Smart liquid scheduling

The key to powering up your dairy, food and beverage production

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Unlock the value in your dairy, food and beverage operations

The food and beverage (F&B) industry is one of the most complex and dynamic sectors, yet it also presents opportunities for forward-thinking players. According to experts, advanced technologies are key to unlocking future competitiveness in the industry.[1]

Liquid scheduling presents great potential to increase your competitive advantage. Any manufacturer producing liquids — whether for dairy, wine or other F&B — knows that tanks are not your ordinary piece of equipment. The right scheduling solution knows this too and takes into account all of your tanks' unique and complex characteristics to maximise throughput and profits.

[1] Craig A. Giffi, Michelle Drew Rodriguez, Bharath Gangula, Aleda V. Roth and Tim Hanley; 2016 Global Manufacturing Competitiveness Index [Deloitte, 2016]

Does your scheduling solution know enough about tanks?

To achieve effective liquid scheduling, ensure that your solution factors in the following tank characteristics:

Tanks are for storage
An important difference between a tank and production resource is that a tank stores materials and is volume-constrained. When tanks are of different sizes, an important part of scheduling involves allocating and potentially splitting batches between tanks.

Tanks have different properties
Planning tanks for use in dairy and F&B production can often be a challenge. Multiple tanks are required in consecutive production stages, and the use of liquids means that the components are stored within the tanks themselves — as opposed to non-fluid materials, which can be stored elsewhere prior to use. Therefore, the availability of all tanks has to be taken into account when scheduling a production batch. This 'tank occupation requirement' creates a high dependency between the plans of consecutive production stages — a disruption upstream or downstream can quickly propagate through all stages of production.

The most obvious choice for one batch with the best fit in terms of size and availability may cause delays, either upstream or downstream for other batches. A scheduling system that can synchronise multiple process stages and consider the interrelationships of different batches will maximise the efficiency of the entire production process.

Tanks can only store one product at a time
In a warehouse, extra space equals extra storage capacity. In a tank, it does not. To accommodate a new product, you first have to empty the tank completely and often clean it as well. A scheduling solution that cannot handle the constraints of tank scheduling will provide an inaccurate representation of resource availability.

Connecting pipes have their own constraints
Pipes that join tanks can only transport one material at a time. There are also routing constraints — there may not be any pipes connected between some process and tank combinations, or some connections may not be appropriate for certain products. Routing and product constraints can only be handled efficiently with a scheduling solution that accounts for simultaneous feeding and consuming resources, connection and product-dependent constraints, and multiple flow rates.

Tanks need regular cleaning
Tanks and other equipment such as pipes and packers require cleaning to prevent contamination and spoilage. The cleaning process depends on a host of complex requirements, which include sequence and characteristics of products, clean-in-place (CIP) process and sanitisation. To generate optimal schedules, your scheduling solution has to be able to recognise changeover values for these factors as well as other characteristics such as quality and brand.

Processes occur in tanks
Schedules have to respect that certain processes take time and that time is not entirely predictable. For example, quality control may send the batch for rework because it does not meet quality standards. One does not plan on the necessity of doing rework, but the scheduling system should be able to respond to delays in production, recalculate all the consequences and, if needed, adjust the schedule to the new situation.

After the processes are complete, the product cannot be left in the tank for too long as some products will spoil and will have to be discarded. Others lose their properties, such as uniformity, and some rework or additional processing (e.g. stirring) may be required.

Some tanks can only operate when full
Because of a tank's specific properties or the need to prevent too much of an air gap at the top of the tank, for example, half-full tanks are not always an option. To guarantee full tanks, planners must ensure that they always schedule the correct volume.

A tank's batch may be destined for more than one packaging option
In a make-to-stock environment with long lead times, bulk products are often produced before customers place their orders. To respond to changes in demand, the packaging plan may have to be adjusted. Your scheduling solution must be able to match the existing product in tanks with a revised packaging plan.

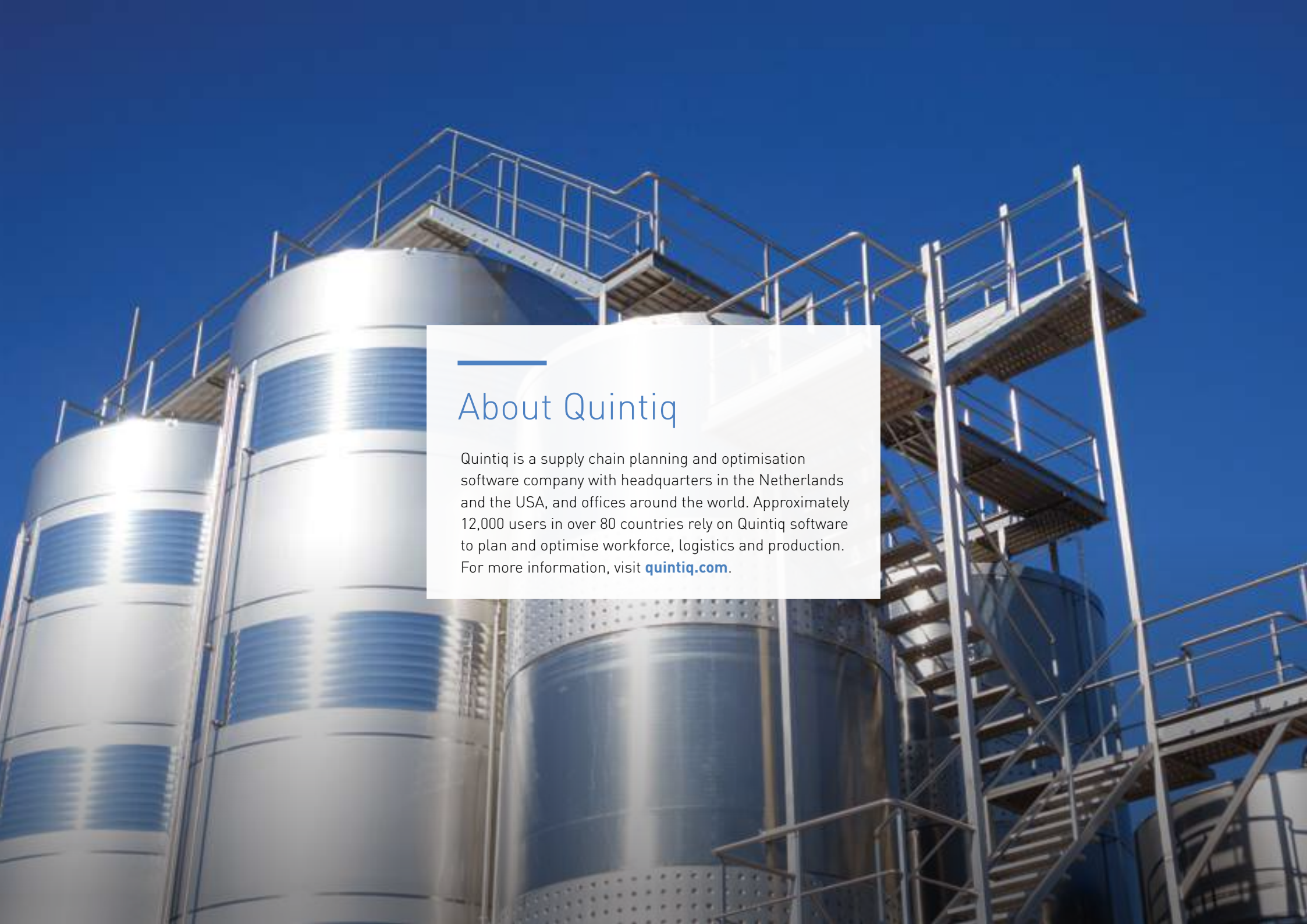
In a make-to-order environment, you may want to combine different customer orders for the same bulk product but with different pack configurations.

Effective liquid scheduling is essential to your business

The only way to truly optimise your liquid scheduling for superior delivery performance is with a solution that fits your unique requirements. A perfect-fit solution must:

- Model and synchronise all business rules, operational constraints and product characteristics
- Make connections and establish relationships between planning elements
- Support best-practice planning and decisions that drive business goals
- Handle changes and disruptions quickly and effectively

Effective liquid scheduling can propel your business to the next level and boost your bottom line. To get started today, **contact us** or **visit our website**.



About Quintiq

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