



FAQ: **Potable Water Pilot Studies**

1 Is there a pilot unit? How do I test Photo-Cat for potable water treatment capability? What is the foot print of the pilot unit?

A 100,000 LPD (40,000 GPD) potable water treatment system is available for pilot testing. The system is an automated water treatment process with full data logging capability. The unit is self contained in a shipping container (8 ft. wide x 20 ft. long x 8 ft. high) so it can be moved from place to place as required. For additional information, a detailed brochure is available.

2 What is the cost of pilot testing?

There is no cost for the use of equipment for pilot testing. However, the recipient is required to bear the cost of delivery, analysis, and other related costs.

3 What is the quality of feed water that Photo-Cat requires?

Photo Cat has an established history of treating lagoon water, groundwater, industrial process water, sea water, and water with low UV transmittance.

4 What ancillary pieces of equipment are needed to support the Photo-Cat pilot test (i.e. boost pumps, compressed air, domestic water, power converters)?

Photo-Cat systems typically come complete and do not require auxiliary equipment.

5 How much time is needed to collect data?

Photo-Cat systems are equipped with full data logging capability; therefore, samples and data can be taken at any time during operation. A test plan can be as short as one week or take many months to complete. The length of a pilot test depends largely on the recipient's preference.

6 What maintenance/adjustments are made and how often?

The scheduled maintenance interval for a Photo-Cat system is in excess of 18,000 hours of run time. Due to the online PLC control system which continuously monitors the process, no adjustments are required.

7 What are the power requirements and consumption?

The prepackaged Photo-Cat pilot unit requires 230V 3-phase power fused at 100 Amps. The unit has a high turn down ratio and, with auxiliary equipment such as pumps and air conditioner for the enclosure, it will draw anywhere from 3kW-20kW depending on the flow rate, treatment and auxiliary loads.

8 How often can we expect to clean the system?

The Photo-Cat system does not require cleaning. The nature of the process prevents the quartz tubes and ceramic membrane from fouling. Therefore, the Photo-Cat system will run continuously, 24/7, without cleaning.

9 What are the scheduled maintenance requirements for Photo-Cat?

The standard industrial practice for the timely inspection of pumps, valves, sensors and lamps should be used as a guideline for the maintenance of the Photo-Cat system. Standard practice for existing Photo-Cat installations is maintenance after 18,000 hours of run time.

10 What chemicals are required?

Photo-Cat does not require any chemicals. When Photo Cat is used to remove iron and other metals, a small amount of acid is periodically required. The amount of acid needed is proportional to the amount of metal that must be removed. This can be NSF approved citric acid or other acceptable types of acid. For convenience, acid can be used offline on a slip stream, or when the Photo-Cat system is online and in service.

11 Does the Photo-Cat process require hydrogen peroxide?

Hydrogen peroxide is not used because the Photo-Cat generates its own, more effective, radicals to oxidize or reduce contaminants. We avoid the use of peroxide because, in its purest form, hydrogen peroxide can contain up to 30ppm of residual or unknown contaminants or stabilizers. The impact of these contaminants or stabilizers on potable water, we believe, is unknown.

12 How can the system fail? And how can failure be identified?

Photo-Cat's pedigree originated in the nuclear industry, and from its initial development it was designed for high reliability and durability. This has been demonstrated in its exceptional industrial track record.

Photo-Cat is equipped with a PLC that continuously monitors and checks compliance variables to identify potential problems or failures before they occur. The Photo-Cat system is designed to provide warnings of potential out-

of-compliance variables or to fail-safe and shutdown if performance variables are not within tolerance.

It is difficult to create a situation in which the system would fail to meet its performance specifications. For a system failure, multiple failures would need to occur simultaneously.

13 How many spares should be on hand? What do they cost? What are the process consumables or waste streams?

Photo-Cat's ceramic membranes do not require service or replacement and its UV lamps have life in excess of 24,000 hours. Therefore, spares requirements are minimal. When needed, spares are available from multiple sources of supply with a 10 year price history.

The Photo-Cat process does not have waste streams or reject streams.

14 What is the projected life of the system? Are there any systems in service that length of time?

Photo-Cat systems have a design life of 25 years. The oldest operational system has accumulated over 52,000 hours with original quartz tubes, ceramic membranes and controls.

15 What is the largest system built to date?

Photo-Cat systems are sized for treatment capability and hydraulic capacity. The largest existing Photo-Cat system has a treatment capability of 100kW. Our largest hydraulic capacity is 400m³/day (0.1 MGD). 0.25 MGD and 0.5 MGD system modules have also been engineered. Like conventional membrane systems, each Photo-Cat system is based on a modular design to allow for scale-up.

16 When the pilot is successful what will a 1 MGD system cost?

Cost and system size is proportional to treatment requirements. We provide capital and O&M cost breakdowns based on defined treatment requirements for triple barrier protection for dissolved chemicals, biologicals and other issues. An engineering package with cost data for a nominal 1 MGD system is available under a separate cover.

17 Where do you see the primary benefit of Photo-Cat?

- Lower lifecycle cost
- Better protection and purification
- Reduced O&M

18 Do you have any case studies we can take a look at?

Photo-Cat's established industrial track record is documented under a separate cover and, in a more limited extent, in the Solutions section of our website. Many of these installations have EPA or other permits for demonstrating sustained discharge compliance. Often, the discharged water is better than drinking water standard.

The Photo-Cat is also used for the production of high purity water without the use of chemicals. This water is purified to 1ppm TOC.

Our potable water experience is documented by various institutions and consultants, and has been presented at various conferences and in public literature. Additional work is ongoing and will be accessible as it becomes available.

19 How does one go from pilot to full scale?

Once suitable engineering data has been collected from the pilot, Purifics is able to supply full scale design and hardware from a Greenfield to an operational system. See additional documentation.



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