

SERFILCO® CASE HISTORY

ZINC PHOSPHATING

Ser-Ductor® agitation improves zinc phosphate tank sludge removal

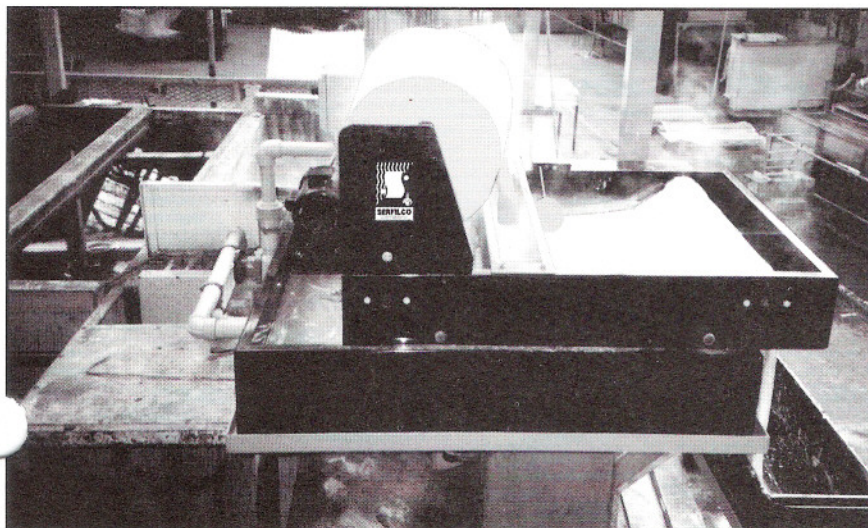
Advanced Technical Coatings Ltd. of Haslingden in Lancashire, England, has been one of the larger and more diverse subcontract trade powder coaters in northwest England for over 25 years. The company caters to most needs of the polymer finishing industry with a wide range of coating materials for dealing with all kinds of components, large or small. It is their strong orientation to quality, a commitment to meeting agreed delivery schedules, and an experienced workforce, which has made Advanced Technical Coatings Ltd. a leader in their field. It was this commitment that gave Advanced Technical Coatings the determination to solve, once-and-for-all, the industry-wide problem of accumulated sludge in their zinc phosphate tank.

For many types of paint and powder coatings, it is necessary to pretreat with a zinc phosphate coating, either by an immersion or a spray process. Zinc phosphate is a heavy sludge generating process which, if allowed to accumulate in the spray sump or the immersion tank, can leave a whitish phosphate salt deposit on the component product that results in poor adhesion and poor "wetting out" of the coating during melt. In addition, this accumulation of sludge will produce a hard, baked-on scale on the heaters or burner tubes that results in poor temperature control and failed heaters, not to mention the continual problem of blocked nozzles on spray systems. The usual

method of solving this problem is to let the sludge settle to the bottom until an unacceptable level is reached, and then to decant off the clear liquid and either get in the tank and dig it out or, more commonly, to employ the services of a waste disposal contractor to come and suck out the liquid sludge.

To maintain their commitment to product quality, and their policy of SPC (statistical process control) on production, Advanced Technical Coatings Ltd. realized that they had to find a better way of keeping the phosphate tank clean. They installed a SERFILCO Automatic Fabric Filter with pumped agitation to remove the sludge continuously and automatically. This equipment replaced an existing filter chamber which simply could not keep up with the amount of sludge being produced.

While similar types of filters have been used in such an application in the past, Advanced Technical Coatings Ltd. has achieved success more as a result of the way the equipment is installed and used. The key to the success of a filter system is to keep the sludge in suspension, not to let it settle, and to remove it as quickly as it is produced. This is where pumped agitation plays an important role. The basic principle is to continuously recirculate the phosphate solution through a manifold arrangement in the bottom of the tank using a high flow/high pressure pump. SER-DUCTOR® nozzles which greatly increase solution movement are spaced at regular intervals along the manifold as illustrated in the schematic arrangement (on page 2). From this recirculation pipework, a bleed is taken to the Automatic Fabric Filter at a predetermined optimum flow rate and fed onto the fabric media on the filter bed. The phosphate solution drains through the filter media and into the filter sump from which it is piped back to the tank. As the filter media gradually becomes blocked with sludge, the solution level on the filter bed rises, trips a float switch which indexes the bed, and introduces fresh, clean filter media to the pumped solution.



Meanwhile the sludge layer built up on the filter media is discharged off the end of the bed and collected in a suitable container. By elevating the filter above the phosphate tank, a gravity return of solution to the tank is possible, allowing a sludge hopper to be placed below the end of the bed and it also prevents accidental syphoning of the tank contents.

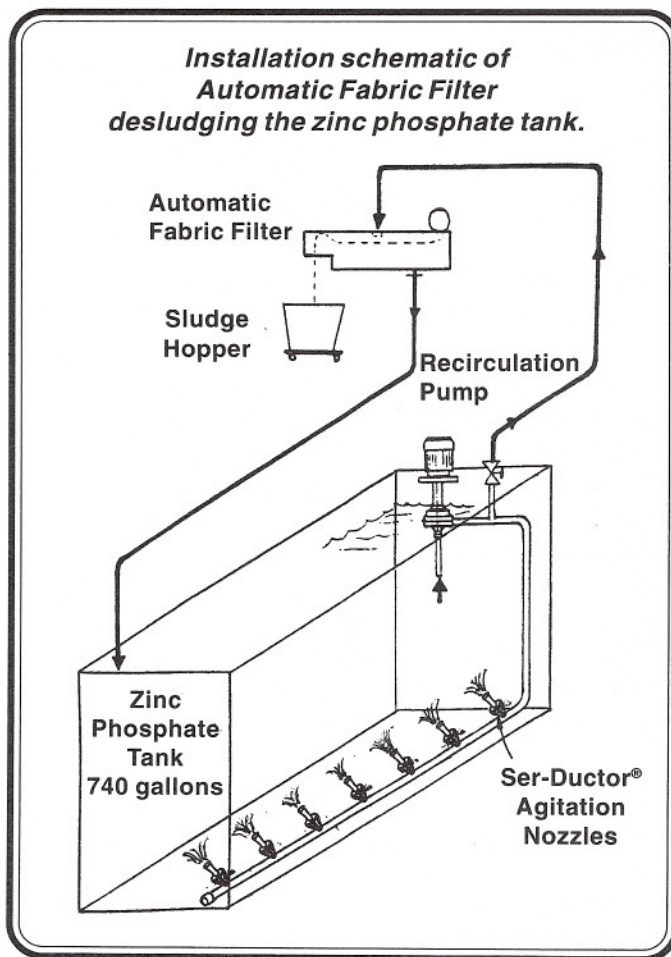
All pipework, as well as the SER-DUCTOR® nozzles and recirculation pump, is plastic for total chemical resistance and, being smooth bore, will minimize the "furring" effect so common with zinc phosphate solution in metal pipework.

For powder coaters who are zinc, iron or manganese phosphating, or chromating, the advantages and benefits of desludging using an Automatic Fabric Filter in this fashion are considerable. They are:

1. No need for the maintenance staff to climb into the tank and manually shovel out the sludge; filtration and sludge removal are continuous.
2. No need to periodically decant off the solution and have the liquid sludge sucked out by tanker, eliminating the associated high cost, volume-related charges so incurred.
3. No downtime is required for cleaning or descaling the heat exchanger tubes. Production and uniform tank temperature can both be maintained.
4. No more tank sludging; no more blocking of spray nozzles. Once a clean solution is made up, the bath remains clean. Phosphating quality is improved and the higher quality level is maintained.
5. It is easier to dispose of the sludge. There's less volume by consolidating it in a hopper and less treatment cost as well.
6. Chemical loss is greatly reduced; the resultant sludge contains far less liquid than can be achieved by simply decanting.

Taking all of this into consideration, payback often occurs in less than 12 months.

Installation schematic of Automatic Fabric Filter desludging the zinc phosphate tank.



Advance Technical Coatings Managing Director, Mr. Gordon Nicholass, says "from the first moment that we switched the machine on, there was a significant improvement in the standard of zinc phosphating on our components . . . we are considering extending this method of filtration to our iron phosphating and chromating processes".

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