

Adjustable Vortex Tubes Set Manufacturer Up For Success

Dyplast Products is a leading manufacturer of polyisocyanurate and expanded polystyrene products. This includes innovative and cost saving pipe, sheet and block rigid foam insulation for applications in temperatures up to 350°F (177°C). Their products are available in densities ranging from 2 to 6 lbs. per cubic foot and have thermal efficiencies that are greater than most of their competitor's foam core products. These foam insulations are available in a variety of shapes and sizes and are used in a large range of industries around the globe.

The Problem

The maintenance and safety manager at Dyplast Products contacted one of our Vortec applications engineers to explore cooling solutions available to chill sections of a steel conveyor on a process line. Each section of the conveyor is made of 12 gauge. steel plates. The plates are individually 64.5" long and 6" wide and weigh 14lbs. Over a period of six hours, the temperature on the steel plates slowly rises from ambient temperature to 115-130°F (depending on the exothermic chemical process that occurs during transport on the conveyor). The internal temperature of the polyisocyanurate process called "bunstock" reaches 300°F. This heat was transferring into the steel conveyor surface. The maintenance manager needed to keep a 24" wide section in the center of the conveyor (where the bunstock is positioned) at 86°F or less for the process to remain viable, and to maintain the specifications and quality of the product. In the past this had not been an issue but changes in the ambient temperature and changes in the chemical process are causing new problems.

The Solution

When other processes such as forced air ventilation, and heat extraction failed, Dyplast Products looked at vortex tubes. The company liked the idea of cooling steel plates using vortex tubes because it gave them the flexibility to easily move cooling from one section of the plant to another, based on the conveyors changing needs. The Vortec application engineers calculated that 8100 btuh of cooling would be needed to keep the 24" center sections of the plates at 86°F or lower. They suggested using a model [328-100-H](#) and a 328-50-H vortex tube to produce

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98 cfm of air at 0 to 10°F. The recommendation was to blow the cold air through an insulated manifold with 25 orifices to evenly distribute the air over the 24" wide section. The application engineer also created a sketch and a description to show how to construct the manifold and how to pipe and filter the compressed air supply to the two vortex tubes. The customer had concerns about the safety of the hot exhaust air from the vortex tubes, so the application engineer suggested a way to vent the hot air exhaust without affecting the performance. Another concern about over-cooling the steel plates arose which would potentially cause condensation. This problem was simple to solve, as the vortex tube's cooling capacity can easily be controlled by regulating the inlet compressed air pressure to the vortex tube (with a pressure regulator).

The Results

The maintenance manager purchased the [328-100-H](#) and [328-50-H](#) vortex tubes and a model [701S-40A 150 scfm 5 micron](#) compressed air filter and quickly installed them. The vortex tube solution worked so well that three months later the company ordered two more of each product for additional processing lines.

Want to learn more about the Vortex Tube? Check out our [Vortex Tube Short Course](#) to learn how the cooling phenomena works!



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