

A photograph of an iceberg floating in the ocean. The visible tip of the iceberg is a small, white, pointed shape against a dark blue sky. The vast majority of the iceberg is submerged underwater, appearing as a large, white, textured mass. The water is a deep blue, and the overall scene conveys a sense of hidden depth and scale.

# Water Technologies for the Pharmaceutical Industry

**Real Depth. Real Impact.**

**Answers for industry.**

**SIEMENS**

# The World's Largest Portfolio of Technologies and Solutions for the Pharmaceutical Industry

In a time of dramatically increasing population and water scarcity issues, it has become imperative that companies explore new approaches to face these challenges. Water and energy conservation, reduction of waste and ever-increasing regulations are forcing companies in the pharmaceutical industry to explore new solutions that will maximize profitability and ensure product safety while protecting the environment.

Siemens Water Technologies provides a depth of resources unmatched by anyone. We have the largest portfolio of innovative technologies and solutions to suit your specific needs and improve upon your existing processes. With the most validated and non-validated pharmaceutical installations around the globe, experienced service teams, and fully-functional factory acceptance tests (FAT), count on Siemens to be your trusted partner for high purity water and wastewater solutions.



## Three issues drive conservation in system design

### Operating Cost Reduction

Reducing operating costs increases efficiency and maximizes profits, allowing reallocation of savings to other areas of your business. Because of this, it is extremely important to explore new methods of reducing the cost of water, water disposal and utility costs without compromising quality, reliability or overall system performance.

### Achieving Regulatory Requirements

Companies in the pharmaceutical industry must operate under strict regulatory requirements. Maintaining acceptable water quality standards for discharge or reuse elsewhere in the facility is extremely important as regulatory requirements can place restrictions on the limit or even presence of specific waste contaminants. There can also be volume limits on water discharged into municipalities or other waste streams. Exceeding these limits often result in severe financial penalties or put a plant's operation at risk.

### Conservation of Natural Resources

As environmental awareness continues to rise around the globe, companies are realizing the importance of efficiently using natural resources to ensure a gentle global footprint. This increase in awareness, combined with strict regulations, makes it critical for pharmaceutical manufacturers to adopt conservation as a standard business practice. Since water and energy are essential resources for our communities, reducing the consumption of these resources in a pharmaceutical plant ensures sustainability and a community-friendly presence.



## Our approach to conservation provides real impact.

Along with Siemens Water Technologies' depth of resources, our reduction, reclaim and reuse approach provides the impact you need for your plant's water and energy conservation efforts, drastically reducing operation costs and waste production while meeting ever-increasing regulations.

### Reduction

Siemens solutions, such as the S3<sup>®</sup> system or brine recovery process, help reduce raw water needs, electrical consumption and waste production, dramatically lowering operating costs while maintaining water quality and product safety. With our solutions, you can:

- Optimize process for highly efficient operation
- Maximize water recovery for lower water consumption
- Decrease cost of disposal and waste treatment
- Achieve more production with less waste

### Reduction Approach—

A U.S. healthcare products manufacturer needed to expand operations and production without increasing water needs and exceeding discharge requirements. It chose the Siemens S3<sup>®</sup> system due to its unique sanitize, start, stop process to prevent the unnecessary costs associated with continuous recirculation. Not only did the system maintain the Pharmacopeia Purified Water quality, it also provided dramatic water and cost savings.

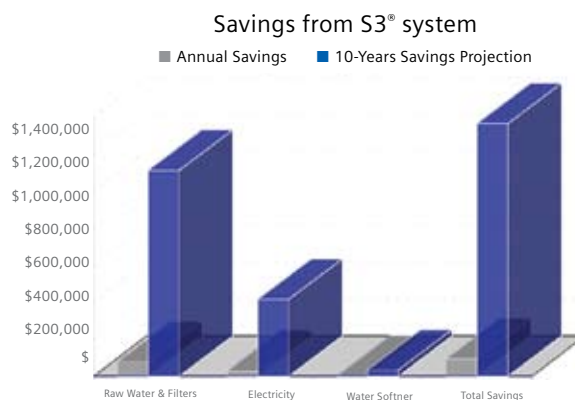
### Reclaim

Reclaiming can reduce or even eliminate waste disposal costs of primary unit process and raw water requirements of secondary unit process, quickly offsetting waste treatment operational costs. Siemens reclaim solutions:

- Recover and treat waste stream for use elsewhere in the process
- Treat and use water for boiler feed, cooling towers and other operations
- Lower consumption of precious raw water
- Drastically reduce operating costs

### Reclaim Approach—

A large healthcare products manufacturer wanted to improve their environmental impact while reducing excessive costs associated with municipal discharge and cooling tower operations. Using a new RO and recirculation design from Siemens, they were able to increase efficiency and substantially reduce the waste stream, thereby reducing waste disposal costs by more than \$350,000/year.





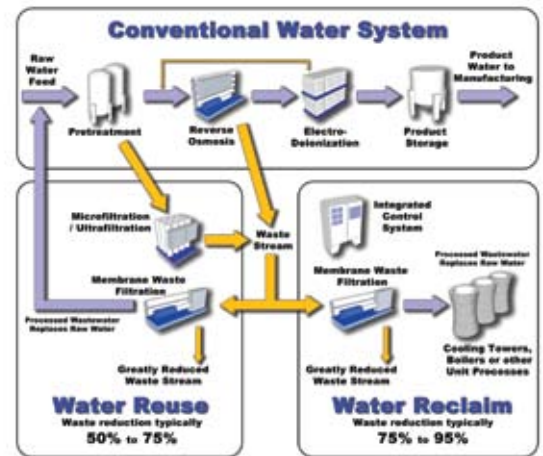
## Reuse

Water reuse provides savings through the reduction of waste disposal costs and feed water requirements, offsetting operational costs associated with the waste reuse process. Siemens solutions for reuse in both validated and non-validated systems:

- Ensure the treated wastewater quality exceeds the feed water quality for high operational efficiency, water quality and product safety.
- Recover and treat waste stream for reuse as feed water
- Lower water demand and waste production
- Dramatically increase plant production in equal or smaller water footprint

## Reuse Approach—

A medical device manufacturer wanted to expand production capacity without exceeding water discharge limits, drastically reduce raw water requirements and waste disposal cost of operation, and reduce specific organics while leaving other inorganics intact. Siemens designed a solution that included nanofiltration that effectively addresses these needs, recovering 80% of the complex waste stream, and saving in excess of \$3.3 million in a 10 year period.



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