

**BACKGROUND**

**Toyo Seikan (Thailand) Co. Ltd.**, Thai branch of the Japanese group Toyo Seikan, leader in the beverage packaging & filling sector, has once again chosen **Frigel & Matsui** for the expansion and upgrading of the process cooling system of their aseptic filling facility located in Ayutthaya, Thailand.

**Matsui Mfg. Co., Ltd.** is a Japanese global leader in the manufacture and sale of plastics processing equipment and systems (molding-process temperature controllers, conveyors, mixers, crushers, recycling devices, etc.) and a valuable Frigel partner of decades.

The Ayutthaya filling plant, where various soft-drinks are filled, had to be expanded adding a new aseptic filling line to the existing one, already served by a Frigel cooling system. The customer chose to expand the cooling capacity while at the same time benefiting of the new Frigel **Multistage technology**.

Frigel Multistage technology is an ideal alternative to common chillers for all those processes where high temperature drops are present, such as **foods and beverages production processes**.



**PROJECT OBJECTS**

- **Expansion of the chiller system:** expansion of the capacity of the existing chillers system by 750 kW, to reach a total of approximately 1200 kW (water-glycol mix at 3 °C).
- **System upgrade to Multistage technology:** modification of the hydraulic configuration and the electronic components of the existing chillers according to the Frigel Multistage concept.
- **Remote monitoring and supervision system:** equip the system with Frigel **MiND** supervision system, to allows remote monitoring and collection of operating data.

**PROJECT & SOLUTION**

**Expansion of chiller system**

Two new **3HL chiller** units have been added to the existing ones, increasing the total system capacity to approximately 1200 kW. The new chillers have been installed on the same hydraulic circuit, connected to both filling lines, in order to exploit all the cooling capacity that the system can deliver.

This configuration also implies an excellent backup capacity of the system: each chiller is equipped with 2 high-efficiency screw compressors, on separate refrigeration circuits, so that in the event of a failure of one of them, the remaining ones can easily satisfy the cooling request, avoiding downtime.

In addition, the **GPV pumping stations**, equipped with inverters, allow to calibrate the flow rate based on real instant needs. The GPVs are equipped as standard with a “spare” pump which is automatically activated in the event of a failure of one of the others. The “spare” pump is automatically cycled to balance the running time of all pumps.



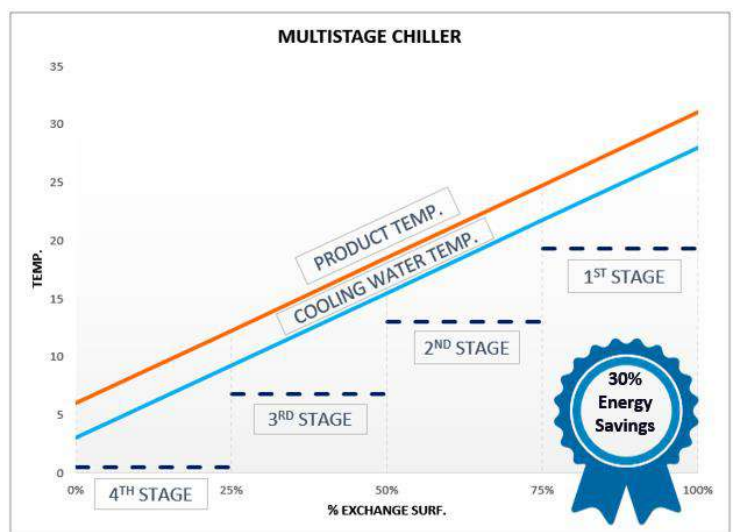
**System upgrade to Multistage technology**

Taking advantage of the system expansion and thanks to the large temperature drop of the process (as is typical of most of beverages and many food manufacturing processes), Frigel suggested to “upgrade” the entire chiller system to its new “**Multistage**” technology.

The Multistage technology allows to “break down” very high temperature differentials into smaller steps (stages), which are performed by a series of cascaded chillers (the nr of stages is optimized depending on the process features).

Contrary to traditional solutions, this technology allows chillers (stages) to work at a higher average evaporation temperature and thus significantly increase their efficiency.

Furthermore, the cooling water can ideally replicate the temperature drop of the product thereby reducing the required flow rate. **Taken together, these features can result in overall energy savings of up to 30%.**



**Remote monitoring and supervision system**

**MiND** is an innovative digital solution developed by Frigel to meet the ever-growing needs of modern companies to reach “Industry 4.0” and “IIOT” (Industrial Internet Of Things) standards.

It allows to observe and manage the working parameters of the machines through a multifunctional user interface, both locally and remotely, with an easy-to-use web interface. MiND is able to provide customers with a perfect supervision and maintenance tool for all Frigel equipment.

In this case, the MiND was connected via LAN cable to all the equipment and used to collect data on the operation of the entire cooling system. These data can be accessed remotely by Frigel technicians for troubleshooting and are stored on a physical SSD memory.



When connected to power meters the MiND also allows the collection and storage of energy consumption data, allowing detailed OPEX analysis and optimization of the cooling system.