

# M-QS ROTKAPPE® Immersion Heaters for Manganese Phosphating Baths

Manganese phosphating baths tend to form encrustation on the walls of the tanks and on heaters.

Porous crusts several centimetres thick can form very quickly, particularly on the tubes of immersion heaters. They can often be removed only mechanically – a time-consuming task.

The mechanism by which these crusts form shows that the crystal boundary of the tube materials, together with chemical, thermal, mechanical and magnetic effects, are the reason for the precipitation of manganese hydroxides and thus for the encrustation.

For this reason, the ideal material for the immersion tubes must be:

- free of crystalline structure
- temperature-resistant
- resistant to chemicals and acids
- smooth and without pores
- non-magnetic

We have therefore developed the **ROTKAPPE immersion heater**

**Type M-QS** for the direct electrical heating of manganese phosphating bath.

This immersion heater meets all of the above requirements and thus permits an improvement of the process technology.

For the user, the following advantages result:

- no encrustation of the tube surface
- a constant, high thermal conductivity of the tube
- reduction of the cleaning work and higher plant availability
- reduction of the amount of waste (removed crusts)
- the immersion tube is resistant to thermal shock

Since there are very many different manganese phosphating baths with a wide range of parameters which lead to encrustation, we recommend first carrying out test operations under the existing operating conditions.

The following application notes for the use of immersion heaters should be observed when doing this:

- The length of the immersion tube must be matched to the size of the tank so that the tip of the tube is never immersed in the sludge at the bottom or touches the bottom of the treatment tank.

- In order to reduce the formation of crystals at the surface of the liquid, the liquid level should be kept as constant as possible (by continuously topping up the bath).
- Any contamination or the first signs of encrustation on the tube surface should be completely removed without delay.
- Observe the minimum distance of 75 mm between the tube surface and the tank wall or the next tube surface.
- The immersion tube may be chemically damaged if the batch contains fluorides or if fluorides enter the bath with contaminated chemicals.
- The immersion tube material "special glass" is brittle and may not be subjected to mechanical shocks

