

# Keep it Clean

Electrically driven linear slides eliminate potential contamination by replacing hydraulic fluid powered equipment

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When it came to designing the next generation of pharmaceutical processing equipment, Vector Corporation looked for modifications to help make the transition from hydraulic to electric power. The new design was developed for Vector's GMX High Shear Granulator Mixers. These mixers are a wet agglomeration system used in the pharmaceutical and healthcare industries to manufacture granulation materials for tablets or capsules. For this particular product, the design phase included the evaluation of competitive units on the market to find opportunities for improvement. One discovery was that the units were using hydraulics to raise and lower the product bowls. Hydraulic systems have the possibility of a connection or hose failure, causing oil leakage within the processing areas. In the pharmaceutical industry where sterility is of extreme importance, the chance that hydraulic fluid could cause contamination led Vector engineers to look for ways to eliminate hydraulics. Processing equipment for the pharmaceutical industry must meet cGMP requirements. cGMP, or current Good Manufacturing Practices are the current accepted standards of design, operation, practice and sanitization, which apply to

*GMX-300 frame with mechanical slide installed.*



*A GMX-600 mechanical slide with recessed in-the-wall design.*

facilities, equipment and procedures. The standards primary purpose is to establish a set of principles and procedures, which, when followed by manufacturers of drugs and other therapeutics, will help ensure the products manufactured will be of the required quality. The U.S. Food and Drug Administration is empowered to inspect for compliance with these standards in drug manufacturing plants where drugs are processed, manufactured, packaged and stored. The decision by Vector's engineers was to eliminate hydraulics from the product design, resulting in the selection of a mechanical slide lift system.

Eliminating the hydraulic components meant that the new linear motion control slide faced many requirements. It needed to be driven by an electric motor, and had to support a relatively heavy overhang load, plus the compressive load of the rubber sealing gasket. To eliminate the hydraulics, the motorized slide is driven by a rolled ball screw with overload coupling and break on input. Russell T. Gilman Inc. was able to incorporate a 5:1 right angle reducer, allowing the motor to run at a nominal speed of 1,750 RPM. These additional features were necessary to precisely control the speed of the mixer assembly, allowing it to reach the proper velocity for closure of the bowl, while not going so fast that dust from the mixture

could escape.

The design modifications also saved time by making the machine easier to manufacture. Using hydraulics requires more assembly time due to the individual components that require installation to make up the system. Using a slide device as a packaged unit that can be installed on the frame plus mounting a lift cradle to lift and lower the product bowl, offered these potential cost savings. Preventative maintenance schedules can also be reduced since the mechanical slide devices do not require the addition of oil, or bleeding of air, from the system as is the case with hydraulics. Once installed, the slide devices offer continuously smooth operational movement.

Utilizing a mechanical slide mechanism offers potential benefits over hydraulic systems. The most significant is the elimination of potential contamination from leaked hydraulic fluid in the processing area. Installing a prepackaged system reduces assembly time and ongoing preventative maintenance. The electrically driven slides can also be programmed to provide precise speed, operational movement, and location.

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