

PET Resin Manufacturer Reduces Cost of Production with Hapman PTA Silo Loading System

Dhunseri Petrochem & Tea Ltd. (DPTL) is a leading global manufacturer of bottle-grade PET (polyethylene terephthalate) resin. The company's plant is located in the port city of Haldia in West Bengal, India. The facility is a continuous chemical process plant that operates non-stop year-round. It produces 600 metric tons of PET resin per day and 200,000 metric tons per annum.

Bottle-grade PET is an engineering plastic produced out of purified terephthalic acid, more commonly known as PTA or TPA, and other chemical compounds. In addition to being easily extrusion blow-molded to any number of shapes, PET is recyclable, clear, strong and lightweight. The PET produced by DPTL is commonly used for bottle applications that will contain drinking water, carbonated soft drinks and other beverages.

Standard Process Wastes Energy

PET manufacturers around the globe typically employ pneumatic conveyors to transport PTA from storage silos and hoppers to downstream processing vessels. The Haldia plant was no exception. The facility receives PTA in 15-ton bulk truckloads. From the massive hopper at ground level, 25 cubic meters (883 cubic feet) of PTA powder is conveyed each hour to a staging silo 35 meters (115 feet) above.



The Hapman tubular drag conveyor is constructed of a 200-millimeter (8-inch) stainless steel casing and employs three inlets and one outlet, as well as a discharge vibrator to ensure 100% discharge of PTA powder. A low-horsepower (25 HP) motor moves a stainless steel chain with polyethylene flights throughout the conveyor's 99-meter (325-foot) circuit to a final discharge height of 35 meters (115 feet) at a 79-degree incline. The continuous operating conveyor moves 25 cubic meters (883 cubic feet) of PTA powder each hour.

CUSTOMER

- Dhunseri Petrochem & Tea Ltd. (formerly South Asian Petrochem Ltd.)

INDUSTRY

- Manufacturer of bottle-grade PET resin

PRODUCTS

- Tubular drag conveyor

BUSINESS BENEFITS REALIZED

- Energy consumption reduced by 225 kWh by replacing pneumatic conveyor with tubular drag conveyor
- Nitrogen consumption reduced by 2,500 Nm³ per day

HAPMAN CASE STUDY: Chemical Processing Plant



“We’ve achieved our goal of reducing energy and nitrogen consumption when conveying PTA by replacing the 320 kWh pneumatic conveyor with a 25-horsepower tubular drag conveyor.”

*- Subrata Mazumdar
Senior General Manager of Engineering
for Dhunseri Petrochem and Tea Ltd.*

“Our original process relied upon pneumatic conveyors to move PTA powder,” noted Subrata Mazumdar, Senior General Manager of Engineering for DPTL. “The pneumatic conveying system — mainly nitrogen compressors — consumed an enormous amount of energy and nitrogen.”

Alternative Conveying Method Sought

With the cost of energy and nitrogen contributing to higher cost of production, an alternative conveying method was sought.

“After much research we realized tubular drag conveying would be the most efficient and effective means for conveying PTA powder,” said Mazumdar. “We chose Hapman because they provided a better design and robust construction of drag conveyor.”

The tubular drag conveyor consists of a stationary outer casing through which a chain is pulled by a sprocket drive. Flights are attached to the chain at regular intervals. As this endless chain and flight assembly moves through the casing, bulk material is pulled from the in feed point(s) to the discharge port(s).

“While similar in some ways to cable- and aero-mechanical-style conveyors, tubular drag technology is superior to these systems because it utilizes a heavy-duty chain to move material at a low velocity,” says Naresh Gandhi, Managing Director of Hapman, India. “The result is a conveying method that is rugged yet gentle for the widest array of materials with virtually no maintenance, is quiet and consumes little power.”

Gandhi also noted the slow-moving, positive-displacement action of the chain assembly is ideal for handling friable and/or blended materials without separation or degradation. Because the fully enclosed system does not introduce air, a constant supply of nitrogen is not required for explosion suppression. The system does employ a purging system, which requires little nitrogen.

In 2009, a Hapman tubular drag conveyor was installed at the Haldia facility. The conveyor’s 200-millimeter (8-inch) casing is constructed of stainless steel and employs three inlets and one outlet, as well as a discharge vibrator to ensure 100 percent discharge of the powder. A low-horsepower (25 HP) motor moves a stainless steel chain with polyethylene flights throughout the conveyor’s 99-meter (325-foot) circuit to a final discharge height of 35 meters (115 feet) at a 79-degree incline.

“We’ve achieved our goal of reducing energy and nitrogen consumption when conveying PTA by replacing the 320 kWh pneumatic conveyor with a 25-horsepower tubular drag conveyor,” noted Mazumdar. “We are satisfied with this system.”

ABOUT HAPMAN

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