CASE HISTORY

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Toveko Filters

Bodycote Metallurgical Coatings

Bodycote is now one of the UK's largest metal finishing groups, with factories across the country. During 1999, they were informed that the concentration of metals they are permitted to discharge was to be reduced significantly. In common with all responsible companies, Bodycote is determined to be environmentally aware. That said, the fact that it is part of a large group doesn't mean that the factory has a bottomless purse.

TOVEKO filter is the final treatment step

Bodycote installed an effluent treatment plant at the factory in 1989. Although not of an ideal design, it had nevertheless served them adequately for 10 years. However, it was obvious that it would not be able to cope with the revised Discharge Consent to be imposed. Bodycote therefore approached some suppliers for a solution to their problem. They were certainly offered brand-new replacement plant, but a straightforward, down-to-earth appraisal of the situation and Bodycote's needs revealed that a relatively simple upgrading of the existing plant would be perfectly adequate.

One of Bodycote's requests was that any new equipment be designed to be easily transportable should they decide to re-arrange their facilities in the future.

The solution finally installed proposed to use the existing effluent plant but to upgrade it by adding the following:

1. An upgraded pH neutralisation system to ensure that the metals present are fully precipitated. Part of this involved ensuring that the pH is controlled very closely.
2. Replacement of certain minor components that had seen better days.
3. A polyelectrolyte reagent dosing system, ensuring that the precipitated metal hydroxides are flocculated sufficiently to ensure their improved removal in the existing settlement tank.
4. Addition of a final sand filter to ensure complete removal of final traces of suspended solids, ensuring dramatically improved discharge quality.

The TOVEKO® sand filter installed was chosen for the following reasons:

1. The outlet from the existing settlement tank flows into it by gravity, thus avoiding the need for the pumping system normally associated with sand filter systems.
2. It is only 2.3 metres high. Therefore there are no potential planning issues associated with tall structures.
3. It backwashes itself whilst in service, normally using a small percentage of its own filtered water to do so. This means that it does not need a standby unit, or the large backwashing tanks etc. usually associated with traditional pressure filters.
4. It has a very small footprint and, being only 2.3 metres high, fits in a normal height room. Many metal finishing companies have very little space available, in which case this design is ideal.
5. It automatically reacts to changes in incoming suspended solids load. In most cases, effluent plants do not have full-time operators; indeed, they are lucky to see someone once per shift, briefly. Slip-ups are therefore inevitable from time to time. This should not necessarily be viewed as bad practice, but rather as a consequence of attending to the company's main business.
6. One of the most common occurrences is an increase in the concentration of solids overflowing the settlement tank. For most sand filters, this provides a problem and they tend to become blinded and need backwashing very quickly.

The Toveko filter has an automatic level sensing device in its inlet launder. In normal operation, this is used to stop and start the sand washers. When the incoming suspended solids concentration rises, the sand bed starts to block and therefore the liquid level in the inlet launder also rises. This is detected by the level device that immediately increases the rate of sand washing to compensate. This does not mean that the filter will cope with dilute sludge non-stop, but it is much more forgiving of common problems than other types of filter.

So, what happened at Bodycote once the modifications were completed?
The following table illustrates the discharge quality that Bodycote are now able to achieve. The figures are taken from an actual Hyder (Welsh Water) analysis result:

Determinand	**Result**	**Limit**	**Old limit**
Suspended solids	<5	400	400
Zinc	0.18	2	-
Chromium	0.5	2	-
Total toxic metals	0.68	5	20

This means that Bodycote now achieve their new Discharge Consent with a very healthy margin of safety, leaving them more able to get on with their main business – metal finishing.

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