

## Wind-Tunnel Tests Conducted by The University of Toledo at the Edison Industrial Systems Center In Toledo, Ohio



### The University of Toledo's Subsonic Wind Tunnel

A closed-loop design, the tunnel's flow is driven by a 14-blade, variable pitch fan coupled to a 150 hp electric motor. Varying the speed of the motor allows tunnel speeds to reach over 200 mph (300 ft/s).

Tunnel dynamic pressure and temperature are monitored continuously by a computer while tests are being conducted. The flow in the test section is very uniform, with a turbulence level of approximately 0.5% outside the wall boundary layers.

### The Testing Procedure For Salco's 20" Vented Cover

The test was designed to simulate Salco's cover on a rail car in service. At flow speeds of 30 and 65 mph, the following data was obtained:

- Flow speed through the cover was measured with an Exttech meter
- Pressures inside the vents, with and without flow through the vents.
- Using fluorescent dye, surface flow patterns on the outside and the inside of the vents.
- Pressurized water spray.
- Smoke flow visualization

The test was supervised by Dr. Terry Ng, of the University of Toledo's College of Engineering



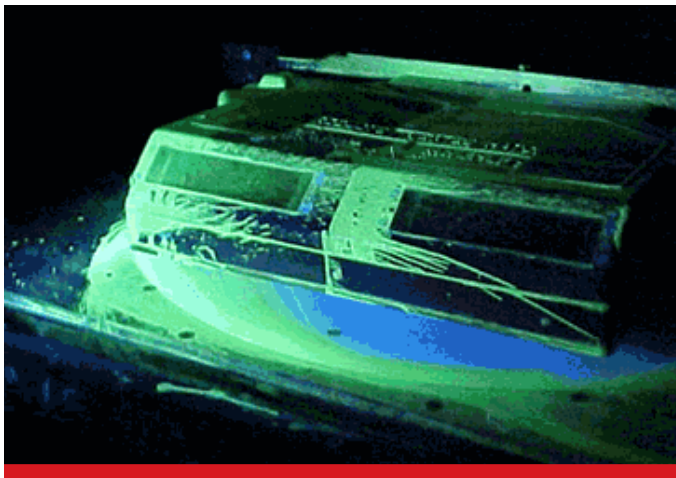
Salco's 20" Vented Hatch Cover within the wind tunnel

### Reasons For Wind-Tunnel Tests:

- To understand performance of vented hatch covers on hopper cars during transit conditions.
- To measure Salco's VHC performance against competitive models.
- To understand hopper car transit conditions for future design considerations.
- To measure performance differences between dual vent openings and single vent openings.
- To answer customer questions regarding vented hatch cover performance.
- To continue Salco's commitment toward product development and to increase our knowledge of performance and application requirements.

Dual vent hoods reduce the risk of airborne contaminants entering while the car is in transit.

Wind-tunnel testing - at speeds of up to 65 mph - demonstrates that air passes around Salco's cover.



Air flows around the cover rather than Into the cover.

### Air Flows Around the Cover Rather than Into the Cover

Threads attached to the cover near vent opening illustrate aerodynamics, and support the advantages of a dual-vent design. Threads in these pictures are blown down and away from the vent opening as air passes around Salco's vented hatch cover.

### Moisture Resistant

Moisture will not contaminate product while car is in transit.

Colored water is used to further demonstrate that air flows around the cover not into it.

