

Excursion swimming pool

De Heerenduinen in Velsen

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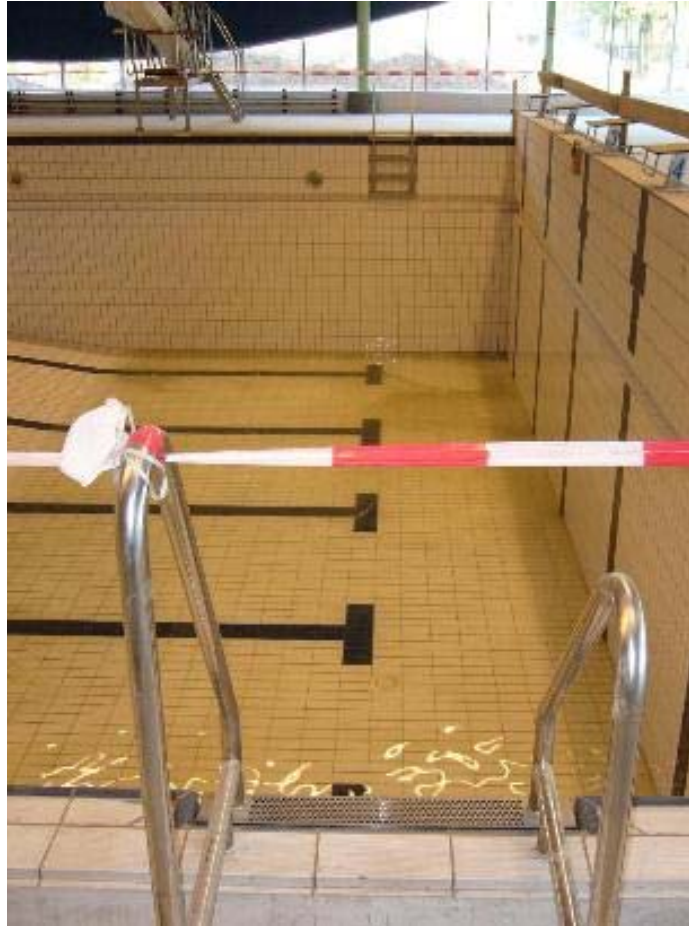
Program

- Introduction pool water treatment
- Future pool water treatment
- Guided tour through technical rooms
 - water treatment
 - ventilation / air conditioning
- Closing
- Return to Delft

Introduction pool water treatment

- Dynamic bathing load
- Main requirements
- Treatment techniques

Filling a swimming pool



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Filling a swimming pool



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Dynamic bathing load



Main requirements

- Acceptable microbiological risks
- Clear view till the pool bottom
- No accumulation of chemical components

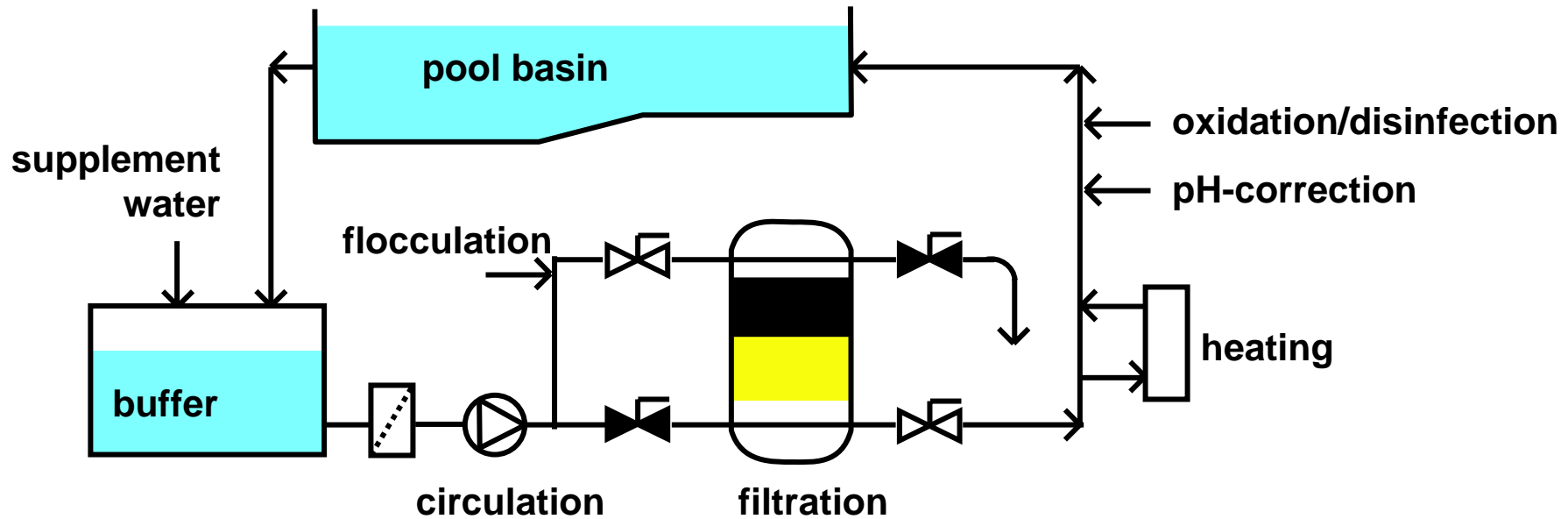
Pool water treatment

- Primary techniques
 - filtration of particles
 - coagulation of smaller particles
 - disinfection of microorganisms
- Secondary techniques
 - pH correction
 - oxidation of pollutants by chlorine
 - heating

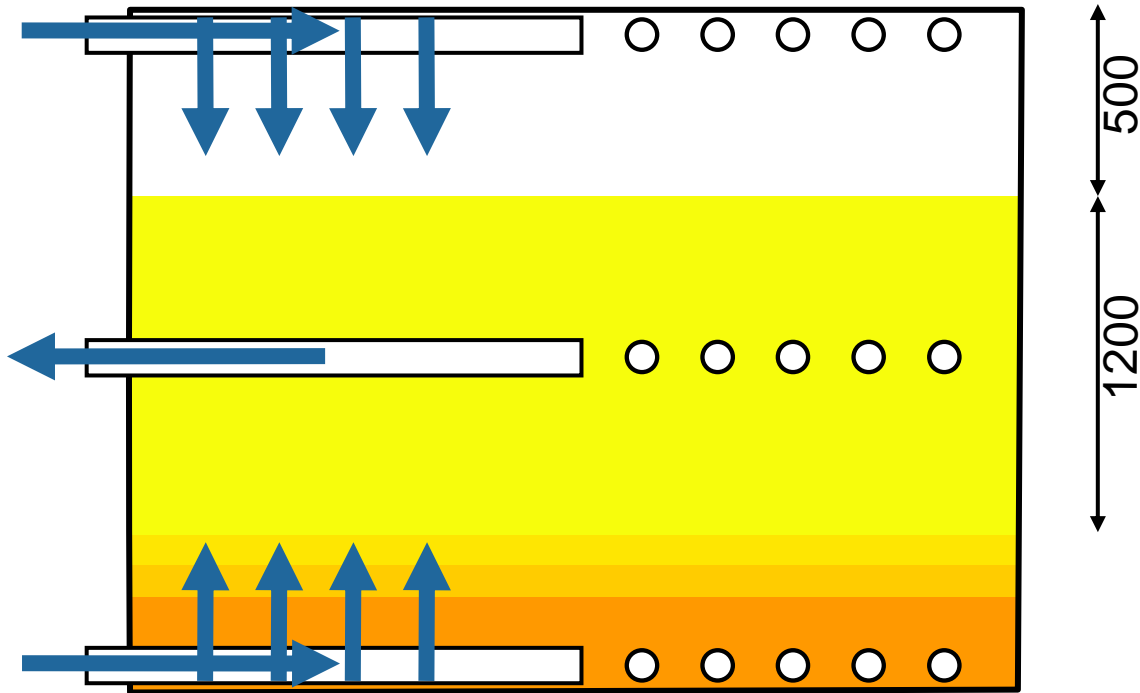
Pool water treatment

- Additional techniques
 - BAC filtration
 - ozonation
 - UV-treatment
 - Ultrafiltration

Pool water treatment



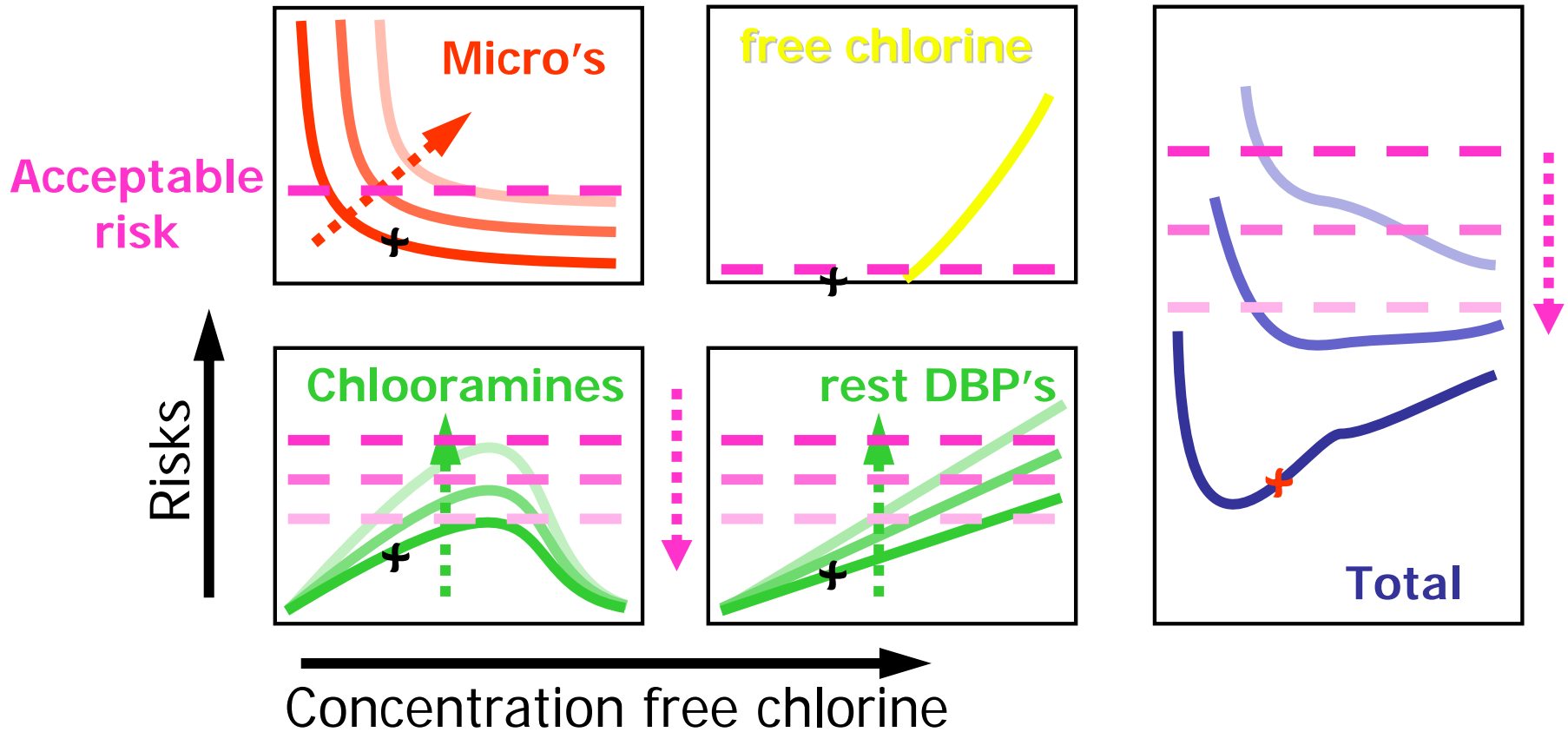
Bi-Flow filtration



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Swimming pool risks and trends



Future pool water treatment

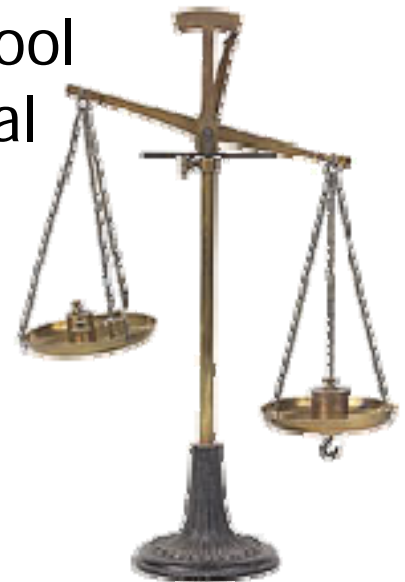
UV treatment is used in drinking water treatment and is effective for many microorganisms.

Can we make microbiological safe swimming pool water with an innovative pool water treatment based on UV treatment.

Balancing the risks

Without chlorine, there is no DBP risk.

The microbiological risk in a non-chlorinated pool should be comparable with the sum of chemical and microbiological risk in a chlorinated pool.



PhD study

Research topics:

- SwimRisk study (balancing the risks)
- Biofilm formation potential
- Lab & field experiments

Biofilm formation potential

- Influence water
 - organic matter
 - growth reducing factors
 - water treatment
- Influence materials en coatings
- Concepts for cleaning
 - mechanical; cleaning probes or cleaning equipment
 - chemical; sodium hypochlorite, CuSO_4 , H_2O_2 or others (shock treatment)

Lab & field experiments

- jar tests
- bath tub / pilot plant experiments
- full scale field experiments
- technical exploitation

This is not possible without chlorine



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This is possible without chlorine



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