

# IS ACID EXTENDER TECHNOLOGY VIABLE?

Report by John Danks

A task that is certainly not enjoyed by any metal finishing operation is that of the disposal of spent pre-cleaning solutions, particularly acid pickles that are laden with metal and no longer functioning properly. When just over a year ago a chemical product was introduced into this country that claimed to significantly extend the life of acid pickles, making regular dumping a thing of the past, SAMFA was duty bound to investigate the merits of the system. Three large electroplating companies participated in the trials and SAMFA assisted with impartial monitoring of these experiments. In this article John Danks of S D Electroplating voices his candid opinion.

In September 2009 Saayman Danks embarked on a project to extend the life of their main acid pickling solution.

Normally the pickle solution would be discarded after a few months due to contamination; this manifests itself by leaving smutty deposits on the steel work pieces. The problem here of course is the build up of heavy metals in the solution and up until now the only remedy was to dump all or part of the solution. This not only meant some unproductive downtime, cost of new acid, but also the considerable cost of neutralization and disposal. So when we were told that we could run the same tank for a year or more we were very enthusiastic to say the least.

Like most good things in life there are costs to pay. These can be prohibitive if you have a small installation without many facilities.

We started off by purchasing a suitable filter that can handle the acid that you use in the plant. This should be preferably an easy one to clean as you need to clean it often; in our case daily. We settled on an in-tank filtration system featuring a quick-change car-

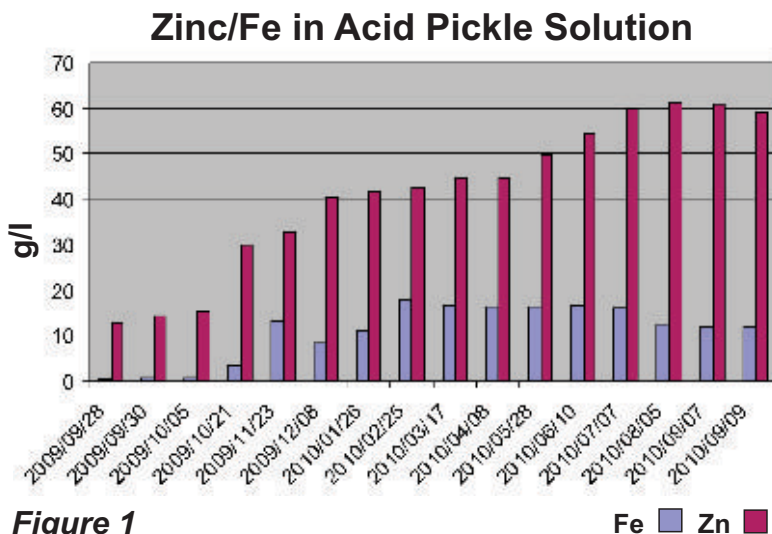


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tridge filter system. This did require a modification to our tank as there was nowhere to put the filter so that it would not interfere with the work flow. After making sure that we had not done any permanent damage to our tank we made up a new acid and ran it for two days with just the filter running.

The pickle tank is a 10% vv sulphuric acid of 4200 litres.

On the third day we added 42 litres of the special acid extender additive. When the filter clogged up within a few hours with a grey mud like material we knew that something was happening. We analysed for iron and zinc in the acid on our XRF Spectrophotometer and continued to check it regularly thereafter. Figure 1 illustrates how the metals reached a plateau after a few months and have remained there until now.



**Figure 1**

Fe ■ Zn ■

As you can see from the above the iron has stabilized at 10-15g/l and the zinc at 50-60g/l. These levels of metal are not causing any production problems and would appear to be sustainable.

The initial and normal running costs of the acid and the extender additive are depicted in the table on the next page.

The initial cost of the additive in this case just over 4 times the cost of the acid and together with the ongoing additions is high. So when you calculate the savings, if any, you must include all the aspects including disposal, waste treatment, downtime and labour.

MAIN LINE ZINC SULPHURIC ACID 4200 lt SPEC 180g/l						
DATE	ACID USED	PRICE	RAND COST	ADDITIVE USED	PRICE	RAND COST
Sep 09	1080	R2.20 KG	2376.00	43.5	R179.00/LT	7786.50
Oct-09	240	R2.20 KG	528.00	2	R179.00/LT	358.00
Nov-09	320	R2.10 KG	672.00	2	R179.00/LT	358.00
Dec-10	200	R2.10 KG	420.00	1.25	R179.00/LT	223.75
Jan-10	240	R2.10 KG	504.00	1.5	R179.00/LT	268.50
Feb 10	480	R2.10 KG	1008.00	3	R179.00/LT	537.00
Mar 10	440	R2.10 KG	924.00	2.75	R149.00/LT	409.75
Apr 10	280	R2.10 KG	588.00	1.75	R149.00/LT	260.75
Jun-10	360	R2.10 KG	756.00	2.25	R149.00/LT	335.25
Jul-10	280	R2.10 KG	588.00	1.75	R149.00/LT	260.75
Aug-10	320	R2.10 KG	672.00	2	R149.00/LT	298.00
	<b>4240 Kg</b>		<b>R 9036.00</b>	<b>63.75 Lt</b>		<b>R 11096.25</b>

**COMPARISON OF COSTS**

USING EXTENDER			ESTIMATE WITHOUT EXTENDER		
Acid	R	9,036	Acid including 2 new solutions	R	10,186
Additive	R	11,096	Caustic soda for neutralisation	R	19,200
Filter per annum	R	<u>20,132</u>	Labour for 2 new tank make-ups	R	1,400
	R	3,200	Sludge Cake disposal	R	2,400
Filter cartridge p.a	R	450			
<b>Total</b>	<b>R</b>	<b><u>23,782</u></b>	<b>Total</b>	<b>R</b>	<b><u>33,186</u></b>

**CONCLUSION**

If you treat your effluent and dispose of it in some either dubious or miraculous way to incur no costs, then stay as you are or at least till they arrest you. For everyone else this is a good idea providing you have the capital to outlay and some modicum of control over your plant.

We from our side will continue to use this product and are embarking on a new project with our nitric/hydrofluoric acid desmut. 