# **PRODUCT CATALOGUE**



# SILOS

360 DEGREE SOLUTIONS FOR YOUR STORAGE #EVERYWHEREINTHEWORLD





Kimstad (Sweden)

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# **01** ABOUT SIMEZA

SIMEZA has been manufacturing storage silos for cereals, flour, and other industrial products for more than 45 years. It is one of the pioneering companies in Europe with proven experience in the design, production, and installation of corrugated steel sheet silos for industrial, agricultural and livestock uses.

The storage of grain in cylindrical silos made of corrugated steel sheet guarantees perfect conservation and, together with the specific accessories in our catalogue, also excellent ventilation, and management of the stored material, greatly reducing the factors that degrade or reduce the quality of the grain. SIMEZA silos are designed in a modular way, which means that they can be assembled quickly and easily; in addition, the high-quality standards present in the materials used in their construction make them highly resistant in all types of environments, guaranteeing the long-lasting preservation of all types of grain.

THE 360° SOLUTION FOR YOUR STORAGE is the great value proposal that we have been implementing since 1975. The extensive experience and in-depth knowledge of our team, combined with the quality of raw materials and a desire for constant improvement, make up the DNA of our company, and providing global solutions to our customers is our daily inspiration.

The market is the investor's benchmark, and the steel silo market is always moving towards higher technical specification, larger dimensions, more reliable performance, shorter delivery time and extreme product flexibility regarding customer requirements.

SIMEZA is immersed in a determined process of expansion, with the clear objective of transforming the former family business into a company focused on the international market, able to offer its product and services to customers all over the world.

Thanks to the close collaboration with world leading companies in the field of storage, processing and distribution of grains and seeds, SIMEZA is positioned as one of the companies with the greatest capacity for growth in the near future.

SIMEZA is aimed at companies involved in export and import activities and investors in large grain terminals (inland or port) in the context of international trade.

The scope and operation of these terminals, together with the experience of these inverters, are requiring silos with much more stringent specifications than those of agricultural plants, and a size and design concept that allows high performance, reliability, and easy operation of the installation.

This type of investor is one of SIMEZA's new customer profiles, which is why the company has been investing for years in new human resources, mainly of a technical and commercial profile, in order to correctly satisfy all their needs.

Today, we can find installations produced by SIMEZA in dozens of countries, throughout the five continents (Africa, the Middle East, Russia, South America, Eastern Europe, and East Asia), among many other territories.



"The experience demonstrated over the years together with a strong commitment to excellence, make SIMEZA silos synonymous with a quality product and today our team and our customers can be proud to show our work all over the world"



#### **02** SIMEZA COMMITMENT

At SIMEZA we are firmly committed to quality and innovation in the manufacture of all our silos, tanks, and accessories. Likewise, and as it could not be otherwise, we fulfil and demand that our suppliers comply with every one of the quality and safety protocols described in the current European Union regulations.

SIMEZA silos are designed in a modular way, which facilitates their assembly. All this, combined with the quality of the materials used in production, and a professional team with wide experience, allows SIMEZA to design, produce and install customised solutions anywhere in the world. These structures are highly resistant in all types of environments, ensuring the preservation of all types of grain for long periods of time.

Our Technical Department has a team of specialised engineers who oversee each project, working side by side with the client, offering personalised attention and supervision of the project, from design to production and installation.

All our structures are designed in accordance with American ASAE/ANSI or European EUROCODE standards to withstand the stress caused by continuous use, extreme temperatures, high winds, heavy snowfall, and seismic loads. In this context, SIMEZA has developed a new concept of silo statics under seismic loads to meet the significant increase in the structural coefficient required in many countries.

In addition, new statics has been developed in accordance with the new roof design, using the 3D FEM method for the different snow and wind loads, and a comprehensive database is now available to react in real time to each individual query.

The size and design of the roof support beams have been optimised to suit the different snow and wind loads, but also to allow for easy packing, transport, and assembly, even for large silos.

Our silos are manufactured using state-of-the-art technology, and SIMEZA does not hesitate to opt for the highest quality when selecting raw materials. The steel we usually use for the plates for the cylinder body is S450GD quality, with a high capacity for static resistance. We also choose the same quality (S450GD) for reinforcements and roofs, providing greater rigidity to the assembly. All our steel plates are galvanised in Z600 quality, offering greater resistance to corrosion and with the possibility of being painted at the customer's request.











#### **03** OUR CAPABILITIES

#### New production line

SIMEZA has made important investments in the last few years in the production lines of its workshops, highlighting:

- **01.** The improvement of the corrugated sheet roll-forming line and vertical reinforcement of the silos, increasing its roll-forming speed, thickness and traction of the steel, and the automatic operation and control of the dimensions of each element individually.
- **02.** The installation of a new flattening and continuous cutting line that allows the company to purchase all the steel only in coil with the same zinc finish and steel quality for all the components. This allows the company greater autonomy, while reducing the intermediaries needed in the internal manufacturing processes, shortening delivery times.
- **03.** The installation of a fully automatic punching and cutting line for bended components, coupled, and integrated with a robotised bending line.
- **04.** The complete automation of the punching and cutting line for roof panels, integrated with the bending line.

With the implementation of this new technology, SIMEZA is now able to guarantee the production of more than 1,500 t of silo steel components per month.

# **Expansion of the factory**

In addition to this, and in order to guarantee a return on these investments, the facility was expanded by integrating three adjacent modules and refurbishing and extending the offices.

#### New packaging and logistics

To eliminate the risks of prolonged outdoor storage of the products delivered to the destination, prior to assembly, the packaging method is done with thin steel sheets, without paper or plastic, for each individual pallet.

To meet with shipment, either by truck or container, the packaging concept is reviewed, using a smaller weight and dimension of the individual pallet, thereby allowing the loading, and unloading operation by forklift or crane.

To facilitate the loading of containers, the factory is equipped with 2 hydraulic platforms, and for the fast loading of trucks, SIMEZA has 2 independent shipping rooms, being able to load simultaneously up to 2 trucks and 2 containers.

#### **New ERP**

SIMEZA has invested a lot of effort in improving the company's management system. The new ERP is already in operation for the commercial, administrative, and technical departments, and is in an advanced process of installation for the control of individual manufacturing costs, material stock, as well as for the control and continuous improvement of manufacturing. This system requires continuous updates and improvements, and in this sense, the IT department includes a team of engineers dedicated exclusively to its implementation and control.









# SILO COMPONENTS (I)

#### Roof

30° inclination to optimise the silo's storage capacity.

Sheets manufactured from high-strength steel S-450GD or higher, Z-600 (01).

Self-supporting roofs for silos up to 10 m in diameter. For larger diameters they are equipped with a separate support structure.

The roof sections are assembled with galvanised bolts and nuts to guarantee watertightness (02).

It is equipped with a variable inlet flange (03), static ventilation nozzles to evacuate the air inside the silo (04), and an inspection hatch located in the eave for the visual control of the product, the collection of samples and the maintenance of the max level indicator (05).

This access is equipped with a resting platform, which can be reached by a vertical ladder installed on the silo wall from ground level, or by a vertical connecting ladder from the upper catwalk (06).

#### Cylinder

The wall rings are manufactured from high-strength steel and hot-dip galvanised Z-600 according to the Sendzimir process. They can be supplied painted on request.

The plate has a wave pitch of 104 mm and a depth of 12 mm, which reduces grain friction and avoids any residues of stored material (07).

The rings of the silo body are assembled with 2, 3 or 4 rows of bolts, depending on the thickness of the sheet metal and the loads exerted on the silo (08).

The vertical reinforcements are made with sections and joints in standard Omega profile or in reinforced Omega profile with greater width (09).

The base plate is adjusted with double anchoring (mechanical or chemical), or using support shims to compensate the tolerance of the foundation (10).

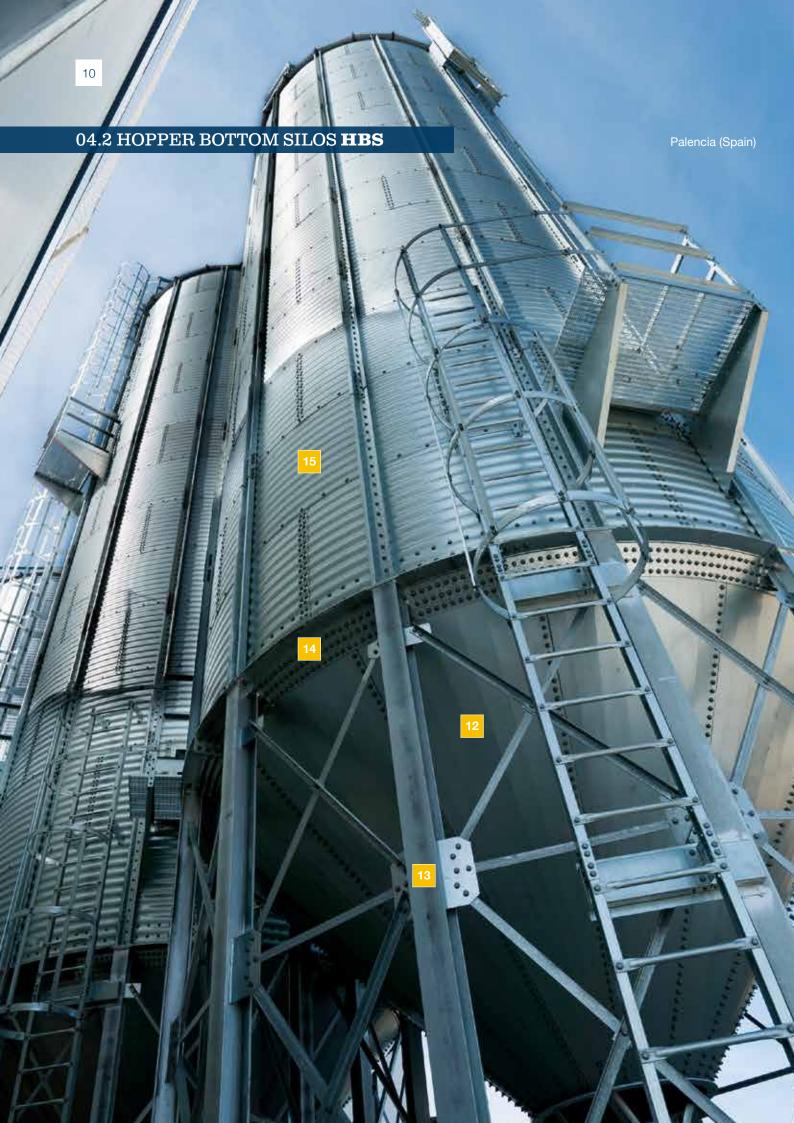
Wind rings are installed (if necessary), according to the static calculation (11).











# SILO COMPONENTS (II)

#### **Hopper**

Manufactured with an inclination of 45° or 60° with a standard outlet opening of 400 mm and ground clearance from 750 to 1400 mm (12).

#### Supporting structure

- **A)** Metal supporting structure (for diameters from 3,1 to 12,20 metres) (13).
- **B)** Supporting structure made of S-450GD steel and hot-dip galvanised, which allows the installation of wide machinery under the hopper. Compression ring (14) connecting cylinder and cone fully optimised in S-450GD steel and hot-dip galvanised.
- **C)** Cylinder wall reinforced with special metal ring, at the intersection of the cylinder with the hopper and the metal structure (15).
- **D)** Possibility to assemble anywhere in the world.

#### Inspection doors

The Flat Bottom Silos (FBS) are equipped with a side access door on the second ring with double hinges and built-in hot dipped galvanised steel frame. This door is designed according to a safety concept that only allows it to be opened in case the product level is below its position (16).

The doors installed on SIMEZA silos allow, among other things, easy access into the silo, the final cleaning of the silo and aeration channels and the control and maintenance of the sweep auger.

An additional side door with the same characteristics can be installed at the height of the natural slope or according to the customer's needs (17).

The Hopper Bottom Silos (HBS) are equipped with an access door in the cone which can be reached by a mobile ladder or directly from ground level (18).











# SILO COMPONENTS (III)

## Supporting structure (skirted solution)

- **A)** Self-supporting inner hopper (diameters up to 5.30 metres) (19).
- **B)** Inner hopper with supporting structure (diameters from 6,10 to 12,20 metres) (20).
- **C)** Inner hopper and support structure made of S-450GD steel, hidden by the silo wall itself (20).
- **D)** Extended corrugated walls of the silo itself, reinforced at the bottom (21).
- **E)** Quick assembly, without crane, the silo is lifted like a flat bottom silo, by means of jackings.

#### **Screws**

The cylinder sheets are assembled with high strength bolts 8.8 or 10.9, hot-dip galvanised bolt and nut, and with 2 or 3 rows of bolts, depending on the thickness of the sheet metal and the loads acting on the silo (22).

# INNOVATIONS AND ADVANTAGES OF THE SIMEZA HBS-S

- **01** Simplified statics and therefore more reliable.
- **02** Simpler foundation, concrete plate instead of ring foundation.
- 03 No need of crane or formwork.
- **04** Assembly always from the ground.
- 05 Space available under the silo.
- **06** Electrical equipment installed in an enclosed space.











# SILO COMPONENTS (IV)

#### Structure for TLS silos

The HOPPER BOTTOM grain storage silos with truck unloading platform have several differential elements that make them unique and efficient in the storage and delivery of bulk material:

- **A)** HOPPER BOTTOM DESIGN: Helps ensure complete product discharge and prevents material from being left at the base of the silo, which reduces waste and increases efficiency (23). SIMEZA TLS silos can incorporate a manual/hydraulic or electric gate to regulate the grain outlet much more efficiently (24).
- **B)** Support structure: Allows direct unloading of the product onto the truck, which reduces waiting time and increases efficiency in loading and unloading the material. The unloading platforms of SIMEZA TLS silos are designed for the passage of trucks, trains or conveying equipment underneath them (25).
- **C)** Inspection platform. SIMEZA TLS silos are equipped with a series of platforms at different heights allowing continuous supervision of the silo discharge flange, these being easily accessible by step ladders, so that the task of monitoring and controlling the discharge can be carried out in complete safety (26).
- **D)** For non-gravitational products or products that are difficult to discharge, there is the possibility of installing a vibrating system, double screw, or fluidisation of the silo to guarantee correct emptying of it.

These silos can be customised with a wide variety of options, such as extra stairs, coverage of the unloading surface (as protection from rain), walkways over the silo, and temperature and humidity monitoring and control systems (27).











#### FARM SILOS COMPONENTS

#### Roof

Constructed by polygonal sectors of flat sheet metal, punched, beaded, and shaped for assembly, the angle of inclination is 40° to maximise the storage capacity of the feed (28).

#### Cylinder

Made of corrugated sheet metal modules, punched and shaped for assembly, they have an important detail: the wave is 104 mm (step) x 12 mm (depth), favouring the evacuation of the feed through the silo wall (29).

#### Cone

Made of polygonal sectors of smooth sheet metal, punched, beaded, and shaped for assembly, there are two models, one with a central drop with an angle of inclination of 62° (SGC) and the other with a lateral drop with two angles, one of 43° and the other of 80° (SGL) (30).

#### Connections

They are made by means of galvanised bolts and screws, flat washers, neoprene washer, nut, and butyl mastic in all joints (31).

#### Legs

Made of galvanised omega type profiles, joined together by galvanised bracing, and anchored by a base plate (32).

#### **Accessories**

Filling hatch

Vertical cylinder ladder for roof access

Initial ladder

Mixed outlet flange for central discharge silo

Outlet flange for side discharge silo

Side drop pipe

Metal handle for top hatch opening

#### Complements

Roof ladder for access to the hatch

Guillotine slide

Screw extraction hopper

Guillotine slide between outlet and screw hopper

Emergency exit in cone

Hopper cleaning door

Ventilation dome on roof

Methacrylate viewer

Pneumatic loading and decompression pipe



## TANK COMPONENTS

#### **PVC** roof

Made of a PVC anti-algae layer with its respective supports and fastening ties, according to the diameter of the tank.

#### Metal roof

Constructed by polygonal sectors of flat sheet metal, punched, and shaped for assembly, with an angle of 30° and provided with a central dome to join the sectors with a closing cover. In larger diameters it has a galvanised inner structure (33).

#### Cylinder

Constructed of high strength corrugated sheet steel modules, punched and shaped for assembly, the wave is 104 mm (step) x 12 mm (depth) (34).

#### Connections

By galvanised bolts and nuts consisting of bolt, flat washers, neoprene washer, nut, and special mastic at all joints (35).

#### **Treatment**

The tank is treated internally with waterproofing products and paints, according to the type of application and/or use of the tank.

# **Anchoring**

The cylinder is embedded in the foundation, according to the details of each model (36).

#### **Accessories**

Roofs

Roof inspection hatch

External and internal vertical cylinder ladder

Inspection hatch access platform

Manhole

Filling by float-operated control valve DN\*

Emptying by flange DN\*

Water drains

#### Other accessories

Filling with DN\* flange

Return with DN\* flange

Overflow with DN\* flange

Suction drain with internal elbow, anti-vortex plate and with DN\* flange

Manometric level indicator with reading in m.w.p.

\*The DN data depends on the customer's installation design (DN 80, DN 100, DN 150, DN 200, etc.).

# ACCESORIES



#### SILO ACCESORIES

A silo as such is not an independent section of a plant, whether it is for agricultural or industrial use. It is a component that must be equipped with various accessories in order to become a section of the plant and therefore allow a complete and safe functionality of the installation.

The SIMEZA catalogue includes an extensive list of accessories (in compliance with international safety standards), which can be selected according to the size, scope, or purpose of the installation.



The silo filling must guarantee safe access to the roof and the inspection window in order to control the stored material, therefore each installation must be equipped with ladders and stairs that allow easy and safe access to the conveyor bridge or inspection platforms.

SIMEZA manufactures a wide range including:

- **A)** Ladder equipped with steps and safety handrail on both sides. Designed and installed as the main access to the entire conveyor system.
- **B)** Ladder equipped with safety cage and resting platforms, which attaches to the silo wall or conveyor walkway supports. It is installed for occasional use or as an emergency exit.
- **C)** Spiral ladder which is supported directly on the silo wall allowing easy access to the eave of the silo, but not to the walkway and conveyors.

#### (02) Platforms

Made of steel, they are installed for product inspection or as resting places along the stairs/stairs to comply with safety standards.

#### (03) Catwalks, mechanisation, and maintenance

SIMEZA manufactures two ranges of catwalks for machining and conveyors, made of S-450GD steel, galvanised Z-600, in widths from 1,200 mm to 3,000 mm, and equipped with handrails on both sides and a grating floor.

They are designed to support the weight of the structure, mechanisation, product and/or additional loads due to maintenance, wind, or snow.

All models are equipped with widened platforms near the motors and conveyor drive unit, allowing adequate space for maintenance of the conveyor.









#### **05** ACCESORIES









For capacities up to 600 t/h, the catwalks are modular with open type frames, while for high capacity and heavy-duty conveyor systems, they are modular and lattice framed.

#### (04) Level indicator

The control of the upper level of the stored mass allows an efficient operation of the silo control system. The max level detector is a standard accessory for all silos, while the min level detector is standard for HOPPER BOTTOM silos.

There are several types of level detectors, membrane, rotary or capacitive. All of them meet ATEX 21 zone requirements. There are also others that can be installed on request to always monitor the level of the stored mass.

#### (05) Temperature control

To avoid deterioration of the stored product, the silos can be equipped with a temperature control system, which includes a set of probes suspended from the roof, equipped with sensors that monitor the entire mass of the stored product, as well as software that operates and controls the entire plant, which can be installed on any computer, laptop, or tablet of the operator.

This software allows the configuration of the temperature alarm for the entire system, and even for each sensor individually, the programming of the monitoring time, the configuration of an alarm for excess temperature to allow a quick reaction and prevent the possible deterioration of the grain, and/or the possibility of the automatic launch of the fans from a smart device or tablet from anywhere.

#### (06) Roof aeration domes

To compensate for the volume of incoming product, the silo roofs must be fitted with aeration domes to allow air to be expelled during the filling process. The same flow, but in reverse, is also required when emptying the silo.

The aeration system includes the supply of aeration domes (even additional), which allow a homogeneous exhaust of the incoming air without creating any negative pressure.

# (07) Exhaust fan

The exhaust air from the internal stored material, as a result of ventilation, is usually warm and humid, and may condense on contact with the lower and inner part of the roof, which is normally at a low temperature. The water resulting from this condensation can fall along the sloping roof and affect the upper part of the stored product on the periphery of the silo.

To prevent this SIMEZA has roof exhaust fans to create an accelerated flow of air along the underside and inner part of the silo roof, inhibiting any condensation.

#### (08) Floor fans

After studying the installation (air flow, required pressure, type of grain, environmental conditions, volume, and dimensions), the necessary fan will be determined, which may be medium or high pressure.

#### (09) Sweep Augers

Flat Bottom Silos cannot be completely emptied by gravity. For this residual product, sweep augers are installed at the base of the foundation that allow the radial dragging of the product towards the central outlet.

#### (10) Gravity side discharge

The silos can be equipped with elements installed on the inside wall, which allow the lateral discharge (by gravity) of a large part of the product into trucks.

# (11) Grain velocity reducer

In some processes, the seed cannot contain damaged/broken grain, as this would affect germination. To avoid the impact of the grain against the bottom of the silo, or against the stored grain, the silo can be equipped with a fall velocity reducer, which is installed along the inner wall, and which prevents breakage and helps the grain to reach its final destination, smoothly.

#### (12) Perimeter handrail and roof ladders

Its function is to increase safety in roof maintenance tasks, and to facilitate easy access to the centre of the roof in the silo, from a platform located in the eave.

#### (13) Fumigation roof

Designed for the placement of roof extractors, designed for proper air circulation inside the silo, in fumigation processes.

#### (14) Cylinder and/or roof insulation

SIMEZA has a silo insulation system suitable for products that easily change their chemical composition, such as processed rice or white maize, or for countries with particularly hot climates.

## (15) Pre-lacquered option

At SIMEZA we offer the option of customising the colour of the silo roofs with a corporate colour.











Huesca (Spain



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## **07** FUTURE AND SUSTAINABILITY

Grain storage silos are a key part of the food of the future. With the growing global demand for food, the need for safe and efficient grain storage is becoming increasingly important. In addition, efficiency in production and storage will have a significant impact on the global economy, as food prices can be affected by supply and demand.

SIMEZA silos and accessories can protect the stored product from plagues, contamination and other external agents. In addition, grain processing technology can help to contribute to the reduction of greenhouse gas emissions and the conservation of natural resources by enabling greater efficiency and sustainability in food production.

In summary, the relationship between grain storage silos and the food of the future lies in the need to meet the needs of a growing world population and to deal with the approaching environmental challenges of food production.







# TORNUM®

SIMEZA is one of the pioneering companies in Europe in the design, production, and installation of corrugated steel sheet silos for industrial, agricultural and livestock uses.

SIMEZA silos have a modular design, which facilitates their assembly. In addition, the high-quality standards of the materials used in their construction make them highly resistant to all types of environments, guaranteeing the long-lasting conservation of all types of grains.

\*SIMEZA silos have a storage capacity of 8 to 25,000 m3

# 360 DEGREE SOLUTIONS FOR YOUR STORAGE

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