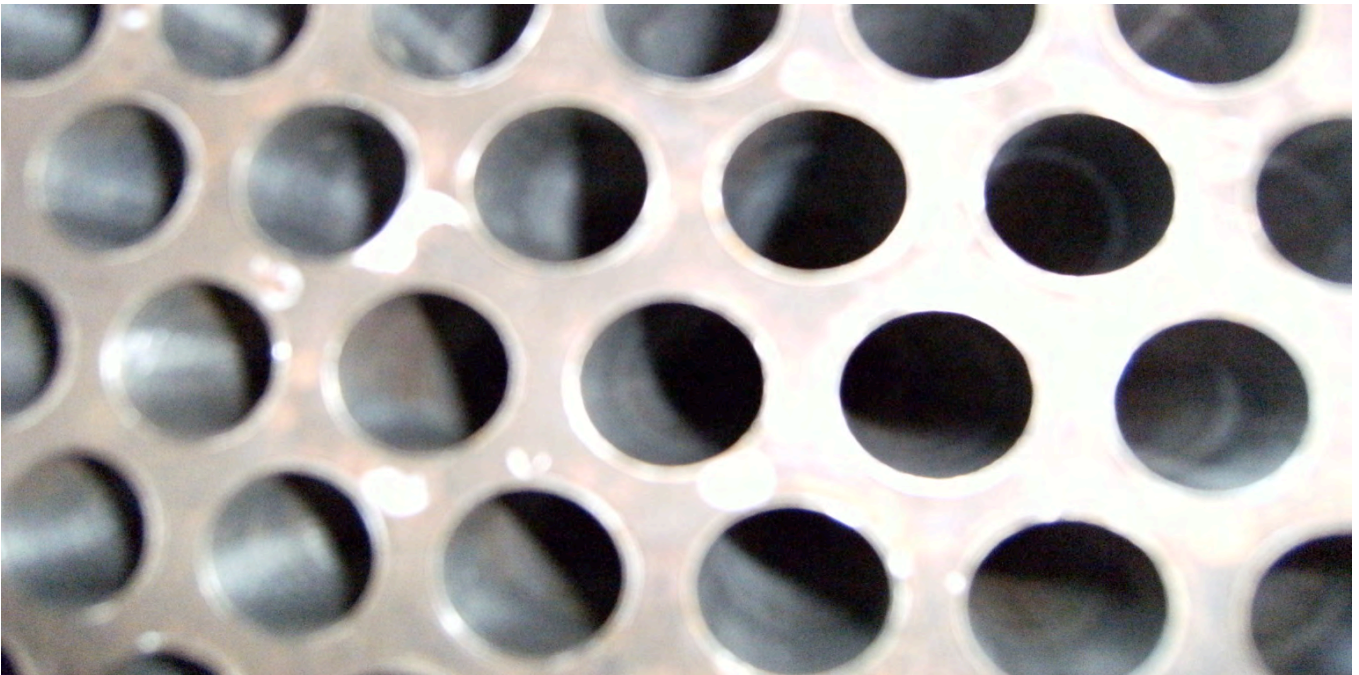


# TUBE CLEANING

SPP HYDROTECH Co., Ltd.

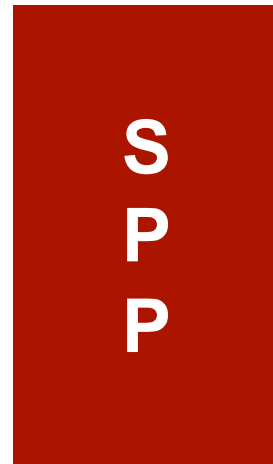


All inner tube surfaces are subject to some kind of contamination. What kind of contamination prevails is mainly determine by:

- Tube material (steel, stainless steel, titanium, copper and its alloys)
- Liquid inside the tubes (product, seawater, brackish water, freshwater)
- Operating condition

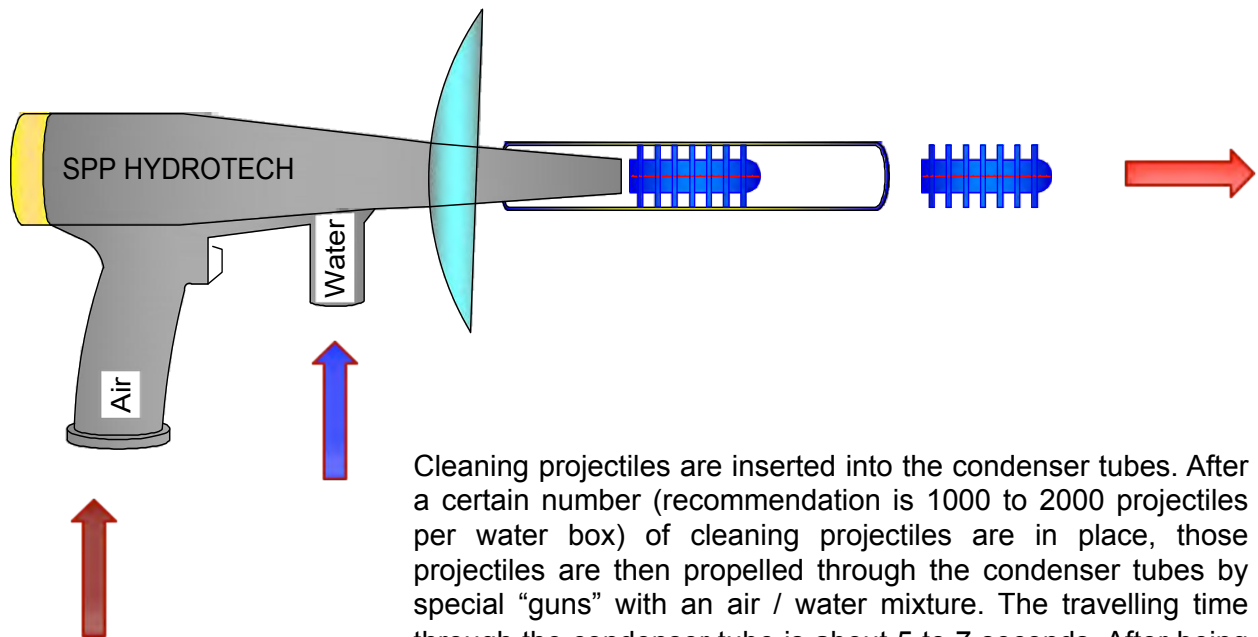


For the cleaning of the inner tube surface, SPP HYDROTECH has employed two methods. One method is to propel cleaning projectiles through the tube by means of an air / water mixture. The second method is utilizing cleaning tools, connected by a flexible shaft to an air powered cleaning machine.



### The fast solution

If the tube contamination consists mainly of soft deposits, propelling cleaning projectiles through the tubes is a fast and reliable solution.

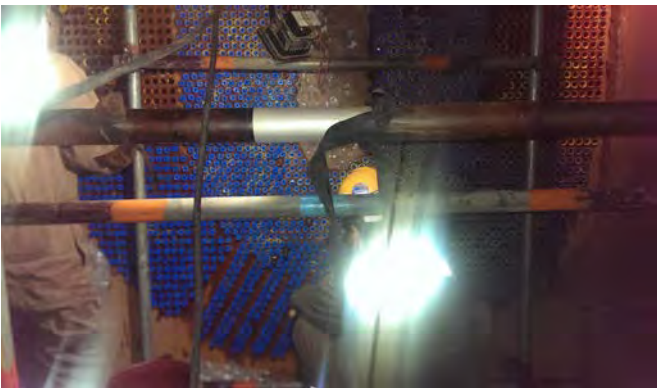


Cleaning projectiles are inserted into the condenser tubes. After a certain number (recommendation is 1000 to 2000 projectiles per water box) of cleaning projectiles are in place, those projectiles are then propelled through the condenser tubes by special “guns” with an air / water mixture. The travelling time through the condenser tube is about 5 to 7 seconds. After being propelled through the condenser tubes, the re-usable projectiles are collected from the outlet water box and re-inserted into the not yet cleaned tubes.



Utilizing this cleaning method is a perfect solution for short shut downs. Technical cleanliness for improved heat transfer is achieved in a very short period of time.

# S P P



# S P P

For different cleaning purposes, a wide range of cleaning projectiles are at hand.

From brush like projectiles to polycarbonate scraper projectiles



The average travelling time for such a cleaning projectile in the tube is about 0.5 m/s.

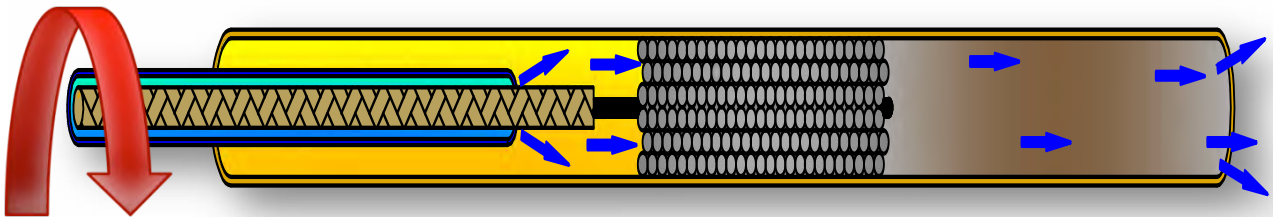


### The solution for perfectly clean tubes

Utilizing rotating cleaning tools connected to air powered cleaning machines.

While the flexible shaft, attached to an air powered cleaning machine, rotates at a pre-set speed, the cleaning tool is slowly pushed through the condenser tube. When reaching the end of the condenser tube, the cleaning brush is manually retracted.

During the process, water is pressed through the gap between the flexible shaft core and the blue colored stationary protective hose. The purpose of pressing water through the protective hose is twofold: First, it cools the flexible shaft core and second it flushes out the removed contamination.



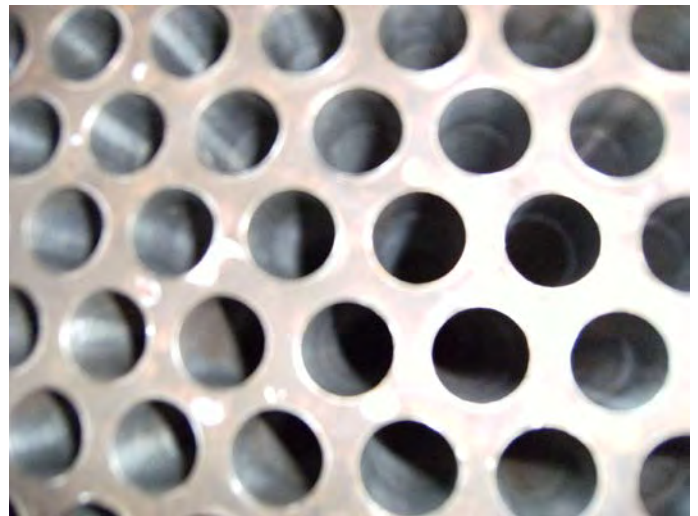
A wide range of different cleaning tools caters for soft deposits, medium hard deposits or hard deposits.



The above shown cleaning tools is just a small selection.

## The results

Titanium tubes in seawater



The left photo above shows the condenser prior to cleaning, while the other two photos are made after cleaning.



## The results

Copper alloy tubes in seawater



Copper alloy tubes in seawater – cleaning in progress

Prior to cleaning and after.



**The results**

CuZn20Al tubes in seawater



Before and after cleaning