



YASKAWA

## Glass Container Application

The emergence of various types of plastic as the dominant container material had put the glass container industry in a slow or no-growth position. However, renewed emphasis on recycling and introduction of new food and beverage products has created increased demand for glass containers, with accompanying needs for both increased production and quality control levels.

Rather than relying solely on constructing expensive new plants to meet expanding needs, the industry is modernizing and upgrading existing facilities. Particular emphasis is being placed on retrofit of modern electrical control devices to existing production equipment.

A Tampa, Fla. based division of an international glass manufacturer, offers an example of a highly-effective modernization program. This major supplier of amber, green and clear glass containers to the food and beverage industries, has undertaken an ongoing program of improvement using adjustable frequency drives (AFD) in its container manufacturing operations.

Their modernization program centers on installation of Yaskawa programmable adjustable frequency drives in "hot end" operations. The Yaskawa drives provide increased efficiency and flexibility, precise speed regulation, easy product changeover, reliability and energy savings.

The upgrades utilize modern drive systems technology to replace mechanical drives on "hot end" individual section (IS) machines, which form molten glass into containers.

The drives are coupled with Syncro-Spede motors to provide speed control and synchronization of "feeder," "machine conveyor," "gob distributor," "tube" "stacker," "transfer," and "cross conveyor" motors.

### Increased Flexibility

Using Yaskawa AFD drives in this system provides the flexibility of running a wide variety of speeds in bottles per minute, depending on the machine and the container being produced. The drives also expedite product changeover through entry of new control parameters via the drive's digital keypad.

Parameters can be entered by using Yaskawa's DriveWizard software, a program designed to allow the user to create and edit drive configuration, set up and performance files.

By using Syncro-Spede inverter duty motors and proper gearing on the machines, the drive control speed can be varied from 3-120 Hz, with a constant torque output.

### Computerized Control System

The main drive provides a pulse output proportional to speed for the computerized control system. This is used as the synch point for the IS machine, allowing auto-correction as needed.

When speed correction is needed, individual motors can be switched on the fly from the main drive to a corrector drive. Motor speed can then be advanced or retarded anywhere from zero to plus or minus 100% — an adjustment range of 200%. Typical advance or retard is about 10% for short periods of time until the machine is synchronized.



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Correction can be accomplished manually, automatically or in conjunction with a computerized control system, depending on the particular machine being used. Once correction is obtained, the motor is cycled back to the main drive.

According to the Yaskawa distributor which provides the drives, motors and IS machine control panels, the AFD drive, motor and gear box can be supplied for less than the cost of mechanical adjustable speed drives.

The mechanical drives previously used required time-consuming mechanical speed control adjustment. Additionally, if mechanical adjustable speed drives are run at the same speed for long periods of time, their pulleys may become grooved, making precise speed adjustments difficult.

The manufacturer is also using Yaskawa AFD drives controlled by PLCs on annealing sprayer units manufactured at its facility and installed nationwide. These reciprocating spray units make one pass for each row of containers and move in an arc versus a straight line to accommodate the speed and movement of the line. Speed settings vary for each size and type of container. Because speed settings can be input through the drive keypad, set up and reprogramming are easy for quick product changeover.

## Drives Provide Conveyor Speed Control

Yaskawa AFD drives are utilized to provide speed control to main table conveyor motors and material handling conveyors at the cold end. Each conveyor unit may use from seven to ten drives in master/ratio systems that can be adjusted while running to any speed ratioed off the master. Yaskawa drives are also being used to control speed on lehr motors and some inspection equipment.

Yaskawa drives provide self-diagnostic capabilities which can alert operators to potential electrical and mechanical failures. Also, thermal magnetic overload relays can be eliminated.

The drive has built-in electronic motor protection and programmable current limit to protect a variety of motor sizes. A two-second power loss ride-through is standard on the drives to provide backup external logic in case of momentary power loss. This virtually eliminates costly nuisance trips due to intermittent voltage dips.