

Recreational Water

Performance, Health, Wellness and Sustainability

The CSTB guides stakeholders in the swimming pool and recreational water sectors. Because managing interactions between energy, water, air and materials is complex.

From design to use, in new and renovated buildings, the CSTB has more than 20 years of multidisciplinary experience. Our expertise in recreational water applies both to public and private sector. It aims at supporting innovation, understanding and training actors to improve the overall quality of buildings and increase the performance of facilities.



RESEARCH AND EXPERTISE FROM THE CSTB

TAILORED SUPPORT USING
DIGITAL DATA AND
MEASUREMENTS IN SITU
OR IN TEST POOLS

The CSTB guides you in considering:

- Relationships between optimization issues involving consumption of energy and heating water,
- Maintenance of the sanitary quality of water and air,
- Operating costs,
- Operating and usage level constraints
- Durability of structural components and systems,
- Etc.

RESEARCH PROJECTS
INTERNSHIPS AND THESES
PRESENTATIONS, REPORTS
AND ARTICLES

1. Decision support in design choice

Expertises

- Combined optimization of energy performance, air quality and water treatment (comprehensive approach)
- Durability of structures (buildings and pools)
- Corrosion • Slipperiness • Acoustics • Lighting
- Thermodynamics of pools and buildings
- Ventilation • Heating • Air Conditioning
- Water and air treatment
- Hydraulic modeling of pools
- Choice of underwater materials & lighting fixtures

Regulatory guidance

- Changes in health regulations
- Energy regulations and Title V
- Performance-based approach (French ESSOC Act)
- Public procurement (French REM/CREM)

New

Renovation

2. Sizing optimization

Sizing and feedback on systems operation

- Comprehensive approach (energy, air, water)
- Heating and summer comfort
- Air treatment system
- Water treatment system and effectiveness of disinfectants
- Optimization of friction loss in water systems
- Durability and performance of underwater lighting fixtures

New

Renovation

3. Performance measurement

In situ monitoring

- Thermal parameters
- Chemical parameters
- Consumption of fluids

4. Performance prediction

Tests in experimental pool

- 1:10 scale public swimming pool

Physical and statistical modeling

- Thermal • Hydraulic • Chemical
- Acoustic • Aeraulic

5. Diagnostics

Expertise in malfunctions

- Pathologies of the building
- Air quality • Water treatment
- Energy, water or treatment product invoice creep

6. Optimization of management and quality of service to bathers

Water and air quality during use

- Measurement and prediction of disinfection by-products (DBPs) in air
- Management tool for water and air quality

Thermal comfort

- Summer comfort • Winter comfort
- Dry areas • Humid areas

TESTS OUR FACILITIES AND SKILLS AT YOUR SERVICE

Test pool to study disinfectant by-product emissions in indoor pools

- > 42 m³ usable pool area (8 × 4 × 1.3 m: leisure pool or 1:10 scale public pool)
- > Water treatment for varying the water recirculation rate between 15 and 40 m³/hr, with control of water and air temperature
- > Simulation of pollution introduced by swimmers by injection of body fluid analog into the pool (simulation of up to 6 swimmers/hr)
- > Simulation of mechanical agitation related to the movement of swimmers

Analytical methods for differentiated measurement of chlorination by-products in water and air

- > Monitoring and quantification in real time of chlorination by-products (MIMS)
- > Analyses of chlorination by-products by spot sampling (GC/MS)
- > Measurement trichloramine in air (INRS Metropol M-104 method)

Pilot study of the effectiveness of disinfection products

- > Simulation of microbiological pollution from bathers
- > Analytical monitoring of bacterial contamination
- > Automatic regulation of disinfection treatment

Digital simulation of fluids for optimization of aquatic centers

- > Aerodynamic analysis and distribution of durations of stay in indoor pools
- > Modeling of the hydrodynamics of atypical pools
- > Prediction of wind speeds around outdoor/northern pools: energy optimization and wind comfort

They trust us:

- > Participation at the ANSES working group as expert – Impact of UV dechlorinators in swimming pools
- > Presentation to AQC (Agence Qualité Construction) – Assessment of tightness problems
- > Participation at the AFNOR/P91 A Pools coordination group
- > Clients: ANSES, DGS, DALKIA, ENGIE Axima, Procopi, Alphadif, and others

Find out more

- > Sustainable water management: sanitary quality and perceived quality of drinking water, water and energy, wastewater treatment, drainage systems, storm water management.
- > Green roofs and facades: thermal performance and management of heat islands, carbon sequestration, contribution to urban environments.
- > Energy performance of buildings: E+C- label, physical models (dynamic thermal simulation, dynamic energy simulation, systems, etc.), statistical models, Internet of things.

CONTACT

Aurélie Tricoire

Sales Manager, Water Division

Tél. : +33 (0)2 40 37 20 29 / aurelie.tricoire@cstb.fr

CENTRE SCIENTIFIQUE ET TECHNIQUE DU BÂTIMENT

11, rue Henri Picherit – 44323 Nantes Cedex 3 – France

Tél. : +33 (0)2 40 37 20 00 – www.cstb.fr

Siège social > 84, avenue Jean Jaurès – Champs-sur-Marne – 77447 Marne-la-Vallée cedex 2

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