Press release

10/11/2017

Special chemical-physical process treats Tata Steel's wastewater

Tata Steel Europe manufactures several types of packaging steel. One of the types is Electrolytic Chromium Coated Steel (ECCS). Until recently, a chemical containing chromium-6 was used to manufacture ECCS. Annex XIV of the REACH prohibits the use of chromium-6 with effect from 21 September 2017. It remains possible to apply for an exemption, but only a temporary one. Tata Steel looks to offer its employees the safest possible working environment, and that precludes the use of chromium-6.

Once it had become clear that the company was no longer willing to use chromium-6, Tata Steel Europe developed a process in which an equivalent product called Trivalent Chromium Coated Technology (TCCT) was made using the safe chromium-3. After tests at laboratory scale and then at pilot scale, this process is now being used in one of the production lines at the facility in Ijmuiden, Netherlands. The process uses chromium-3 combined with formic acid. These substances are also present in the wastewater released during the production process. Both chromium-3 and formic acid have to be removed from the wastewater before it is discharged to the surface water. Tata Steel Europe asked EnviroChemie to develop a process to remove the formic acid and chromium-3 in such a way that no chromium-6 formed in the wastewater process.

EnviroChemie carried out various tests at its laboratory in Rossdorf, Germany, to find the best possible process. This resulted in a combination of techniques. 'The composition of the wastewater makes it very difficult to treat,' says Sales Manager Sicco Hilarius of EnviroChemie.

'It's not possible to oxidize formic acid with ozone or hydrogen peroxide, for example, because that could also convert chromium-3 into chromium-6. And that's precisely what we didn't want,' explains Mark Litz, Process Technology Manager at Tata Steel Packaging. 'The chromium-3 had to be removed first, after which it was possible to continue breaking down the formic acid in Tata Steel Europe's aerobic biological wastewater treatment plant. That made it a more attractive option to invest in the treatment plant,' says Mark Litz.

The treatment process ultimately turned out to be physical-chemical process of detoxification, neutralization, and dehydration. The formic acid could be neutralized with caustic soda and the rest of the contamination was flocculated by adding a polyelectrolyte. The biggest challenge was the long reaction time of the formic acid and caustic soda. The solution was found in leaving it to stand for longer.

The plant has been in operation since the end of March 2017 and both the client and the contractor are satisfied with the results. The chomium-3 concentration after physical-chemical treatment is around 0.1 milligrams a litre, which is under the discharge limit.

Chemical-physical treatment plant removes chromium-3 and formic acid from the wastewater

Contact:

EnviroChemie GmbH, Jutta Quaiser, Head of PR,
In den Leppsteinswiesen 9, 64380 Rossdorf, Germany☏ +49 6154 6998 72,
jutta.quaiser@envirochemie.com, www.envirochemie.com