

# VIBRA SCREW CASE HISTORY



CH-249

## Bin Activators Replace Vibrator to Improve Flow of Food Chemicals

### Customer

Alberta Gas Chemicals, Inc., a wholly owned subsidiary of Alberta Gas Chemicals, Ltd. Plant in Duluth, Minnesota, produces food grade malic acid and fumaric acid, used worldwide to add tartness to foods, beverages, candies, gums, and dry powder mixes.

### Problem

In the Duluth plant, both malic and fumaric acid are stored in bins as dry powders after processing, and then are conveyed by screw conveyor to packaging machines. Malic acid is 20 to 100 mesh and it is hygroscopic. Fumaric is 80 to 325 mesh and it is light and fluffy. Both materials have a bulk density of about 57 lbs. per cu. ft. They are stored in five 304 stainless steel bins, two of which have 40,000 lb. capacities, one at 30,000, and two having 10,000 to 15,000 lb. capacities. Both materials hang up, especially if moisture is present. The company formerly used air-operated mechanical vibrators to restore flow. The vibrators weren't satisfactory; they attached directly to the bin wall and caused metal fatigue.

### Solution

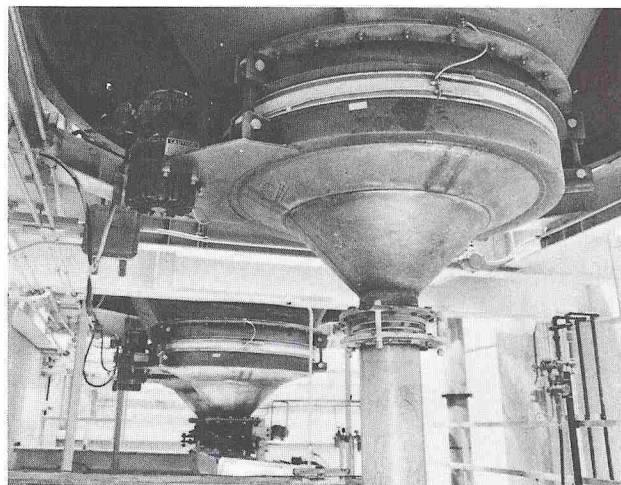
6 Vibra Screw Bin Activators: one 3-ft. dia., one 4-ft. dia., and four 5-ft. dia., all food grade construction, all 304 stainless steel.

The company took the opportunity during plant renovation two years ago to install the Vibra Screw Bin Activators. The large bin on the malic acid side has two discharge outlets, each with a Bin Activator on it. On the malic side, elliptical transitions are used down to a round outlet for the Bin Activators. The Bin Activators are flexibly mounted to the bottom of the bins, and they employ controlled vibration of a powerful gyrator which is mounted to the activator and rides with it. The gyrator's horizontal thrusts disengage particles in the most efficient possible way to prevent packing at the outlet. An integral part of the Bin Activators is an internal baffle which is mounted directly above the outlet. It serves two purposes: it removes the headload from the outlet, and it resolves the horizontal thrusts of the gyrator into vertical impulses which extend far up into the material in the bin to prevent bridging. Because of the flexible mounting of the Bin Activators, the gyrator vibrates the Bin Activator, its baffle, and material in the bin, but not the bin. In fact, the bins are mounted on load

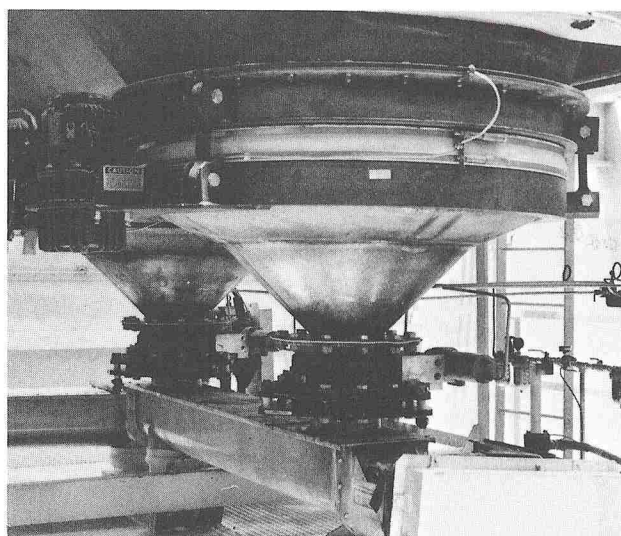
cells which give accurate indication of material levels in the bins without any adverse effect from the Bin Activator vibration. From the Bin Activators, the material flows to packaging machines, where it is packed in 50 to 100 lb. bags.

### Results

Material now moves in a continuous, uninterrupted flow to packaging. Maintenance is mainly preventive, providing the additional benefit of less downtime. Bin fatigue is no longer a problem. Projected flow rate has been achieved.



Six Bin Activators improve flow of malic and fumaric acid at the Duluth Plant of Alberta Gas Chemicals, Inc.



Vibra Screw Bin Activators eliminate metal fatigue and stress cracks in the bins formerly caused by mechanical vibrators.