

# Information memorandum

July 19, 2017

KPMG

Tetőhűtés

## Independent expert report

### Hungarian innovation

„In addition to the electricity savings, significant quality improvements in the working environment can be achieved”

**WaterFilm Technology®** is a **Hungarian energy efficiency innovation for industrial, logistic and commercial halls**, which, in addition to the electricity savings of air conditioning and cooling systems, also achieves **significant quality improvements in the working environment**. The patent-pending WaterFilm Technology® offers an efficient solution for the heat radiation and inflow through the flat roof of halls. In 2017, Öntözés.hu Ltd, the owner of the proprietary rights, is selling initially to Hungarian production facilities.

### Thermal radiation and heat shock in industrial halls

The **temperature** of industrial halls near the production lines **can reach 35-40°C\*** (95-104°F) resulting from the increase in solar radiation intensity. When temperatures exceed the adjusted level of work safety threshold, the number of **mandatory stoppages increase**, meanwhile **production capacity and comfort level of employees decrease**. WaterFilm Technology® significantly reduces risk of production continuity caused by increasingly frequent heat shocks.

### How does it work?

WaterFilm Technology® is **capable of cooling down** an overheated roof from as much as **75°C to 30-35°C** (167°F to 86-95°F) with evaporating 1.5 L/m<sup>2</sup>/hour of water during peak periods\*.

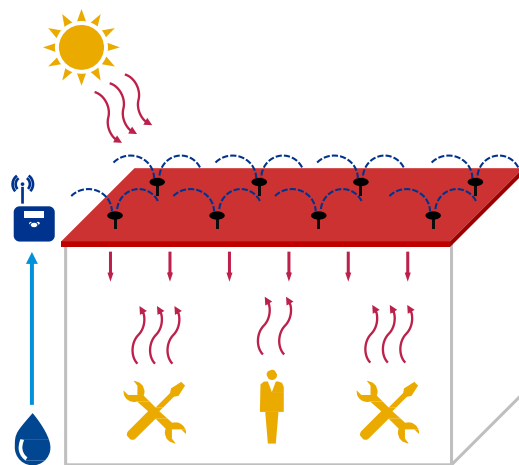
The cooled down roof structure eliminates the heat radiation towards the interior of the building, hence it **reduces the energy consumption** of other **existing cooling systems**.

In the case of **new investments** it reduces the need of installing other cooling systems, minimising initial **investment costs**.

#### Further advantages of the WaterFilm Technology®:

1. industrial grey water can also be used, which significantly reduces sewage bills;
2. indoor temperature can be reduced by 2-9°C (3-16 °F), depending on the production technology and the building's structure.

WaterFilm Technology® is **most efficiently applied when it is installed on more than 10 thousand square meters of roof surface**. The system is **optimally deployable on flat roofs** that are **free of other objects** (e.g. solar panels, solar collectors), and with readily available **industrial or well water**.



### References

The roof cooling system has been installed at three locations so far. The system operates most efficiently in the two production halls (Opel and Dunapack) where shutdowns due to unplanned heat shocks disappeared and the workers' comfort increased\*.





# Benefits of the application of WaterFilm Technology®

## Reduction in investment costs

- For existing or new industrial halls it is relevant in the case of installing a new cooling system
- The capacity of other cooling equipment may be reduced already at the planning phase

## Electricity savings of cooling equipment

- Heat radiation of the roof can potentially be eliminated
- Air temperature of the halls may be reduced
- The electricity consumption of existing cooling systems can be significantly reduced
- The efficiency and reliability of the cooling units on the roofs increase

## Improvement of working conditions and comfort

- The comfort in the halls can significantly improve
- Depending on the structure of the building and the production technology, inside temperatures may drop by 2 to 9°C (3 to 16 °F), further improving the comfort of workers

## Avoidance of shutdowns and scraps

- WaterFilm Technology® eliminates the effects of heat shocks during the summer months
- Scraps and downtimes maybe eliminated
- Large fluctuations of temperatures, dilatation and degradation of the roofs are reduced, which may extend its service life

## Environmental protection

- WaterFilm Technology® uses grey water, therefore it is both commercially and environmentally sound solution
- Electricity savings achieved by roof cooling is also measurable by reductions in CO<sub>2</sub> emissions



## Returns of the investment and payback period

Investment cost of WaterFilm Technology® in pilot projects on a **10-15,000 m<sup>2</sup> roof surface** is approximately **EUR 100,000-120,000** that includes deployment, the first winterization, remote control and monitoring, and **2 year full warranty**. When installed alongside other cooling systems, assuming total annual operating costs of EUR 2,000/annum, the WaterFilm Technology® system has a **payback period of 7-17 years\*\*** considering just the savings on electricity (with 110 MWh/year electricity savings).

The roof cooling technology may:

1. **eliminate 5 minute work safety breaks;**
2. **eliminate unplanned production shutdowns caused by heat shocks;**
3. **decrease by even 50% the investment costs of other cooling equipment in case of a new investment;**

which both or alone substantially reduce the payback period of the roof cooling investment.



## Risks, warranties

Category	Risk	Probability	Risk management
Technical	Malfunction of roof cooling system sensors		Accidental failure can be temporary resolved remotely (with the sensors of the adjacent sector). Malfunctioning sensors are replaced within the warranty period.
	Leaking due to roof cooling system		So far no leaking has been observed, moreover, continuous application of roof cooling prevents the occurrence of thermal dilatation.
	Pipes and nozzles clog or break down		The special nozzles do not clutter even when using industrial water. The plastic tubes are specifically protected against UV rays. The components are provided by a stable and diverse supplier base.
Natural	Lightning strikes the roof cooling system		The system is equipped with special lightning protection system, therefore the effect of the risk is greatly reduced.
	Large wind effects during operation		The droplets emitted by the WaterFilm Technology® are not influenced by the wind effect, reaching the surface of the roof, thus ensuring proper operation.
Economic	Negative financial returns		The price of the pilot installation ensures that the investment is immediately paid off from avoided shutdowns, and through electricity savings in the medium-term.

\* Data and information were provided by Öntözés.hu Ltd., the two reference production facilities (Opel and Dunapack), and BME (Budapest University of Technology and Economics).  
 \*\* The result of KPMG's simplified return calculation is based on BME's model of electricity saving by evaporative roof cooling. The exact extent of any savings achievable by roof cooling always depends on the specific circumstances and can only be determined individually.

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