

# STEEL PICKLING SOLUTION

Wilfley Revolutionary close-coupled special design to meet customer small footprint, nonmetallic wet end, single cavity and Solidlock Static Seal.

# WILFLEY®

DURABLE. WATERLESS SEALING. INDUSTRIAL PUMPS.



**Market:**  
**Steel Pickling**

**Application:**  
**Pickle Liquor  
(HCL Solution)**

**Equipment:**  
**Special with Wilfley  
Seal Technology**

**Location:**  
**USA**



## BACKGROUND

Steel pickling refers to a treatment that is used to remove impurities, rust, and scale from the surface of a material. During hot working processes, an oxide layer (referred to as “scale”, due to the scaly nature of its appearance) develops on the surface of the metal. Before most cold rolling processes, previously hot rolled steel goes through a pickling line to remove the scale from the surface and make it easier to work. To restore the best corrosion resistant performance, the damaged metal layer must be removed, exposing a fully alloyed stainless-steel surface.

To remove this oxide layer, the material is dipped into a vat of what is called “**pickle liquor**”. Pickle liquor can come in many forms; carbon steels with an alloy content of less than 6% are often pickled in hydrochloric or sulfuric acid. For steels that have a higher carbon content, a two-step pickling process is required, with additional acids used (phosphoric, hydrofluoric, and nitric acid).

The primary acid used in steelmaking is hydrochloric acid, although sulfuric acid was previously more common. Hydrochloric acid is more expensive than sulfuric acid, but it pickles much faster while minimizing base metal loss.

## CHALLENGES

Acid cleaning has limitations in that it is difficult to handle because of its corrosiveness, and it is not applicable to all steels. Hydrogen embrittlement becomes a problem for some alloys and high-carbon steels. The hydrogen from the acid reacts with the surface and makes it brittle and causes cracks. Because of its high reactivity with treatable steels, *acid concentrations and solution temperatures must be kept under control to ensure desired pickling rates.*

Small footprints requested, durable Non-metallic for HCL with certain % of solids (scale), leak free operation due to HCL hazards.

## THE SOLUTION

Wilfley Close-Coupled Pump specifically designed for this application with Wilfley Non-Metallic ETFE (Tefzel®) Liner on Pump Case and AR Impeller and Solidlock® State of the Art Static Seal. No seal flush needed, and no acid concentration affected.

## THE RESULT

The Wilfley pump lasted longer, no need of every six months competitor pump replacement. Customer loves maintenance simplicity of Wilfley pump and being a more efficient pump, it has saved approximately US\$9,000 per year in energy cost, and additional US\$ 15,000 in new pumps a year.

## WILFLEY ENGINEERING

Wilfley Engineering Team, developing a special pump for customer needs. Smaller footprint, sized to meet customer piping system, more efficient pump with specialized non-metallic AR Impeller and reliable solution for customer.



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