



# API Oil/Water Separators - A Total System Approach

Water Technologies

**SIEMENS**



*Backed by over 70 years of continuous experience providing new, innovative and cost-effective wastewater treatment solutions, Siemens is uniquely equipped to handle all of the environmental solutions that petroleum and petrochemical companies require.*

## A generation ahead

In 1937, we partnered with the American Petroleum Institute (API) to develop the industry's first engineered oil/water separator. Today, more than 70 years and thousands of installations later, the API oil/water separator remains the industry benchmark.

### Unmatched experience

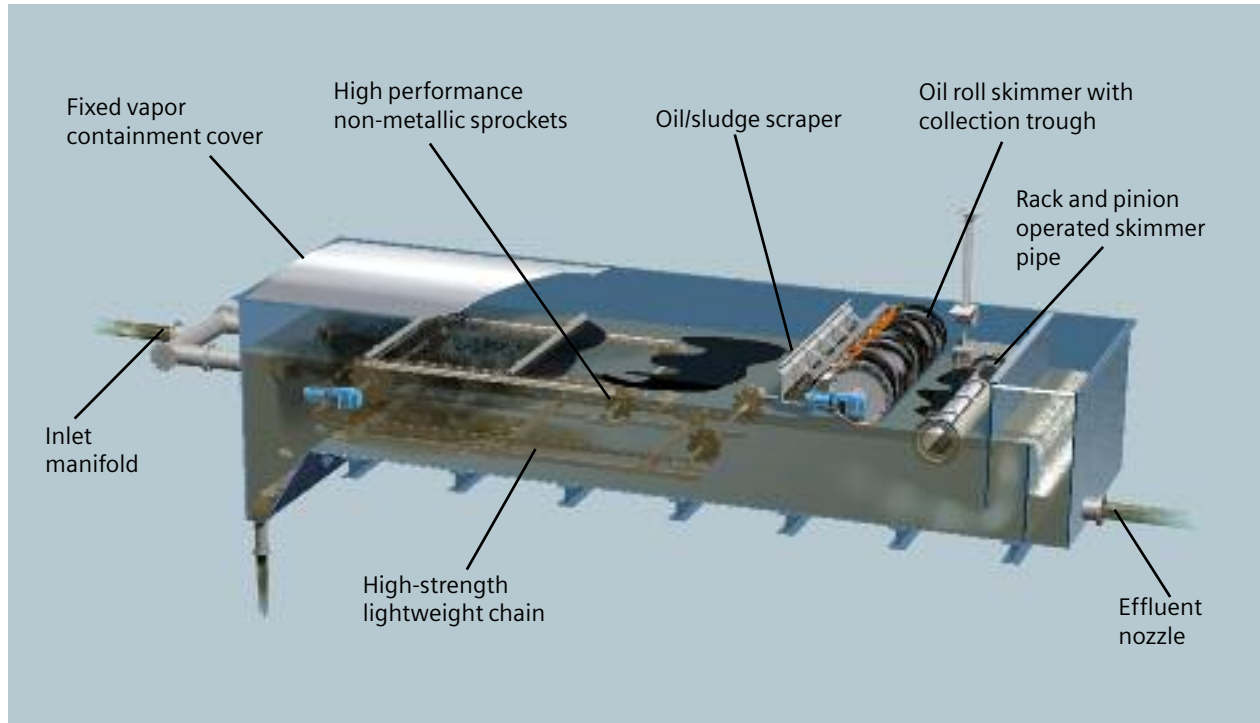
Our experience in designing, building and providing primary oil/water separation is unmatched in the industry. Our systems recover more reusable oil, require less maintenance and are safer than other systems. We continually improve and upgrade our designs to provide the highest levels of performance and meet all current regulations.

And our collectors and skimmers are suitable for a variety of applications in the petroleum industry, from wastewater treatment to oil product recovery and recycling. Our technologies include the API oil/water separator, the slotted skimmer pipe, the oil roll skimmer and other types of skimming equipment.

### API separators provide earlier recovery of reusable oil

Our API separators treat and remove up to 80 percent of oil from refinery process water and storm run-off. If emulsification is minimal, a greater percentage of oil may be removed. API separators reduce the load on downstream treatment units and recover more oil before chemical emulsion breakers are added in secondary oil/water separation.

Our API separators are sized according to established API guidelines for gravity separation and collection of separable oil from petroleum industry wastewater. For effective flow distribution, we recommend our unique inlet design using dished deflector baffles in place of the more antiquated slotted baffle.



## Reliable and easy to maintain

### Sludge scrapers require less maintenance

The main reason collector components fail in petroleum applications is because of their inability to remove thick, sticky sludges from sludge hoppers. That is why our sludge collection hoppers, screw conveyors, flushing connections, clean outs, sludge withdrawal piping and sludge pumps have been specially designed for minimal maintenance and operator attention.

Our most common sludge scraper design uses a 4-shaft chain and flight collector mechanism. In this configuration, flights are conveyed by carrying chain running across four sets of shafts and sprockets – two sets at the top and two at the bottom. Combinations of 2-shaft and 3-shaft collectors are also available.

The flights skim oil from the surface of the water to the effluent end of the separator for removal on a continuous basis. As the flights reach the effluent end of the tank, they travel to the bottom where they move sludge to the hoppers at the influent end of the tank. Here the sludge is pumped to disposal systems, or recovered in coking operations.

### Oil roll skimmers deliver reliable oil removal

Our oil roll skimmers ensure safe and efficient removal of collected oils, even when visual observation is not possible. The operation is continuous, independent of oil depth in the API separator and requires no operator attention or adjustment.

Manufactured from hand-selected, schedule 40 stainless steel pipe, the skimmer has a highly machined surface finish. This creates a much larger surface area and provides surface tension properties to gather more oil. Machining also provides a flat surface for the doctor blade to run on, ensuring complete contact of the blade with the pipe. This is essential for oil removal capacity and doctor blade longevity. High volumetric flows of oil can also be removed with the slotted skimmer pipe, although this method will remove excess water with the oil. Depending on the slop oil system to be used for recovery of this product, additional water may be acceptable.



*Our fixed VOC containment cover systems reduce the risk of explosions by using an inert gas, such as nitrogen, instead of air.*

## Performance, safety and durability

### Fixed containment covers retain vapors more effectively

We use fixed vapor containment covers on API oil/water separators to reduce odors and volatile organic compound (VOC) emissions to the surrounding airspace. The covers are elevated from the oil/water surface to enclose all of the oil skimming equipment, creating a vapor space that is blanketed with nitrogen gas to maintain a non-explosive environment, and to provide enhanced oil skimming.

Access hatches allow inspection of the skimming equipment, effluent weir and effluent chamber. The cover gasket, made of a special long-life material compatible with the environment, provides a positive seal by nature of its compressibility. Fixed steel covers are provided for enclosing the API separator to ensure vapor and odor containment. Large removable hatches allow for equipment installation and maintenance.

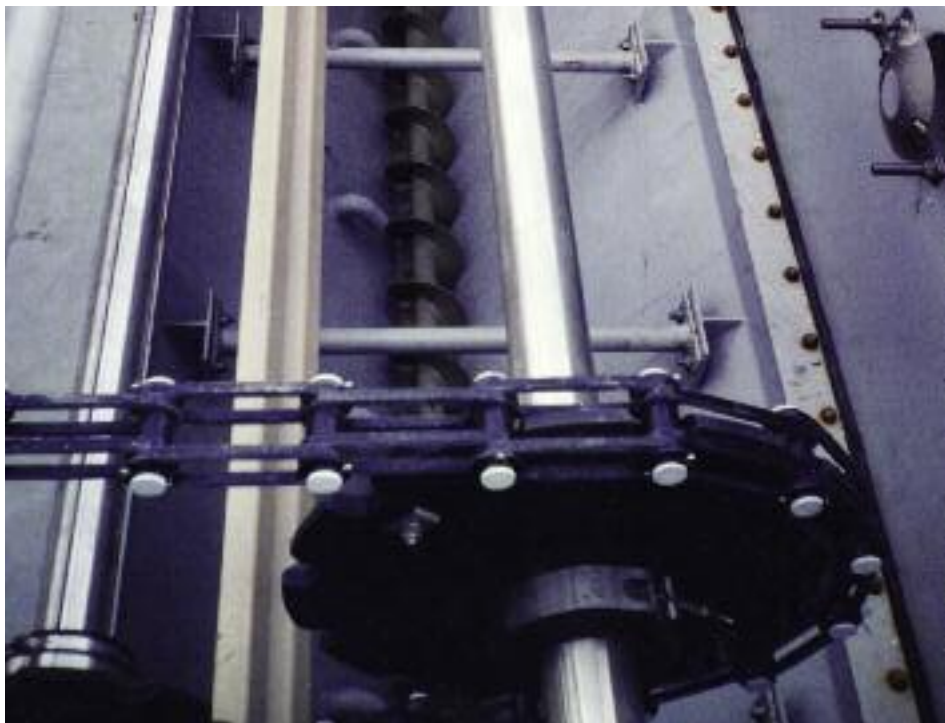
Over the years, we've come to thoroughly understand API separator applications and specific needs of the customer and the equipment. This experience, coupled with our commitment to customer satisfaction, results in smooth project execution, safe operation and efficient, long-term process performance.

Our API separator design has been risk-assessed, assuring safe operation. Safety considerations include:

- Above ground, steel tankage for double containment and visual leak detection for hazardous sludge and wastewater.
- Vapor-tight covers to contain harmful and regulated VOCs.
- Specially designed, high-strength, non-metallic collector components for corrosion, temperature and abrasion resistance.
- Stainless steel on all wearing metallic components for reduced corrosion.
- Pressure/vacuum relief, flame arrestors and more.



*Oil roll skimmers ensure safe and efficient removal of collected oils.*



*Our sludge scrapers are designed using high-strength, non-metallic components to resist damage caused by corrosion, temperature and abrasion.*

### **Siemens Water Technologies offers exceptional customer service**

Our innovative Evaluate, Train and Troubleshoot (ETT) Reliability program gives you access to our expertise every day.

This new program is a professional and efficient tool to help you and your staff:

- Better understand your water treatment equipment
- Improve the operation and reduce unscheduled maintenance at your wastewater treatment plant

The customized ETT Reliability program includes:

- On-site evaluation
- On-site classroom and hands-on training
- Digital troubleshooting guide with photos of your equipment

### **Evaluation**

In this first step, professionals from Siemens Water Technologies work with you to conduct inspections at your location to evaluate the process and mechanical reliability of your wastewater treatment system.

### **Training**

After the evaluation, we'll conduct both classroom and hands-on training.

### **Troubleshooting**

The final stage of this customized program is a digital troubleshooting guide. The guide includes digital photographs of your equipment with notes about adjustments and specific instructions that may be required for each component.

In addition, we offer an electronic operations and maintenance manual, also based on the specific equipment at your site.



*Our API separators remove up to 80 percent of oil from refinery process water.*

## Selecting non-metallic components

API separator sludge is heavy and viscous, therefore chain and flight collector components must be equally heavy duty. A number of collector chains and flights are available—use the following to help determine your chain and flight selection:

- Metallic chain has been used with varying degrees of success. Types available include cast iron, cast steel and stainless steel. Metallic chain is much heavier than non-metallic chain, sometimes hindering installation, and cast iron and steel components can deteriorate over time and require replacement. Stainless steel components, while less prone to corrosion, are significantly more expensive than cast iron or steel.
- The success of non-metallic chain is directly related to the material composition of the chain. Some non-metallic chains are prone to chemical attack from organic compounds in the wastewater, while other types of non-metallic chain can stretch due to high wastewater temperature. This stretching, or elongation of the chain, can result in premature failure of the collector system as the chain disengages from the sprockets. Grit in the wastewater can also cause excessive wear and premature failure on chain connector pins if the chain pins are not properly designed. The biggest advantage to non-metallic chain is its light weight and ease of installation and maintenance. With proper material selection and design, non-metallic chain can provide the same strength and durability as metallic chain, for less cost, both in materials and labor.
- Like chain, both metallic and non-metallic style collector sprockets are available, having the same advantages and disadvantages, with one exception.



*We offer a number of chain and flight collector components.*

Motor drive sprockets and collector head shaft sprockets have a significant amount of torque and load on them. Some non-metallic sprockets suitable for use on idle shafts may not be suitable for drive, or high torque, applications because of material strength.

- In the past, collector flights had been made of redwood. Today, most facilities use non-metallic, fiberglass flights. When selecting a fiberglass flight, note that many resins do not hold up well to the organic compounds found in refinery and petrochemical plant wastewater, and the flights can quickly delaminate. Also, the moment of inertia of the design and the modulus of elasticity of the material both affect the strength and stiffness of the flight. The proper combination is needed to ensure proper movement of sludge.

- Chain and flight collector components normally have wear shoes attached to them. The wear shoes ride on wear strips attached to the tank floor on the bottom collecting run, and to carrying tracks on the top skimming run. The wear shoes are normally made of steel when using metallic collector components and polyethylene when using non-metallic collectors. Since non-metallic wear strips can expand under heated conditions and carbon steel wear strips can corrode, stainless steel wear strips should be used in most cases.

Contact us today to find an API separator and associated components that are right for you.

Siemens  
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