

# FOOD FREEZE DRYING

IMPROVING EFFICIENCY AND PRODUCTIVITY  
WITH EDWARDS GXS DRY VACUUM PUMPS

[edwardsvacuum.com](http://edwardsvacuum.com)

Cuddon Ltd., based in New Zealand has become a benchmark in the world of freeze drying machines with over 50 years' experience and over 300 installations worldwide. From 5.5 kilograms to 1500 kilograms ice condenser capacity, Cuddon's freeze drying machines are used for a range of applications from small pilot research plants to large commercial multi-dryer industrial operations. With stringent quality controls and reliable performance, each Cuddon freeze dryer is manufactured under ISO 9001 accreditation.

When it comes to integrating freeze drying equipment into existing systems and factory processes, Cuddon is highly respected across the world. Their freeze drying equipment are used in a wide range of industries across the world including food processing, dairy, pet foods, nutraceuticals, pharmaceuticals and biological active ingredients, cultures and starters, taxidermy, floral drying and even disaster recovery.



## KEY FACTS

Customer	<b>Cuddon</b>
Region	<b>New Zealand</b>
Sector	<b>Food freeze drying</b>

<b>BENEFIT</b>	<b>REDUCED HEAT-LOAD AND NOISE LEVEL IN THE PLANT ROOM.</b>
	<b>BETTER VACUUM PRESSURE LEADS TO SUBSTANTIALLY REDUCED PROCESSING TIMES.</b>
	<b>ENERGY SAVINGS OF AT LEAST 50%.</b>

## VACUUM SYSTEMS

### 1. CHALLENGE

Traditionally, oil-sealed rotary vacuum pumps have been often used in combination with roots boosters for freeze drying. Freeze drying process removes water from frozen products by sublimation. Sublimation occurs when a solid, in this case ice, changes directly to vapour, bypassing the liquid phase. The products to be freeze dried are frozen conventionally and exposed to vacuum to remove the vapours.

During the primary drying phase, high condensable vapour load is removed from the process chamber. The refrigerated condenser does not condense the entire load and a certain amount needs to be handled by the vacuum pumps. The resulting vapour condensation in the vacuum pump causes performance issues, such as:

- Compromised lubrication due to condensed liquid and oil mixture.
- Decreased vacuum performance caused by increased vapour pressure of oil/liquid mixture.
- High maintenance requirement with frequent oil changes and pump re-builds.



GXS dry vacuum pump

### 2. SOLUTION

To avoid repetitive and frequent maintenance and pump rebuilds, Edwards suggested the GXS series of dry vacuum pumps. The GXS series with their unique screw technology and world-leading high-efficiency drives enable advanced temperature control and offer long service intervals. Built with an oil-free pumping chamber and operating at internal temperatures that prevent condensing of vapour in the pumps, the GXS series helped Cuddon deliver oil-free vacuum solutions.

The GXS is a silent powerhouse – the updated technology and design ensures low vibration and quiet operations in their work environments. The oil-lubricated gears eliminated the need for grease and maintenance intervals and ensured an extended operational life.



### 3. OUTCOME

Cuddon experienced improved vacuum performance and a stable vacuum pressure leading to substantially reduced processing times. The GXS dry vacuum pump is easy on the environment – oil-free exhaust emissions from the vacuum pumps and no oil leakage on to the surrounding floor. The GXS is capable of pumping 100% condensable vapours without condensing to liquid in the pumps, which resulted in substantial maintenance cost savings.

