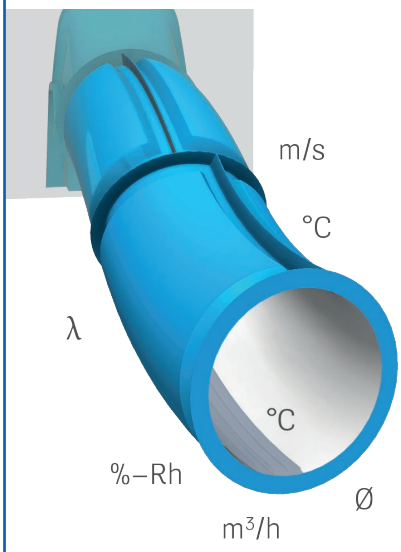
HydroSport SWEDEN

Lower energy and water cost for your waterslide

The Hydro Sport Green Advantage

Insulated waterslides with verified calculation tool

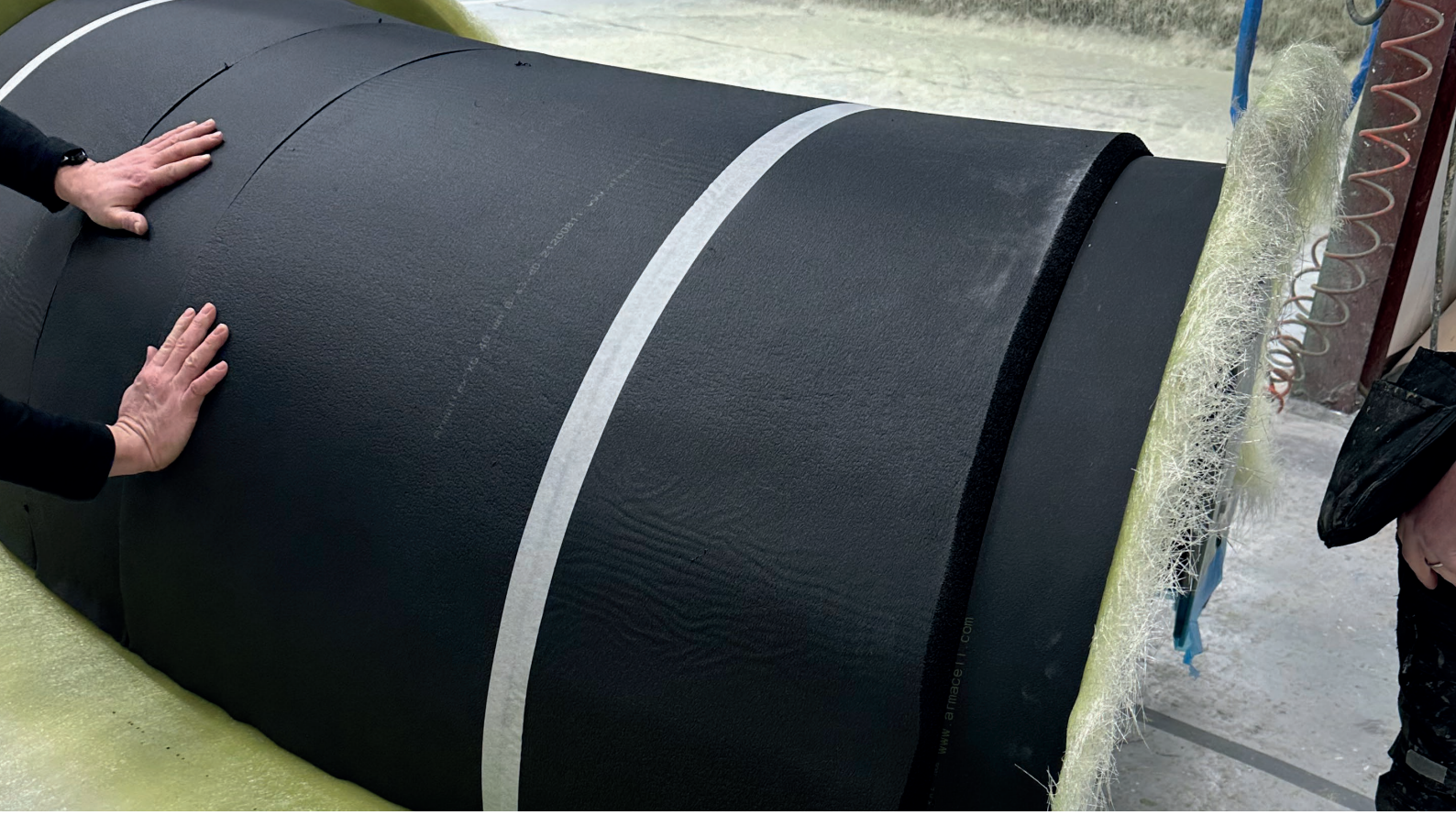


Barrier to stop cold air flow during non-operation hours

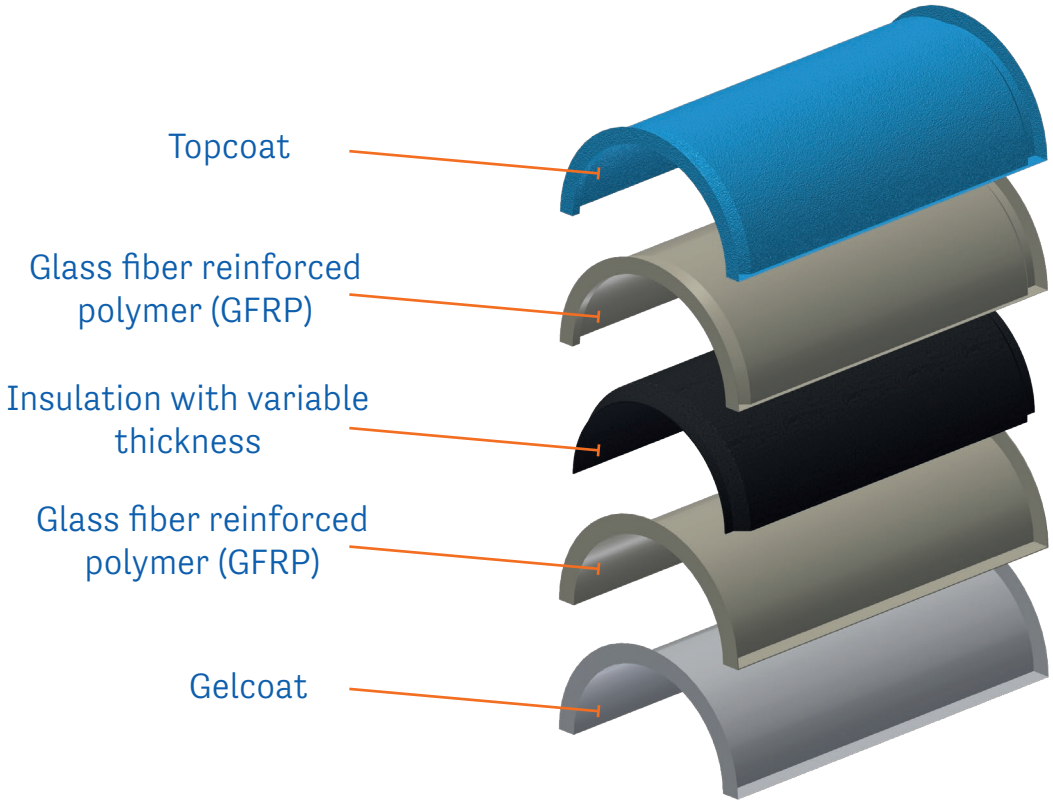
Use less water flow Demand based water supply

The Hydro Sport Green Advantage

Reduced operational cost due to energy savings from reduced heat losses and reduced water treatment volumes



Waterslide sections are created by combining multiple layers of different materials.
Insulation of a waterslide can be made in different thicknesses based on the customers needs.



Factory-made insulation solution with eliminated cold bridges and reduction of total average U-value down to below 0,5 W/m² °C.
An additional advantage is the reduced noise to surroundings.

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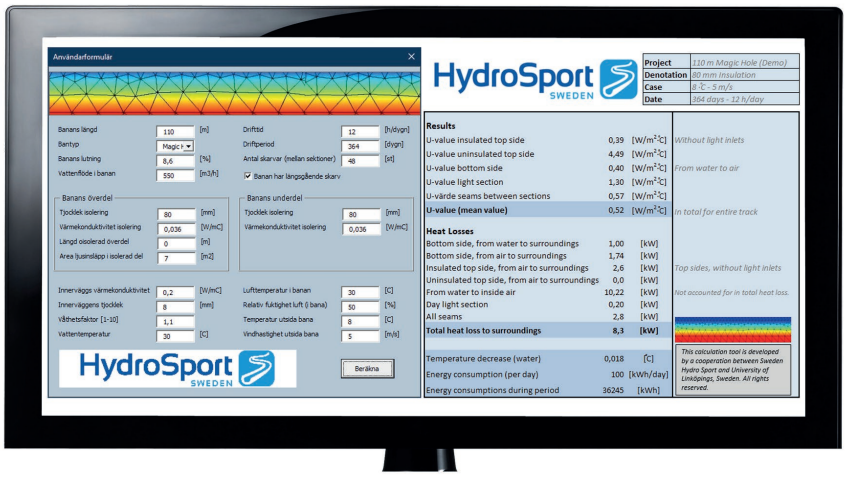
Hydro Sport Calculation Tool

Sweden Hydro Sport, together with scientists from the University of Linköping, has developed an advanced tool to calculate the energy loss from individual waterslides.
The tool considers relevant heat exchanges:

- between water and air inside the waterslide
- between waterslide and surroundings

LINKÖPING UNIVERSITY



The tool presents following results

- Detailed U-Values [W/m^2°C]
- Heat losses [kW]
- Effect on water temperature [Δ°C]
- Energy consumption [kWh]

Calculation example

0 mm insulation

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Project	110 m Magic Hole (Demo)
Denotation	0 mm Insulation
Case	8 °C - 5 m/s
Date	364 days - 12 h/day

Results			
U-value insulated top side	4,67	[W/m²°C]	Without light inlets
U-value uninsulated top side	4,67	[W/m²°C]	
U-value bottom side	6,61	[W/m²°C]	From water to air
U-value light section	4,69	[W/m²°C]	
U-värde seams between sections	5,07	[W/m²°C]	
U-value (mean value)	5,86	[W/m²°C]	In total for entire track
Heat Losses			
Bottom side, from water to surroundings	22,66	[kW]	
Bottom side, from air to surroundings	18,78	[kW]	
Insulated top side, from air to surroundings	27,9	[kW]	Top sides, without light inlets
Uninsulated top side, from air to surroundings	0,0	[kW]	
From water to inside air	10,22	[kW]	Not accounted for in total heat loss.
Day light section	0,72	[kW]	
All seams	23,4	[kW]	
Total heat loss to surroundings	**93,5**	**[kW]**	
Temperature decrease (water)	0,054	[C]	This calculation tool is developed by a cooperation between Sweden Hydro Sport and University of Linköpings, Sweden. All rights reserved.
Energy consumption (per day)	1122	[kWh/day]	
Energy consumptions during period	408332	[kWh]	

80 mm insulation

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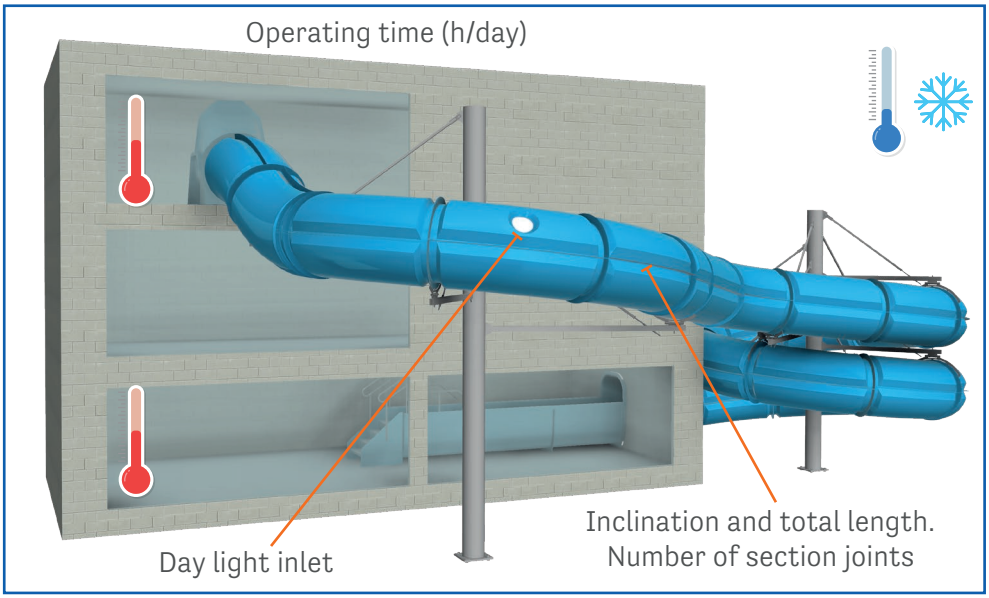
Project	110 m Magic Hole (Demo)
Denotation	80 mm Insulation
Case	8 °C - 5 m/s
Date	364 days - 12 h/day

Results			
U-value insulated top side	0,39	[W/m²°C]	Without light inlets
U-value uninsulated top side	4,49	[W/m²°C]	
U-value bottom side	0,40	[W/m²°C]	From water to air
U-value light section	1,30	[W/m²°C]	
U-värde seams between sections	0,57	[W/m²°C]	
U-value (mean value)	0,52	[W/m²°C]	In total for entire track
Heat Losses			
Bottom side, from water to surroundings	1,00	[kW]	
Bottom side, from air to surroundings	1,74	[kW]	
Insulated top side, from air to surroundings	2,6	[kW]	Top sides, without light inlets
Uninsulated top side, from air to surroundings	0,0	[kW]	
From water to inside air	10,22	[kW]	Not accounted for in total heat loss.
Day light section	0,20	[kW]	
All seams	2,8	[kW]	
Total heat loss to surroundings	**8,3**	**[kW]**	
Temperature decrease (water)	0,018	[C]	This calculation tool is developed by a cooperation between Sweden Hydro Sport and University of Linköpings, Sweden. All rights reserved.
Energy consumption (per day)	100	[kWh/day]	
Energy consumptions during period	36245	[kWh]	

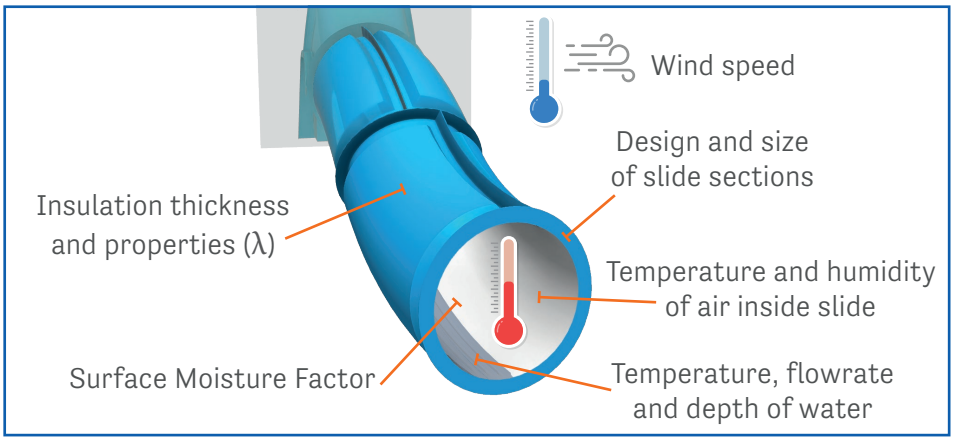
- U-value improved from 5,86 to 0,52 W/m^2°C
- Reduction of heat losses to surrounding by 91%

The Hydro Sport Green Advantage

Reliable calculation to support the planning phase of the project.
Paramount when choosing operational equipment and solutions.



Consideration of all relevant parameters



Inspection and maintenance friendly installation with free access to waterslide joints and all bolts.

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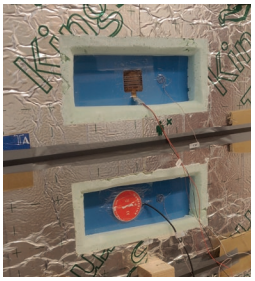
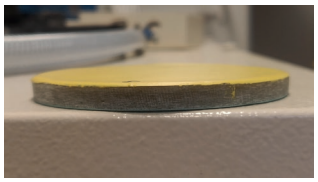
Advanced verification of thermal conductivity for a waterslide components

The thermal conductivity for Glass Fiber Reinforced Polymer (GFRP) is not easy to specify since the glass content in the matrix varies depending on the factory that produces the GFRP.
That is why the thermal conductivity for the components needed to be determined.
The measurements were done in two different methods in the laboratory at University of Gävle.
A case study was done in one of the waterslide installations to investigate Energy Gap (difference between theoretical/simulated and actual values) and validate the calculation tool.



Insulated GFRP and laboratory set up



Uninsulated GFRP and laboratory set up

UNIVERSITY OF GÄVLE

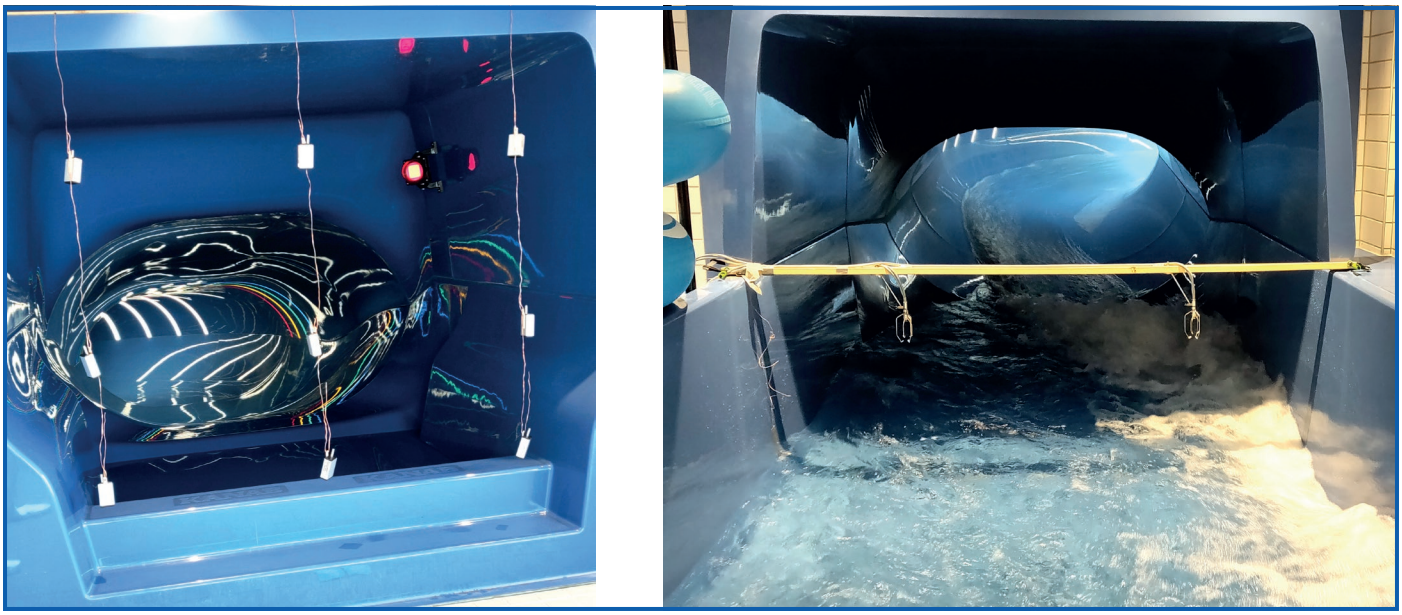
The case study was done with experts from University of Gävle to ensure proper setup of the test and collect the data. The study carried out in two different stages.
The primary one was to verify the U-value including thermal bridges of the waterslide in a closed dry section.
The secondary stage was to validate the calculation tool in an operating waterslide.

The primary stage of the case study

The Hydro Sport Green Advantage

Elimination of heat losses during non-operation hours.

Development for safety, energy optimization and new experiences



Secondary stage of the case study

Comprehensive verification tests have been performed to ensure the reliability of our calculation tool.

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CONSTRUCTING JOY

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