

# Instant disinfection of Point-of-Use water, efficient and independent of water temperature

Jaak Geboers\*, Merlijn Janssen\*\*, Michiel van der Meer\*\*\*

\*Philips Lighting B.V., Mathildelaan 1, Eindhoven, Netherlands

\*\* Philips Lighting Poland S.A., ul. Kossaka 150, Pila, Poland

\*\*\* Philips Innovative Applications, Steenweg op Gierle 417, Turnhout, Belgium

## Introduction

In order to overcome limitations of current low pressure mercury lamps and add additional safety to POU applications, a new disinfection technology was developed by Philips. The commercial name for this new technology is InstantTrust.

## Methodology & Findings

Current used low pressure Mercury UVC lamps are based on a gas discharge of Mercury vapor. To be effective, the Mercury first needs to be in the vapor phase. As a result, the Mercury based lamps have a relatively slow run-up, causing the disinfection rates during the first 30-60 seconds of operation to be much lower than the optimal disinfection rate.

InstantTrust technology works instantly (faster than 0.1 sec) to produce clean water from the first second onwards.

Cold water from dispensers typically has a temperature of approx. 4 °C. As Mercury vapor pressure is highly dependent on the temperature of the surroundings, the output of these lamps is very sensitive to the ambient temperature as well. As a result, current low pressure lamps give less than 20% of their output at 4 °C. The Instant Trust technology does not have these limitations. The discharge is based on a noble gas, which is already in the vapor phase and the pressure is hardly influenced by the temperature. As a result, the new technology provides a constant performance at all temperatures, including refrigerated and warm water. Several disinfection performance tests were concluded both in-house, externally via customer's laboratories and an external certified laboratory.

The certified lab measured the reduction of MS2 and E.coli species at different flow rates and water UVC transmissions.

Method	Log reduction	Flow [lpm]	System Power [W]
MS2 , 70%/cm	2.4 / 2.3	2.5	27
MS2, 85%/cm	2.7 / 2.7	2.5	27
MS2, 85%/cm	2.0 / 2.0	4	27
MS2, 98%/cm	2.2 / 2.2	4	27
MS2, 100%/cm	3.4 / 3.6	2.5	27
E.coli , 98%/cm	6.8 / >6.8	4	27
E.coli , 85%/cm	4.6 / 4.6	4	27

In other labs tests were performed also on other microorganisms such as yeast, E-coli, Micrococcus lutea, K. terrigena, Brevundimonas diminuta, HPC, Pseudomonas Aeruginosa. All results were fulfilling all customers' expectations.

In addition to instant disinfection of water independent of temperature, the InstantTrust is approximately half the size of a current disinfection function. This compactness allows adding UV disinfection to smaller equipment than ever before. Moreover, contrary to low pressure Mercury lamps, InstantTrust is mercury free to reduce the end product's ecological footprint.

## Worldwide opportunity

By overcoming these four key limitations of current low pressure mercury lamps, InstantTrust technology opens up new possibilities to add UV technology where this was not possible before. The new technology is ideally suited for instant disinfection of small quantities of cold water at flows of currently up to approx. 4 liters per minute. This means it can be applied in any Point-of-Use dispensing equipment such as bottle refill stations, table top purifiers, pitchers, drinking fountains, dispensers, taps, water coolers and under the sink purifiers.

**Keywords**

Water disinfection

Point-of-Use applications

Instant

Independent of temperature

Mercury free