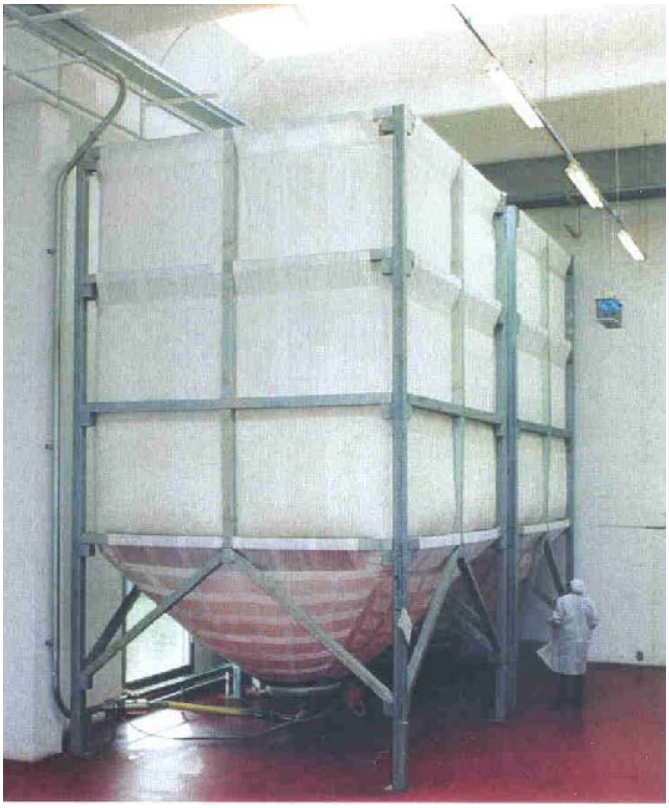
tel. +38 044 225 93 72 · +38 067 566 0 566
kyuri@ec-cibo.kiev.ua · www.ect.kiev.ua
27 Vadyma Hetmana St., Kyiv, 03056, Ukraine

Bulk storage, conveying and dosing of flour AGRIFLEX

Agriflex S.r.l. (Italy) · fabric and steel silos · pneumatic conveying · in-line sifting · weight dosing into the dough mixers



Trevira® fabric silos inside a production room — photo from the supplier

Application

A complete bulk flour handling system: intake from a flour tanker or from bags, storage in silos, pneumatic conveying across the workshop, in-line sifting and metal detection, and weight dosing directly into the dough mixers. Besides flour the system handles sugar and other bulk ingredients.

The configuration — the number and the type of silos, the number of lines and delivery points — is engineered for the particular plant: from the daily flour consumption, the stock in tonnes needed for several days of autonomous work, and the height and the layout of the room.

What bulk storage gives

— flour is no longer carried in bags: fewer staff, less handling equipment and less storage floor space;
— consistent dosing quality — the weight is checked by an instrument, not by counting bags;
— sifting and metal detection happen in the flow, while the flour is being fed to the mixer;
— automatic accounting of what was received, what is left in the silos and what is consumed per day — fewer losses;
— no packaging waste; the silo fabric lasts more than 15 years;
— installation inside a working workshop, with no special assembly openings.

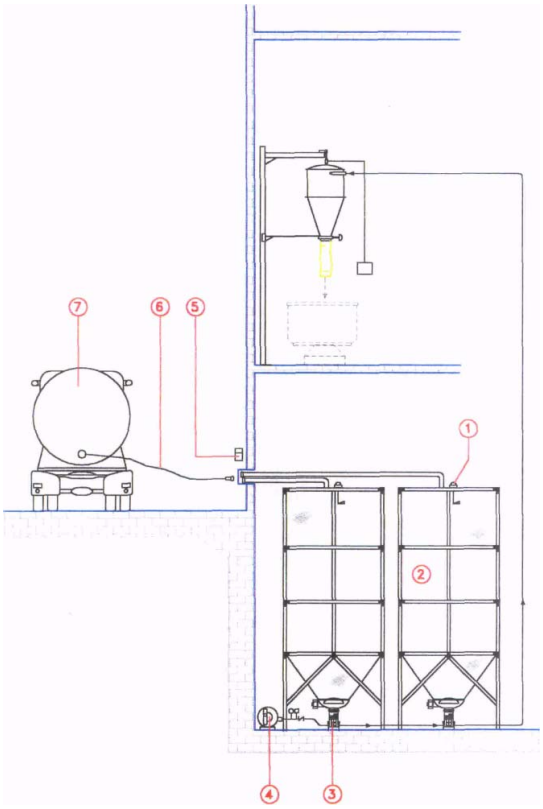
tel. +38 044 225 93 72 · +38 067 566 0 566
kyuri@ec-cibo.kiev.ua · www.ect.kiev.ua
27 Vadyma Hetmana St., Kyiv, 03056, Ukraine

System composition

Subsystem	What it includes
Intake	from a flour tanker through loading pipes, or from bags through a bag tipper
Storage	silos inside or outside the workshop: Trevira® fabric, ESA stainless steel panel, steel, fibreglass
Conveying	pneumatic conveying under pressure or under vacuum through AISI 304 stainless steel pipes
Sifting and cleaning	vibrating sifter in the pneumatic line and a magnetic separator that catches metal bodies
Dosing and weighing	silo weighing, weighing hoppers and electronic scales discharging into the dough mixers
Automation	control cabinet with a PLC and a touch panel, accounting of stock and consumption, remote service access

Typical layout

The flour tanker is connected to the loading pipes brought out onto the outer wall of the store and blows the flour into the silos. Underneath the silo the product is taken by the vibrating bottom and the rotary valve, and the pneumatic line carries it through the sifter and the magnetic separator to the receiving hopper above the dough mixer.



Equipment layout: flour tanker, loading pipes, two fabric silos, compressor with a rotary valve and the receiving hopper above the dough mixer — drawing by the manufacturer Agriflex

tel. +38 044 225 93 72 · +38 067 566 0 566
kyuri@ec-cibo.kiev.ua · www.ect.kiev.ua
27 Vadyma Hetmana St., Kyiv, 03056, Ukraine

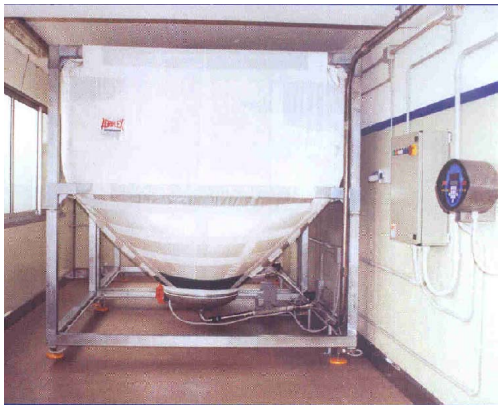
Storage: types of silo

Type	Description
Trevira® fabric	a modular frame of galvanised or painted steel and a bag of technical Trevira® fabric: food-grade, antistatic, of very high mechanical strength. Capacity up to 125 m³, the shape and the dimensions are matched to the room. Installed inside the workshop; outdoors — in a separate technical room
ESA — stainless steel panel	butt-welded panels with external ribs: the structure is self-supporting, with no internal tie rods or flanges, and therefore easier to service. The regular polygonal shape without right angles gives complete emptying. Installed indoors
Steel	made of stainless steel sheet in two versions: bolted panel silos for indoor installation and fully welded monobloc silos for outdoor installation. Antistatic
Fibreglass	a four-layer wall formed continuously in cylindrical shape: high mechanical strength and tightness. The VR range runs from 8 to 100 m³, diameter 2.2 · 2.5 · 3.0 m

Whatever the type, the silo is fitted with a safety valve and an explosion vent, flour inlet connections and an electronic weighing system; fibreglass silos also have an inspection window.

Trevira® fabric silos

— the load-bearing frame is bolted together from tubular galvanised sections with joints designed for quick assembly and dismantling;
— the body is a bag of reinforced Trevira® fabric: it lets air through but holds back flour dust and complies with EU rules on contact with food;
— the top surface is a self-cleaning filter fabric that releases the loading air;
— pneumatic loading pipes Ø 100 mm of AISI 304 stainless steel with a quick-release coupling; maximum loading pressure 0.8 bar;
— at least 300 mm of free space must be left above the silo — otherwise the filter fabric does not work;
— the base is no larger than 3600 × 3600 mm; the height is matched to the room;
— converting volume into mass: × 0.6 for flour, × 0.8 for sugar.



A single fabric silo with the weighing instrument on the wall — photo from the supplier

tel. +38 044 225 93 72 · +38 067 566 0 566
kyuri@ec-cibo.kiev.ua · www.ect.kiev.ua
27 Vadyma Hetmana St., Kyiv, 03056, Ukraine

Flour intake from a tanker

Flour from the road tanker is blown into the silo through AISI 304 stainless steel pipes Ø 100 mm with a quick-release ball coupling. The pipes are brought out onto the outer wall of the store and closed in a metal box with a door and a lock. The maximum distance from the loading pipes to the silo is 40–50 m; it depends on the output of the tanker compressor and on the number of bends in the line, of which there are usually no more than four. The maximum loading pressure is 0.8 bar, and a typical intake rate is about 4 t/h.

A sampling device is fitted on the loading pipe. The level in the silo is watched by a mechanical sensor, and an overfill is signalled by a cabinet with an audible and visual alarm and an acknowledgement button.



Loading pipe terminals, labelled per silo — photo from the supplier

Intake from bags: the bag tipper

Where flour arrives in bags, the bulk system starts with a bag tipper: the bag is emptied into a receiving hopper, from which the product goes into the silo or straight into the line. The hopper has a spherical bottom, is made of stainless steel and has an impact grid for the bags, a protective lid, an electric vibrator with adjustable eccentrics and a rotary valve; the legs stand on anti-vibration mounts. A typical hopper holds 200 l, and the largest version up to 700 kg of product. The dust is drawn off by a self-cleaning filter with a 1 m² antistatic sleeve and a 1.1 kW fan.

— with a rotary airlock feeder and a compressor — the product is blown into the silo under pressure;
— with a flexible screw — mechanical feeding into the silo;
— with a vibrating bottom and a flexible rubber sleeve — feeding under vacuum.



Bag tipper with a rotary valve and a compressor — photo from the supplier

tel. +38 044 225 93 72 · +38 067 566 0 566
kyuri@ec-cibo.kiev.ua · www.ect.kiev.ua
27 Vadyma Hetmana St., Kyiv, 03056, Ukraine

Pneumatic conveying

Parameter	Value
Method	pressure or vacuum — chosen according to the distance and the required throughput
Line throughput	in the projects delivered: 1000 · 1600 · 2000 · 2700 kg/h over distances from 20 to 95 m
Compressor	centrifugal, in an ATEX zone 22 version: three-phase motor of 4 · 7.5 · 11 or 15 kW depending on the line, air filter, pressure gauge, pressure switch, silencer, frame on anti-vibration mounts
Feeder	DSA-AX 200 through-flow rotary valve: cast iron body and rotor, 0.55 kW geared motor, protective casing
Pipes	AISI 304 stainless steel, Ø 60 · 80 · 89 · 101 · 114 · 129 mm depending on the section; large-radius 90° bends, couplings and wall brackets
Flow diverting	VD 100 valve of cast aluminium: double-acting pneumatic actuator, 5-way solenoid valve, two limit switches, food-grade seals
Maximum distances	up to 40–50 m from the loading pipes to the silo; up to 80–90 m from the store to the point of use

Sifting and metal detection

Unit	Data
Sifter in the pneumatic line	VIBRO V 601M (Ø 600 mm) or V 801M (Ø 800 mm): stainless steel, stainless steel screen, electric vibrator, quick-opening inspection hatch on top, painted steel frame, ATEX 22 version
Stand-alone sifters	B 15A — 1.5 t/h · B 25A — 2.5 t/h · B 30AC — 3 t/h · B 25 — 3.5 t/h · B 40AC — 4 t/h · B 40 — 5 t/h; 0.55 kW drive
Metal detection	magnetic separator in a Ø 89 mm pipe: four permanent magnets that intercept metal particles in the flow



Sifter in the pneumatic line — photo from the supplier

tel. +38 044 225 93 72 · +38 067 566 0 566
kyuri@ec-cibo.kiev.ua · www.ect.kiev.ua
27 Vadyma Hetmana St., Kyiv, 03056, Ukraine

Weighing the silos

Each silo stands on four load cells; the signal goes to an SA 01 microprocessor in a sealed housing with a polycarbonate front panel and a function keyboard. The instrument shows the instantaneous weight, has an automatic tare and maximum and minimum level thresholds and a digital data output; a device protecting against overturning is provided. A program for the customer's computer keeps a record of the weight in the silo, of the batches and of the daily consumption.

Dosing into the dough mixers

Unit	Data
LG 39 electronic scales	dosing of 5 components by weight or by pulses · memory for 99 recipes · accounting of silo stock and consumption · automatic and manual tare · dosing in percent · intermediate discharges · access by code · RS 232 for a printer, RS 422/485 for data transfer · data retention on power failure · IP55 enclosure to ATEX
Weighing hoppers	the TS 50 · TS 100 · TS 150 · TS 200 · TS 300 range, where the figure is the weighing limit, and the TSF 100 · TSF 200 · TSF 250 · TSF 300 range; AISI 304 stainless steel
Filter on the hopper	self-cleaning bag filter of 5 m² (up to 11 m² on the cyclone): antistatic fabric sleeves, compressed air receiver with a regulator, 3/4" solenoid valves, cyclic counter-pressure blowing unit, inspection hatch
Discharge	Ø 250 mm gate with an ATEX electro-pneumatic actuator; tubular screws Ø 219 mm, 1.5 and 4 m long, of stainless steel, geared motor with an inverter
Vibrators	electric, with eccentric masses and adjustable intensity: 0.18 kW on the weighing hopper, 0.45 kW on the silo vibrating bottom
Silo vibrating bottoms	spherical stainless steel bottom with an internal counter-cone for even discharge; the FV 400 … FV 2500 range, Ø 600 and Ø 800 mm in the projects delivered



Weighing hopper discharging into the bowl of a dough mixer — photo from the supplier

tel. +38 044 225 93 72 · +38 067 566 0 566
kyuri@ec-cibo.kiev.ua · www.ect.kiev.ua
27 Vadyma Hetmana St., Kyiv, 03056, Ukraine

Automation

— an industrial-grade PLC: no moving mechanical parts, resistant to electrical interference and to extreme temperatures;
— analogue values — the weight in the silos and the volumes of liquids — are digitised right at the sensor and transmitted over a field bus, so the accuracy does not depend on the size of the installation;
— IP55 control cabinet of RAL 7035 steel sheet, cable entry from below, main circuit breaker with a breaking capacity of at least 25 kA, supply 400 V 50 Hz ±5 %;
— a 10-inch colour touch operator panel with an animated mimic diagram of the plant: selection of automatic cycles, recipe editing, alarm acknowledgement, entry of constants, monitoring of the consumption of dosed products, manual control of the units for fault finding;
— an alarm gives an audible signal outside the cabinet with an acknowledgement button and a detailed description on the operator panel;
— Tosibox in the cabinet — automatic remote access for the Agriflex service department to the PLC;
— design, manufacture and testing of both the hardware and the software are carried out by Agriflex itself, with a check on a simulator before shipment.

Standards and certification

The equipment is supplied with a declaration of conformity and CE marking: Directive 2006/42/EC (machinery), 2014/30/EC (electromagnetic compatibility), 2014/34/EC (ATEX) — with the rupture elements calculated to VDI 3673, IEC EN 60204-1 (electrical equipment), EU Regulation 1935/2004 (suitability for contact with food).

Examples of silos delivered

Capacity	Dimensions and project
33 m³ ≈ 20 t	base 3100 × 3100 mm, height 5700 mm — four silos, four dough mixers, 2020
42 m³ ≈ 25 t	base 3620 × 3620 mm, height 5000 mm, room from 5300 mm — a fourth silo added to a working system, 2009
50 m³ ≈ 30 t	base 3620 × 3620 mm, height 6000 mm, room 6500–7000 mm — two intake silos plus a delivery silo, 2007

Supply and service

Delivery, installation and commissioning, staff training, a 12-month warranty, post-warranty service and spare parts. Not included in the supply: building work, electrical and pneumatic services inside the workshop, earthing, lifting equipment for unloading and erection, voltage stabilisers and the raw material for the tests.

The data are indicative; the manufacturer reserves the right to change them without notice. The composition and the capacity of the system are determined at the design stage for the customer’s production.