

## Case story

# VLT® 690V high-power frequency converters **optimise large-scale fermentation process** in China

Fermentation is important for large-scale production of industrial enzymes and careful control of the fermentation process is necessary to ensure optimal microbial metabolism. Seed from one fermentation tank is transferred to the next, ending up in the main fermentation tank in which the temperature, pH and dissolved oxygen must be carefully controlled to optimize the enzyme production. Cell metabolism develops heat and cooling water is used to maintain a constant temperature in the tank. Sterile acid and alkali are added to regulate the pH. The required degree of dissolved oxygen is maintained by adding

sterile air and stirring, so that the air disperses into tiny bubbles. Additional nutrients can increase the amount yield. Total control of the processes requires control of tank pressure, pH value, stirring speed and level of bubbles. Frequency converters are often used in fermentation applications, controlling feeders, mixers, fans, water-cooling units and other equipment. Dedicated control software, PLC's and fieldbus communication are applied to optimise both the quantity and the quality of the enzyme. Within the fermentation stirring is vital, and the speed of stirring has

Based in Denmark, Novozymes is the world's largest producer of industrial enzymes. The company has offices and production plants in more than 20 countries. One of these, Suzhou High Tech Computer System Co., Ltd., is China's largest enzyme production plant. Its largest fermentation tank is 10,160m<sup>3</sup> – Asia's largest. Novozymes uses the VLT® AutomationDrive series frequency converters to control mixers, blowers, compressors etc..

a direct impact on the quality of the enzyme. VLT® drives control the blender, that mixes the materials in



the blender with strict control of the mixture stirring speed, ensuring a stable level of dissolved oxygen. In large-scale industrial fermentation of microbiological culture, bacteria and fungi are usually used to produce high-value products in the chemical and pharmaceutical field.

Danfoss VLT® AutomationDrive FC302 series of high-power 690V inverter offer the following benefits:

- 160% starting torque can be sustained for one minute.
- The VLT® AutomationDrive high power inverter has 30% less heat loss than main competitor drives.
- A wide range of product sizes and supply voltages. With 690 V, the drives provide 1.2 MW power.
- Can keep full performance at 45°C average ambient temperature.
- Built in coils makes it possible to use 150 m screened cables or 300 m unscreened cables.
- Danfoss is a leading provider of frequency converters with sales and service in more than 100 countries. Thousands of professional engineers provide service at any time.

