CASE STUDY: ELECTRONICS MANUFACTURING

On-site Treatment of IPA and Acetone in Process Wastewater to Eliminate Off-site Incineration and Enable On-site Reuse

Customer Pain Point

A multinational electronics manufacturer operates a facility located in California that uses an isopropyl alcohol-based (IPA) solvent in a final manufacturing step. IPA vapors from the process are removed using a scrubber. The scrubber blowdown is an aqueous waste with an IPA concentration of ~3% (70,000 – 80,000 mg/L COD) that cannot be reused on-site or discharged to the sewer because the flash point of the waste stream is below 140 degrees F.

As a result, the IPA wastewater was trucked off-site to an incineration facility located several hundred miles from the facility. Off-site trucking and incineration is expensive, subject to cost escalation, higher risk and energy intensive. The customer's goal was to treat the wastewater on-site by raising the flash point in order to reduce the cost and risk of off-site shipping and disposal.

Axine system installation at a customer site in CA

Axine's Solution

Following treatability testing and field piloting, Axine designed, built, installed, owns, operates and maintains a turnkey treatment system under a multi-year service agreement. The Axine system is designed to oxidize the IPA solvent, reducing the overall COD by > 85.0% so the flash point of the treated stream is consistently above the site target of 201 degrees F and can be safely discharged to the sewer. As an added benefit, the Axine treated stream meets the site's reuse criteria and is subsequently sent to the reclaim system for use as cooling tower make-up water.

The Axine system oxidizes the IPA to trace levels of by-product gases including hydrogen, oxygen and carbon dioxide, which are vented to the atmosphere. No solid or liquid wastes are generated, and no hazardous chemicals are utilized.

Axine Value Proposition

- Eliminates off-site trucking & incineration of wastewater
- Generates immediate opex savings via Axine's service model
- Automates & streamlines waste treatment system
- Enables water reuse; treated water used in cooling towers

Treatment Results

Axine solutions are highly versatile and capable of treating a wide range of organic contaminants such as solvents, aromatics, polymers, surfactants, pesticides, active ingredients and other similar complex organic compounds. Table 1 shows the wastewater composition before and after Axine treatment.

Parameter	Units	Treatment Requirement	Untreated Water	Axine Treated Water	% Reduction
Flash Point	°F	> 202	127	> 212	N/A
IPA	mg/L	N/A	28,800	< 75	> 99.7%
COD	mg/L	N/A	71,000	< 2,750	> 96.1%

Table 1 – Wastewater parameters and treatment results

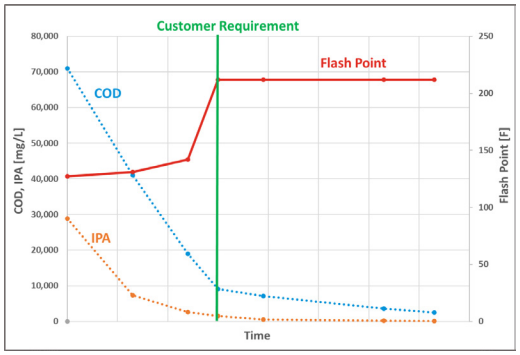

Figure 1 - Treatment reduction curves for IPA and COD concentrations before, during and after Axine treatment to reduce the flash point

Figure 1 shows Axine treatment performance reducing COD and IPA to achieve the flash point requirement. Overall, this project enables the facility to achieve corporate goals of waste reduction, reducing off-site waste shipments, improving operational efficiency and promoting water reuse.

System Design & Operation

Axine's turnkey system includes wastewater receiving tanks, electrochemical reactors, power supply, controls and instrumentation, trace by-product gas management and flow management systems. The system was assembled off-site by Axine and installed in 48 hours. Axine's wastewater treatment "as-a-service" package includes 24x7 remote system monitoring, routine and preventative maintenance, all consumables and replacement parts, rapid-response field service support, on-line system monitoring and monthly KPI reporting. Axine systems are fully automated and remotely monitored. Operational and performance data is collected wirelessly. Our proprietary data analytics monitors a wide range of performance metrics to enable safe and reliable operation. Customers can monitor performance on-line at any time.

Customer Value Comparison

Table 2 compares the customer's previous approach of trucking and incineration with Axine's on-site treatment solution.

Value Parameter	Trucking & Incineration	Axine
Cost	Higher	Lower
Annual Savings	0%	> 25%
Off-Site Waste Trucking	Yes	No
Off-Site Waste Incineration	Yes	No
Water Reuse	No	Yes
GHG Emissions	Higher	Lower
EHS Risks	Higher	Lower

Table 2 – Evaluation of previous method vs. Axine

About Axine

Axine has created a new standard for treating toxic, recalcitrant organic pollutants in pharmaceutical, chemical and other industrial wastewater to address a global problem. Axine's breakthrough solution combines advanced electrochemical oxidation technology with a flexible, modular system design and a unique wastewater-as-a-service business model. Axine provides customers with a robust, versatile solution capable of treating all types of organics to meet the most stringent treatment requirements without using hazardous chemicals. Axine's service model enables customers to achieve wastewater and sustainability goals with minimal capital investment and technology risk. For more information, please visit **www.axinewater.com**

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