

## Electroless Nickel Tanks: DOUBLE BOILER TYPE

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What is a double boiler? A double boiler is an outer tank that heats the solution that is placed in an inner tank. If your Mother ever melted chocolate on the stove, she would fill a pot with water, place a round stainless bowl on top of that pot and put the chocolate in the bowl. Why would she do this? Due to its composition, the chocolate would burn directly in the main pot. The “indirect” heating combined with the surface area allows for even heating of the chocolate.

Double boiler electroless nickel (EN) tanks have been around for over 30 years. The construction generally consists of an outer tank that is insulated and jacketed, a stainless inner tank, and a heat source of either flanged or screw-in, electric heaters or a gas fired immersion tube with a burner.

You ask why this design of a tank over other designs of EN tanks? One reason is, heat density. A standard over the side electric immersion heater has a watt density of 30-40 watts per square inch. A de-rated electroless nickel heater is 20 Watts per square inch and a PTFE coated heater is typically 10 Watts per square inch. With a double boiler design the watt density is equal to 3-4! There is no localized heating because the entire inner tank becomes a heat transfer source. By placing a drop-in liner in the inner tank you are ready to plate after 3 hours of heating.

The outer tank is typically filled with ethylene glycol and water. There are some new fluids in the market, which are more environmentally friendly.

The tank plates out... no problem, pump out the tank, place a new liner in, refill the tank, wait an hour or so and you are ready to go again. Liners reduce the headache of passivating the main inner tank each time and reduce the handling of the nitric.

With this type of tank, you can place either horizontal or vertical agitation system on it with a “bump” to de-gas the parts. The filtration pump can be mounted on a metal plate that has a hinge on it. Put a plastic hose in the vent hole above the impeller to keep the solution that is left in the pump from spilling out.

The return agitation system can be put on a union fitting; with a couple of twists the sparger system can be easily removed from the tank.

Serious EN platers have the heating and cooling in the outer jacketed tank. One hour to heat up and 45 minutes down!

If you are this serious about the EN, then you probably have a bleed and feed system too. These systems allow you to maintain the nickel levels and balance the chemistries at the same time producing excellent parts.

We have an array of EN heating systems in our engineering bag. Steam heating with PTFE coils, 316L passivated and electro-polished, SS stainless mini heat exchangers, electric immersion heaters with 316L stainless, gas fired double boiler tanks and yes, even the PTFE heaters.

There are no perfect answers in electroless nickel heating only intelligent choices.