



Case study:

UV Pure systems provide chemical-free disinfection of harvested rainwater for bus wash station



System design specifications:

- **Application:** Rainwater harvesting and reuse
- **Location:** GO Transit Bus Service and Storage Facility, Hamilton, Ontario, Canada
- **Commissioned:** January 2016
- **Source:** Rooftop rainwater collection
- **System:** 4 x Upstream™ 15-50
- **Flow:** 60 gpm (227 L/min)
- **Minimum UV dose:** 30 mJ/cm²
- **Minimum UVT:** 60%

GO buses are being washed with harvested rainwater in Hamilton, Ontario as part of an initiative by regional transit service, Metrolinx, to reduce water demand and improve stormwater management at its new bus service and storage facility.

Disinfection is an important, often regulated, step in rainwater harvesting to inactivate harmful microbial pathogens that can contaminate rainwater as it is collected from rooftops and conveyed to storage.

To help protect facilities staff from accidental inhalation of aerosols or ingestion of wash water, the system manufacturer, Ontario-based Interpump Inc., has added UV Pure Upstream systems to eliminate opportunistic pathogens such as E. coli and Legionella. As rainwater is collected, it first passes through a vortex pre-treatment filter before entering a 6,000-gallon (22,700-litre) underground cistern.



Photo courtesy of Metrolinx

From there, additional treatment is provided by a 30-micron filter, followed by a 5-micron filter. Final disinfection is performed by four UV Pure Upstream 15-50 systems that can collectively produce up to 60 gpm (227 L/min) of clean, safe water.

By capturing and reusing rainwater, the system also contributes to a resilient stormwater management system that can help control inflow to the sewer systems and mitigate the potential for erosion and flooding to the downstream environment.

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Hallett systems provide high level of disinfection for UVT as low as 50%

Upstream systems are ideal for rainwater applications since they can achieve a high level of disinfection even when ultraviolet transmittance (UVT) is as low as 50%. Although rainwater collected from rooftops often looks clear, UVT can be low since the water can pick up dissolved organics that can absorb UV energy and negatively impact disinfection.

The Upstream's Crossfire® technology incorporates elliptical reflectors that reuse UV energy and deliver a UV dose that is 2.4 times greater than conventional UV systems. Reflecting the UV light also targets pathogens from 360 degrees and eliminates the risk of shadowing, which is more likely in conventional systems and could allow live pathogens to pass through.

Each UV Pure system is equipped with smart controls and dual sensors that continually monitor three critical performance parameters—UV dose, UV lamp intensity and UVT. If any parameter is not within specifications, the system will trigger an alarm and the central control panel will notify an operator to address the issue.

The facility, which is aiming for LEED certification, will also benefit from the robust automatic cleaning system that prevents fouling of the quartz sleeve. This simple process helps to make UV Pure systems virtually maintenance free, since it prevents the need to shut down systems and manually clean the quartz sleeve with acid or other caustic cleaners. In many cases, systems have operated for several years and have required only scheduled UV lamp



Four UV Pure Upstream systems provide a high level of disinfection for harvested rainwater, even when UVT is as low as 60%.

Interpump completed commissioning of the system in January 2016 and provided comprehensive training for staff at the service and storage facility. Similar rainwater harvesting and wash systems with UV Pure technology are being manufactured and installed by Interpump in Edmonton, Alberta; Toronto, Ontario; and Brampton, Ontario.



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