



TOYOTA

**Case Study: Toyota Motor Manufacturing, West Virginia (TMMWV)
Buffalo, West Virginia**

Background

The Toyota manufacturing facility in West Virginia was established in 1996 and manufactures 4-cylinder and V6 engines, five-speed automatic transmissions and automatic transmission gears. This plant has an annual capacity of more than 550,000 engines and 600,000 automatic transmissions and regularly participates in Toyota’s internal water audits. The ultimate goal is to reduce, reuse and recycle virtually all water within their reach. This facility has a wide variety of water treatment systems and each system is under continuous process improvement review.

Challenge

The prefiltration portion of an R.O. system located within this plant utilizes a municipal water source. Prior to installation of the electropositive filters, the SDI on the system’s feed water going to the RO membranes averaged approximately 4.42. Combined with the turbidity within that feed water stream, Toyota was replacing their membranes 6 - 7 times per year due to premature fouling of the membranes beyond cleaning. Annual costs for maintaining this system were considered unacceptable both for replacement parts, but also in terms of labor and materials for each cleaning cycle.

Solution

After installation of the NanoCeram electropositive filters, the SDI levels dropped considerably and averaged approximately 1.19. Initial pilot scale testing utilized 2.5" x 10" electropositive filter cartridges with 5-micron pleated polypropylene cartridge prefilters.

This configuration yielded approximately four (4) days of effective life for the NanoCeram filters. After replacing the 5-micron filters with 1-micron pleated filters, the effective life of the NanoCeram filter cartridges increased to 6 - 7 days. TMMWV has now installed HyFlo™ stainless steel housings to incorporate multiple rounds of 4.5" x 20" NanoCeram electropositive filters and 1-micron prefilters.



Summary

NanoCeram® filter cartridges have increased the effective lifetime of the RO membrane elements significantly. Cleaning cycles have been reduced from once every 1-2 weeks, to once every 12 months. It is estimated that the RO membranes will now meet or exceed the manufacturer’s suggested lifetime with the decreased incidence of wear & tear associated with standard cleaning processes. This represents a 5-fold cost avoidance and has reduced filtration costs for this system at the TMMWV plant by 80%.

