ABOUT SANTEC CORPORATION

Santec Corporation is located at the foot of the Rocky Mountains in beautiful Denver, Colorado and offers wastewater assistance services for the design, permitting, equipment procurement, start up, and rehabilitation of wastewater treatment plants. Santec was started in 1987 because there was a need for efficient, scalable, treatment facilities in remote and specialized areas where there is no access to municipal sewer. The results have been tremendous with Santec developing more than 150 wastewater facilities in 22 states and the Caribbean.

“Our mission is to be the leading supplier of scalable, cost efficient, reliable wastewater treatment systems for remote and specialized customers. We are a customer focused, process centered organization that delivers efficient solutions to our

One of Santec’s primary strengths is our swift implementation of a turn-key, cost-effective technical support strategy. This involves a range of services from planning and consulting, site visits, and collaboration with engineering and design teams. Effective utilization of Santec for the wastewater technical support minimizes engineering costs, and simultaneously bolsters the overall level of expertise provided to the client by the project engineer.
BENEFITS

DESIGNED SPECIFICALLY TO YOUR APPLICATION

A diverse solution offering is critical in serving an ever expanding market and Santec continues to capitalize by customizing every job spec to the specific demands of the customer rather than pushing a “one size fits all” agenda. Treatment plants must account for future population growth and the increased waste that results in so many plants that are built too large up front which results in wasted development space and capital expenditure. A Santec treatment facility maximizes the customer’s investment budget by utilizing a “phased build” approach so the plant grows only as the development progresses and waste requirements increase. This approach allows developers to lower the cost per finished lot and improve their bottom line.

OPERATIONAL SIMPLICITY / SUPPORT

One of the primary concerns of nearly every small to medium scale wastewater treatment facility is effective operation of the plant. In fact, the Environmental Protection Agency estimates that up to 80% of small to medium sized wastewater treatment facilities are currently operating out of compliance.

Santec addresses this problem in a number of important areas. Santec focuses its design efforts on minimizing the overall level of operator attention required. Making all equipment and maintenance readily accessible and easily removable to the surface is one example of this design focus. Santec also works to preempt operational problems through customized operations and maintenance manuals for each facility Santec is committed to establishing working relationships with each operator, under the assumption that good operator rapport translates into excellent plant performance.
Glacier Ranch WWTP, Montana
100,000gpd

Design Parameters

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>INFLUENT</th>
<th>EFFLUENT</th>
<th>REMOVAL EFFICIENCY</th>
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</thead>
<tbody>
<tr>
<td>BOD₅</td>
<td>220 mg/l</td>
<td>&lt;30 mg/l</td>
<td>86.4%</td>
</tr>
<tr>
<td>TSS</td>
<td>220 mg/l</td>
<td>&lt;30 mg/l</td>
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<tr>
<td>TOTAL NITROGEN</td>
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<tr>
<td>Fecal Coliform</td>
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<td></td>
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<tr>
<td>Flow</td>
<td></td>
<td>100,000 gpd</td>
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</table>
MINIMIZATION OF SLUDGE HANDLING

As an appurtenance, Santec also offers sludge drying and dewatering systems. These systems automatically compresses and packages the sludge generated from the process into porous bags, which subsequently can be tested and approved under EPA guidelines for landfill disposal, or they can also be land applied for fertilization.

PLANT EXPANDABILITY/ PHASING

A key in providing cost effective treatment designs is the ability to provide flexibility. Each Santec facility can be expanded to accommodate additional hydraulic flow, or modified influent concentrations simply by bringing additional reactors on line to maintain the appropriate treatment levels and detention times. Plants can also be upgraded to include such process designs as disinfection and denitrification by adding reactors to the original treatment design. Santec plants do not typically require concrete footings or tie-downs and are buried in pea-gravel. This makes expansions or upgrades inexpensive in terms of excavation, and simple in terms of accessibility.

A common application utilizing the flexibility of the Santec design is the staging of plant size to coincide with development. Often, projects such as subdivisions are developed over a period of time, or in phases. Santec plants are easily modified to reflect actual demand. This saves the owner a large portion of initial cost while affording him (and the regulatory agency) the opportunity to view the performance of the treatment process over time before committing to the final plant.

“A Santec plants are easily modified to reflect actual demand.”

AESTHETICS

Odor control, visual impact and noise mitigation are all primary concerns for developments investigating options for onsite treatment of wastewater. The sub-grade installation and nature of the Santec design lends itself to minimizing the impact it will have on the surrounding area.

Odor control at our facilities begins with the fully contained fiberglass tanks installed underground. Gasses and odors produced by the treatment process are contained in the tank instead of being released directly into the atmosphere. The trapped gasses can then be directed to activated carbon filters which remove the particles from the air that are the source of odor.

The underground fiberglass tanks also provide for a discrete visual profile. Tens of thousands of gallons of treatment capacity can be hidden under the ground. A simple 6 foot security wall or fence can completely obscure the facility from view save the top of the equipment building. Many facilities will use effluent to irrigate landscaping and trees around the facility providing for a discreet and more aesthetically pleasing site.
Mitigating noise is accomplished through the minimal use of mechanical components. The mechanical portions of our facilities are enclosed in the equipment building and located inside of the underground tanks. Our facilities are quiet enough to locate in close proximity to homes and businesses with disturbing the neighbors.
RV Park, Nevada
3,000 gpd
Fairgrounds, New York
5,000gpd
Pilot/Flying J, Arizona
40,000gpd
Coronado Utilities, Arizona  
350,000gpd

Design Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Influent</th>
<th>Effluent</th>
<th>Removal</th>
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<td>Design Flow (mgd)</td>
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<tr>
<td>BOD₅ (mg/l)</td>
<td>220</td>
<td>&lt;30</td>
<td>85%</td>
</tr>
<tr>
<td>TSS (mg/l)</td>
<td>220</td>
<td>&lt;30</td>
<td>85%</td>
</tr>
<tr>
<td>Total Nitrogen (mg/l)</td>
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<td>e. coli</td>
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<td>Non-detect (4 of 7)</td>
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WASTEWATER SUPPORT SERVICES

TECHNICAL SUPPORT:

- Turn-key wastewater treatment systems
- Coordination, organization, and facilitation of the wastewater design team
- Project phasing/ feasibility analyses and reports, aimed at minimizing capital and operations expenditures
- Site supervision of installation
- Full regulatory submittal packages including drawings, complete design calculations, equipment and process descriptions, equipment and process specifications, support operations data, and any other materials required for approval by regulatory agencies
- Computer-generated process and design presentations showing pictures and data charts from existing facilities
- Access to information and technical staff through internet/ ftp downloads/ email

OPERATIONS SUPPORT:

- Customized operation and maintenance manuals
WASTEWATER TREATMENT PRODUCT LINE

WASTEWATER TREATMENT PLANTS:

- Design - submittal, manufacture, assembly, start-up, & operator training
- Totally enclosed, below-grade, four-stage extended/ step-aeration designs
- Flows from 2,000 to 1,000,000 gallons per day (1MGD)
- Treatment of Domestic / Commercial / Food processing waste streams
- Secondary, tertiary, and advanced treatment levels
- Nutrient removal (Nitrogen and Phosphorus)

APPURTENANCES / ASSOCIATED EQUIPMENT:

- Lift and transfer pumping stations - Turn-key design, manufacture, and start-up, including pump, basin, and forced main sizing, valve chambers, controls
- Fully enclosed, continuous flow, non-backwashing, sand filters
- Chlorination and dechlorination systems (gas, tablet, and liquid)
- Ultraviolet disinfection units (closed channel and open channel)
- Irrigation dosing / storage designs and pumping systems
- Flow equalization designs and systems
- Automated sludge drying and bagging systems
- Flow metering systems
- Integrated blower packages, complete with mounting base and fiberglass housing
- Complete electro-mechanical control, programmable logic control, and remote monitoring/ control systems
- Prefabricated design, layout and supply of site operations/ storage/ laboratory buildings
- Custom fiberglass design and manufacturing to nearly any specification
- Sludge drying and dewatering systems
EXAMPLE -- SINGLE PHASE WASTEWATER TREATMENT PLANT

The above site layout drawing is an example of a single train wastewater treatment plant installed by Santec Corporation. This particular treatment plant was designed to provide a secondary level of treatment of an average flow of 30,000 gallons of wastewater per day from a school. The influent design pollutant concentrations for BOD$_5$ and TSS are 250 mg/l and 250 mg/l respectively.
The above site layout is an as-built drawing of a denitrification wastewater treatment plant installed by Santec Corporation. This particular treatment plant was designed to provide an advanced secondary level of treatment for an average flow of 56,700 gallons of wastewater per day from a subdivision. The system is designed to provide the following effluent quality levels following treatment of this domestic wastewater stream: 30 mg/l BOD$_5$/ 30 mg/l TSS/ and < 8 mg/l Total Nitrogen.
EXAMPLE – SEQUENCING BATCH REACTOR (SBR)

The site layout shown below outlines a Sequencing Batch Reactor Facility design for an average daily flow of 3,000 gallons per day. The system is designed for the following effluent quality levels: BOD5 (30 day average) <30mg/l, TSS (30 day average) <30 mg/l, Total Nitrogen <10mg/l.
EXAMPLE -- MULTIPHASE TREATMENT PLANT

The site layout shown below outlines the first phase of a Santec multiphase treatment plant design. This particular phase is designed to treat an average flow of 100,000 gallons of wastewater per day.

The drawing below outlines the layout of the same project at final buildout, ultimately designed to treat a total flow of 0.5 MGD in five parallel treatment trains of 100,000 gpd capacity each.
TYPICAL PROCESS FLOW DIAGRAMS
The following schematics outline typical process flow diagrams for wastewater treatment system designs with and without denitrification.
The above drawing depicts the placement of the tanks in the treatment plant. The actual elevations are determined from the inlet invert elevation and the finished grade elevations, and the outlet discharge pipe elevation (if gravity).