

Case History

Wet dust collection system gets the lead out

A South American battery manufacturer installs dust collection equipment to help protect employees and meet local regulations.

Battery making is a messy process from start to finish. The process emits a variety of dangerous pollutants that can be difficult to contain. Tecnova, an automotive battery manufacturer based in Guayaquil, Ecuador, needed to find new equipment to reduce lead dust and combustion emissions to keep up with regulations.

The company's batteries are made up of lead and lead dioxide plates. The lead plates consist of a rectangular grid made of lead mixed with antimony or calcium. The holes of the grid are filled with a red lead paste and dilute sulfuric acid. The paste is pressed into the grid's holes, which are slightly tapered to better retain the paste. The paste is porous to increase surface area for the acid to react with the lead inside the plate. Once dry, the plates are placed in the battery housing with separators.

Lead dust is a common issue in battery manufacturing, primarily during plate production. Plate production includes various types of casting, in which lead is melted down and the molten lead is poured into molds. During this process, lead fumes and lead oxide can become airborne. Also, the lead oxide in the paste that's pressed into the grid often can become airborne once it dries, leading to a potentially hazardous workspace and harmful environmental emissions.

Searching for a low-maintenance solution

Tecnova's lead emissions released in battery plate production consisted of



The Whirl/Wet dust collector collects lead particulate at Tecnova's main production building.

particles larger than 3 microns. In the battery assembly process, emissions consisted of particles under 1 micron. The company decided to install two traditional baghouses in the assembly

area to handle the smaller lead particulate. But what to do about the emissions of larger particles in the battery plate production was a harder problem to solve.



The wet dust collection systems efficiently manage collected particulate and use very little water.

“New regulations required the collection of lead dust and combustion emissions,” says Konrad Kaul, technical vice president of Tecnova. “After talking to several suppliers, we decided a different solution was required.”

Tecnova considered using a baghouse to collect the larger particulate, but the option was deemed a poor fit because of the particle size. The filters would have constantly clogged, resulting in costly replacements and wasted work hours.

Cutting down on hazardous dust

Ultimately, Tecnova decided that the best solution for the larger particulate would be a wet collection system. A wet system wouldn't have bag filters to clog and would provide efficient collection. The company chose the Whirl/Wet dust collector system from Tri-Mer Corp., an air pollution control system manufacturer based in Owosso, Mich. USA. The collector has a cone-shaped tank, a stationary, dual-opposed blade system with curved upper and lower blade assemblies, and a mist eliminator. A capacitance probe wired to a solenoid valve automatically monitors and controls the dust collector's water level at the proper depth for maximum dust collection.

During operation, an air mover accelerates dust-laden air to high velocity, sending the air to the collector. In the collector's tank, internal static pressure pulls the dust-laden air through the blade system, which mixes the air with water. To increase turbulence for more thorough mixing and dust collection, a tangential airstream is injected through a linear slot in the lower blade assembly. Within the blade system, the mixed air and water rotate and accelerate across the surfaces of the curved blade assemblies. The wet dust settles by gravity, forming sludge at the bottom of the dust collector's tank. The mist eliminator, which has a chevron pattern, removes water droplets 30 microns and larger from the airstream.

The wet dust collector maintains the water level automatically, collecting particulate at more than 99 percent efficiency. Water use is minimal; additional make-up water is only needed to compensate for evaporation or sludge removal. Collected water from the airstream is recycled back into the system to prevent water waste, and the particulate material is left in the bottom of the unit for recovery or disposal.

Two H model, 10,000 cfm Whirl/Wet systems were installed for the

plate production line. The H model has an automatically timed drain-down system with a hopper and programmable release valve to remove the collected particles and can be set to self-empty into a disposal tray at a specified time interval. This minimizes the effort needed for the system to work efficiently.

“The Model H's automatic cleaning allows us to work without requiring an operator to constantly monitor the system,” Kaul says.

Moving forward

The company has been satisfied with the wet dust collection system.

“There have been no issues with the equipment,” Kaul says. “Since the units were installed in 2010 and 2011, the only maintenance we've had to do is an annual wash of the mist eliminators. The wet dust collectors have been a great solution for meeting the required lead emissions regulations.” **PBEI**

Note: Find more information on this topic in articles listed under “Dust collection and dust control” in *Powder and Bulk Engineering/International's* article index on the magazine's website, www.pbeinternational.com, and in books available on the website in the *PBE/I Bookstore*.

Tri-Mer Corp.
Owosso, MI USA
+1 989 723 7838
www.tri-mer.com