the municipal wastewater system. To improve efficiency, the **pre-insulated** pipes were installed - the geothermal water flows now through **Flexalen® pre-insulated polybutene-1 pipes** manufactured by Thermaflex.



Heating System and Hot Water Supply

The heating system relies on heat exchangers within the energy centre. Two 100 m³ concrete buffer tanks store water at 30°C and 60°C, supplying the therapy facilities. Additionally, the centre has a cooling tower that cools the geothermal water to 30°C when the heating system is inactive.

Key Features of the Heating System

- **Closed-loop system** with flow and return lines.
- **Filled with potable water**, eliminating the need for special water treatment.
- **Flow temperature** maintained at 58°C.
- **Pre-insulated PB-1 pipes** ensure more efficient distribution.



Facilities connected to this system include Hotel Toplica, Hotel Petrova Gora, the health and regeneration centre, the public library, the therapy centre, and the mud bath.

Geothermal Water

The geothermal network, supplied by the energy centre's buffers, now operates with two distinct pipelines:

- **Cold thermal water:** 30°C; uninsulated polybutene-1 service pipes.
- **Hot thermal water:** 60°C; insulated polybutene-1 service pipes.

Water temperature is adjusted on-site based on the specific needs of each facility. The system runs daily from 7:00 AM to 3:00 PM, efficiently serving hotels and therapy centres across the site.



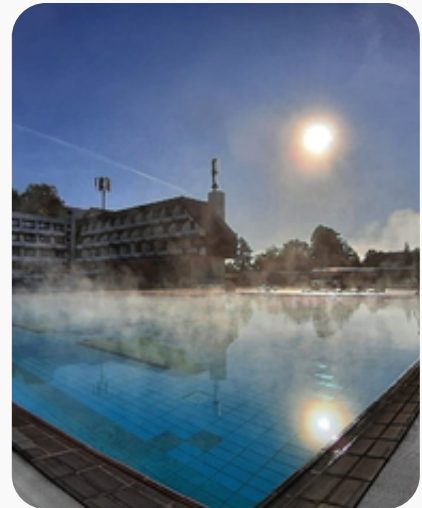
Results & Benefits

To achieve all these improvements, Top-Therme partnered with **Thermaflex**. The project selected **Flexalen® 600** and **Flexalen® PU SL** pipes for their proven durability, thermal efficiency, and environmental performance, which resulted in:

- ✓ **Improved water distribution:** Guests now enjoy a more consistent and high-quality therapeutic experience.
- ✓ **Increased system durability:** Flexalen® pipes provide strong resistance to chemical exposure, minimising leaks and damage.
- ✓ **Reduced environmental impact:** The use of sustainable materials aligns with Topusko's long-term green initiatives.

This successful project not only modernised critical infrastructure but also strengthened Topusko's reputation for eco-friendly development. The initiative delivers real value to the local community while protecting natural resources.

By combining **smart design, sustainable materials**, and **expert partnerships**, Top-Therme demonstrates how wellness tourism and green innovation can go hand in hand.



 www.thermaflex.com

 international@thermaflex.com




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