

Optimizing indoor climate in swimming facilities

Swimming pools are important gathering places for physical activity, play, and swimming instruction. Research shows that both swimmers and staff in swimming facilities have a significantly higher incidence of asthma and respiratory problems than the rest of Norway's population. This is mainly due to small invisible substances – disinfection by-products – formed when chlorine reacts with organic materials in the water. These concentrate especially in the air layer just above the water surface, creating a critical environment in the swimmers' breathing zone.

This PhD project is built on the interdisciplinary SHAPE project, where researchers study how air quality affects swimmers' health and performance. The PhD project will explore and research existing and innovative climate control methods for swimming pools. The project covers advanced ventilation systems, water treatment, sensors, and intelligent controls – all aimed at reducing pollutants and creating the best possible indoor climate.

A key ambition is to develop solutions that safeguard health and promote sustainability in both new and existing swimming facilities. The research aims to create the best possible indoor environment with minimal exposure to harmful substances for swimmers and staff. Better control of indoor climate and ventilation also offers opportunities to reduce unnecessary energy use, which is vital because swimming pools are among the most energy-demanding buildings. These measures can ensure a safer, healthier environment and significant energy and climate benefits.

The knowledge gained is also highly relevant beyond swimming pools. Similar challenges with air quality, energy, pollution, and operational optimization exist in many demanding buildings like hospitals, laboratories, food industry facilities, and clean rooms. The goal is to contribute to safer, healthier, and more sustainable indoor environments in the buildings of the future.