



Tetra Alwin[®] Soy

Soya extraction unit



Highlights

- Lower bean cost thanks to high protein extraction yield
- Good flexibility to produce desired taste
- Quick conversion from bean to product
- Lower water consumption
- Less product loss
- Less environmental impact
- Easy to clean with CIP
- High production-to-footprint ratio
- Consistent quality
- Easy operation, with less risk of error

Application

A flexible production system for continuous extraction of both beany and low-beany soya base from soya beans. The soya base is blended, UHT-treated and packaged in subsequent processing equipment.

Working principle

Soya beans (whole or dehulled) are fed into a silo tank in the grinding section. No prior soaking is required. The beans are transferred by gravity via a dosing valve into a hopper, to which hot water is added via a control valve. A positive pump transfers the beans and water to two grinders – a perforated disc mill followed by a colloid mill – where they are ground to a slurry for transfer to the fibre separation section. By controlling the grinding temperature, a soya base with either a beany or a low-beany taste profile can be achieved. In the latter case, sodium bicarbonate may be added to further reduce the beany taste.

In the fibre separation section, fibrous residue (okara) is separated from the soya base by high-speed centrifugal force using one or two decanters. In a one-decanter system, the okara is removed by a positive pump for disposal, and the soya base is sent to the next section, enzyme deactivation. In a two-decanter system, the okara from the first decanter is collected, water is added for protein recovery, and the mixture is sent to the second decanter for separation. The okara is then removed for disposal while the soya base from the second decanter is used for grinding the beans.

The enzyme deactivation section uses direct steam injection to heat-treat the soya base in a holding cell to deactivate the trypsin inhibitors. A downstream vacuum vessel flash-cools the soya base before further cooling in a PHE (plate heat exchanger).

After cooling, the soya base is transferred to downstream equipment for further processing.

Basic unit

Prior to delivery and on-site installation, the Tetra Alwin® Soy extraction unit is pre-assembled in three main sections:

- **Grinding section**
 - bean silo tank
 - bean dosing valve
 - positive pump for beans/water feed
 - 2 grinders
 - plate heat exchanger
- **Fibre separation section**
 - decanters
 - valve cluster for CIP/Product flow selection
 - CIP Station for CIP of decanters
- **Enzyme deactivation section**
 - balance tank for soya base/water feed
 - direct steam injector
 - holding cell
 - flash/vacuum vessel
 - plate heat exchanger

Automation system

- Automatic control using Allan Bradley PLC or Siemens PLC as standard

Options

- Sodium bicarbonate preparation and dosing tanks for the grinding sections
- Okara discharge pump

Capacity

- 4 000 kg/h, 4% protein soya base (single decanter)
 - 4 000 kg/h, 5% protein soya base (double decanters)
 - 7 000 kg/h, 4% protein soya base (single decanter)
 - 7 000 kg/h, 5% protein soya base (double decanters)
- Other capacities on request.

Layout

Space requirements

Tetra Alwin Soy 4 000 kg/hr			
Module	Length (mm)	Width (mm)	Height (mm)
Sodium bicarbonate	5 100	1 400	2 400
Grinding	3 000	2 000	4 600
Fibre separation (1)	4 500	2 600	2 600
Fibre separation (2)	4 500	1 600	2 600
Enzyme deactivation	3 400	2 000	3 600
Spiral holding cell in ED section: 1200 OD x 1700 H			
CIP unit	4 400	1 800	2 000
Total*	16 000	8 000	4 600

Tetra Alwin Soy 7 000 kg/hr			
Module	Length (mm)	Width (mm)	Height (mm)
Sodium bicarbonate	5 100	1 400	2 400
Grinding	3 800	3 500	4 400
Fibre separation (1)	5 100	3 400	3 200
Fibre separation (2)	5 100	1 800	3 200
Enzyme deactivation	3 600	2 700	4 000
Spiral holding cell in ED section: 1200 OD x 1700 H			
CIP unit	4 600	2 000	3 000
Total*	20 000	8 000	4 600

* Recommended total line space incl. sodium bicarbonate option