

IPEX Industrial Case Study

Water & Wastewater Treatment Applications

IPEX Thermoplastic Piping Systems Deliver Potable Water and Conserve Groundwater in Sugar Land, Texas

Founded as a sugar plantation in the mid 1800s, Sugar Land is one of the most affluent and fastest-growing cities in Texas, having grown more than 158% in population over the last decade. With such development, it's no wonder that the City of Sugar Land needed a better way to provide potable water to support the population while reducing dependence on the existing groundwater withdrawal method that



The City of Sugar Land Surface Water Treatment Plant delivers 9 mgd of potable water to residents.

had been contributing to flooding problems in the region. In fact, the Fort Bend Subsidence District mandated reduction of groundwater use by 30% in 2013 and 60% by 2025.

After nearly a decade of planning, the City recently approved the construction of a new \$69 million surface water treatment plant in the Gannaway Lake area adjacent to Kempner High School. Expected to be operational in late 2013, the Sugar Land Surface Water Treatment Plant (SWTP) will utilize raw water from Oyster Creek, a local creek that parallels the Brazos River, to produce 9 million gallons per day (mgd) of drinking water. From retention ponds, to pump stations, treatment and filtration, the surface water from Oyster Creek will ultimately be turned into potable water for Sugar Land residents—all through a complete thermoplastic

piping system from IPEX – comprised of single-wall and double containment polyvinyl chloride (PVC) and chlorinated polyvinyl chloride (CPVC) pipe, fittings and manual and automated thermoplastic valves.

At the new Sugar Land SWTP, water from four retention ponds is pretreated and then pumped to the treatment facility where coagulation and flocculation systems treat the water and remove suspended solids, sediment and turbidity. The water then flows to a low-pressure membrane ultra-filtration system that removes any further organic molecule contaminants to create potable water that goes through a final granular activated carbon system prior to distribution.

Anywhere the chemical treatment system flows underground from storage or pump systems, double containment pipe and fittings are required to prevent any possible leaks or spills into the surrounding groundwater. For the double containment, the Sugar Land SWTP used



The IPEX Guardian™ Vinyl double containment system was required for underground runs, which transitioned to IPEX single wall PVC and Corzan CPVC inside the facility.

the IPEX Guardian™ Vinyl double containment system. The Guardian system was comprised of both Xirtec®140 Schedule 80 PVC and Corzan® Schedule 80 CPVC carrier and containment pipe and fittings, ranging in size from 1/2-inch carrier inside of 2-inch containment to 2-inch carrier inside of 4-inch containment.



IPEX Corzan® CPVC pipe, valves and fittings are used in areas transporting highly-corrosive chemicals.

"While we've installed piping for many years, double containment was somewhat new to me," says James Schmerber, project manager with LEM Construction who provided design assistance and installation services for the new treatment plant. "IPEX set up demonstration training for our crews, and we found that the system was ultimately as easy to install as single-wall PVC and CPVC piping systems from IPEX."

IPEX Guardian double containment systems offer a complete selection of pretested modular components which are extremely easy to install. Compared to conventional double containment piping systems, the patented Centra-Lok™ design reduces the number of overall joints by up to 60% and the number of field joints by up to 10%. Since joints are always the most common source of premature failures and leaks, it is easy to realize the immense impact the Centra-Lok design has on maintenance, repair and installation costs.

Areas within the treatment facility, including the chemical and membrane areas, consist of IPEX single-wall Xirtec140 PVC and Corzan CPVC pipe, valves and fittings.

"The treatment chemical specification originally called for all PVC, but due to the chlorine dioxide, sodium hypochlorite and sodium chlorite chemicals used in the treatment process, IPEX application engineers recommended Corzan CPVC for those areas," says Schmerber. "The change in material, along with delivery times on some fittings and numerous inspectors on the site, caused some project and schedule challenges. However, Robert Dragisic, our IPEX regional sales manager was always easy to get a hold of, and he was extremely helpful in coordinating the chemical compatibility analysis and getting us the product we needed. It was nice to have such great customer service and one point of contact."

To control flow throughout various areas of the SWTP, a variety of IPEX ball valves are utilized. IPEX EasyFit VXE Series Ball Valves were used for smaller pipe diameters of up to 2 inches, while VX Series Ball Valves were used for larger pipe diameters of up to 6 inches. These compact ball valves feature a full-port, bi-directional double blocking design. Their true union style allows the valves to be easily removed from the piping system and fully serviced. Available in both PVC and Corzan CPVC for use throughout all areas of the Sugar Land SWTP, the valves offer precise machined ball and stem components that provide improved seal integrity under tough service conditions. The ball valve handle also functions as a tool for ball seat carrier adjustment.

For areas in the chemical treatment system requiring remote operation, the Sugar Land SWTP deployed electric actuated IPEX VKD Series Ball Valves with integrally molded mounting features that allow an actuator to be directly mounted on the top of the valve. These features also permit easy removal of the actuator from the valve for maintenance purposes. IPEX's comprehensive line of pneumatic and electric actuated valves allow an operator to control a near infinite number of valves/functions with speed and precision, from a centralized remote location.

"In the membrane filtration area, we installed solenoid valves from IPEX for precise control in automated applications," says Schmerber. "We also used IPEX sediment strainers to remove any solids and impurities." IPEX Solenoid Valves are 100% duty cycle solenoid valves with an innovative lever-shutter design that offer precise control and high-cycle service. IPEX RV Sediment Strainers help protect critical pipeline components with a clear construction that enables easy inspection of the screen while in service and reduces operating costs with a bottom-entry design that enables maintenance on the valve while in-line.

For more than 20 years, IPEX has offered one of the most comprehensive lines of single wall and double containment pipe, valves and fittings—all engineered and manufactured to strict quality, performance and dimensional standards. With all the corrosion resistance and installation benefits, combined with the performance and longevity of easy-to-use valves, the thermoplastic piping system from IPEX at the newly constructed Sugar Land Surface Water Treatment Plant will reliably do what it is intended to do—deliver potable water to the surrounding community for many years to come while shifting them away from reliance on precious groundwater.



IPEX manual VXE, VX and electric actuated VKD Series Ball Valves were used throughout the facility to control flow as needed.

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