

Cyanide Removal

(Extracted from the Diaion Manuals pages 211 to 212)

5. Treatments of Cyanides waste waters

Cyanides are widely used in plating processes. The high concentrated waste waters from them are oxidation decomposition by the alkaline chlorine method, but this method does not suit the low concentration waste waters. Such diluted waste waters are normally demineralized with IERs; Cyanides are adsorbed by IERs and treated waters are recovered as rinse waters. Typical process flow is as follows:

Cyanides waste waters → Filtration → Mixed Bed of WBAERs and SACERs → Mixed Bed of SBAERs and SACERs or Single Bed of SBAERs → Pure waters

The reason why mixed beds are applied in this process flow is not to make the treated waters acidic, since metal complexes with cyanides precipitate in acidic conditions and cause the blockade of micro pores and leak in the treated waters. Table VI-5-1 summarizes such operation examples.

Regeneration process also needs some modification. Though free

cyanides are adsorbed by SBAERs, they cannot be desorbed sufficiently with NaOH solutions. Thus, the second SBAERs should be treated with NaCl solutions to release cyanides in advance of the regeneration with NaOH solutions. ³¹⁾

[Table VI-5-1] Cyanides waste water treatment ⁽³¹⁾

| Example | Feed [m ³] | | pH [-] | Total CN [mg/L] | Total Cr [mg/L] | Zn [mg/L] | Fe [mg/L] | Na [mg/L] |
|---------|------------------------|------------------|--------|-----------------|-----------------|-----------|-----------|-----------|
| 1 | 5 | Raw water | 5.9 | 10.3 | 23 | 15 | 0.5 | 35 |
| | | Effluent from MB | 7.5 | 0.3 | <0.1 | <0.1 | <0.1 | 0.32 |
| | | Treated water | 9.0 | <0.003 | <0.1 | <0.1 | <0.1 | 0.3 |
| 2 | 10 | Raw water | 6.4 | 8.8 | 15 | 12 | 0.3 | 30 |
| | | Effluent from MB | 5.8 | 0.21 | <0.1 | <0.1 | <0.1 | 0.45 |
| | | Treated water | 8.7 | 0.014 | <0.1 | <0.1 | <0.1 | 0.5 |
| 3 | 20 | Raw water | 8.2 | 9.7 | 21 | 19 | 0.5 | 19 |
| | | Effluent from MB | 5.5 | 0.31 | <0.1 | <0.1 | <0.1 | 0.22 |
| | | Treated water | 9.2 | <0.003 | <0.1 | <0.1 | <0.1 | 0.25 |
| 4 | 30 | Raw water | 4.2 | 10.3 | 3 | 16 | 0.5 | 15 |
| | | Effluent from MB | 5.7 | 0.20 | <0.1 | <0.1 | <0.1 | 0.25 |
| | | Treated water | 9.3 | <0.003 | <0.1 | <0.1 | <0.1 | 0.32 |