SYMAGA

# industrial silos

www.symaga.com

# INDEX

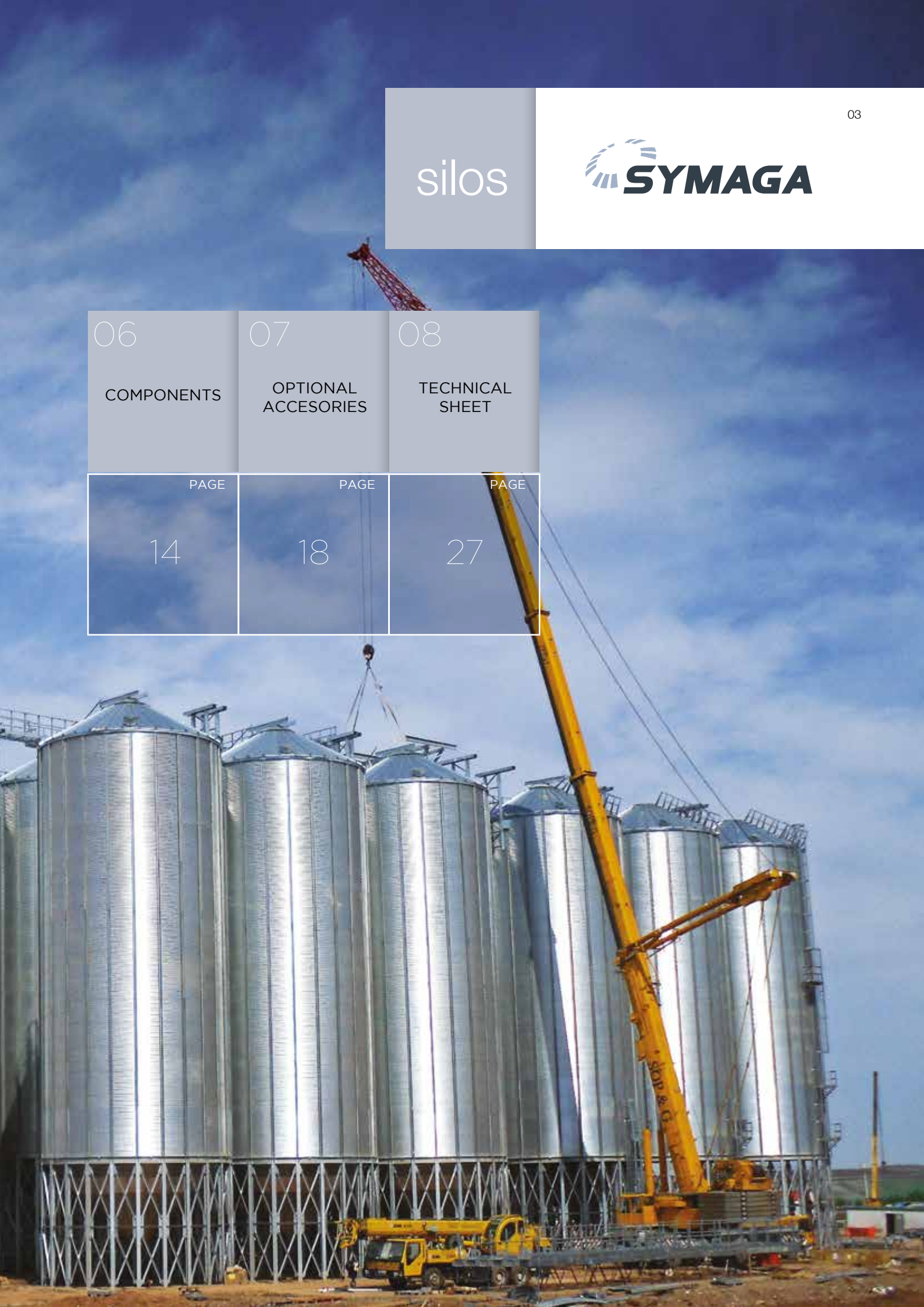


RUSSIA, 58.244 m³

# silos

SYMAGA





# 01

## KEY FACTS

Symaga is a Spanish company specialized in designing, manufacturing and marketing galvanized steel silos for the storage of seeds, grains, malt, oilseeds, pellets, rice, and, in general, agriculture, agroindustry, bio-fuels and biomass.


*EXPERIENCE OF*

40

YEARS

Backed by an experience of 40 years and 55 million m³ of storage capacity built worldwide, Symaga ensures the optimal execution of any project. We have performed projects in more than 150 countries**.**

*CONSTRUCTED STORAGE*

55

M m3

*SUSTAINABLE PRODUCTION*

SGA

MES

*WORLD LEADERS*

*RELIABILITY AND QUALITY*

Our factory is fully atomated, equipped with state of art technology following the standards of the Industry 4.0 Technology guideline. 30 robots performing different tasks, owning a CE Manufacturing Certificate since 2013, together with our MES and SGA computer systems which allow a more accurate control and management of both our raw material and finished product inventory.

We are committed to the environment by putting in place sustainable manufacturing plans . A photovoltaic solar enegy plant covers 70% of our electric consumption. Our waste disposal management aims at preserving our resources.

Our products are well known for their durability and easy-assembly. Silos are manufactured in ondulated galvanized steel. Raw material used in the process is certifiied with European Origin, wih the maximum quality.

references in more than 150 countries


## R & D

Symaga has constantly invested in R & D. This innovating work is developed in conjunction with clients and suppliers, thereby improving our products and services and thus giving better value and eficiency to our customers.

*MORE THAN*

## 150

EMPLOYEES

Our Technical and Engineering Department, and After-sales Service Department, are always available for our customers: since the initial layout conguration until the assembly nalization. Moreover, our multi-lingual Commercial Department facilitates communication.

*MORE THAN*

## 12.000 T

OF GALVANIZED STEEL IN STOCK

Symaga features more than **12.000 tons of galvanized steel of average standing stock**, giving us the ability to deliver on the agreed date.

# 02 GENERAL HISTORY


Symaga was founded in 1985 by Alfonso Garrido Muñoz, basing the business in manufacturing and marketing of farm silos and livestock equipment.

Symaga began in the heart of La Mancha, in Villarta de San Juan, in a small craft of 200 metres. Nowadays Symaga has a factory located on a plot of 400.000 sqm of land with **100.000 sqm of buildings**.

**More than 90% export rate.**

Symaga international presence has an exponential growth year after year. We are currently present in over **150 countries worldwide**.

BUILDINGS:
100.000 m²

1985
200 sqm
CRAFT:
2017


3
PRODUCT LINES

SYMAGA
RELIABLE STORAGE

- INDUSTRIAL SILOS
- WATER TANKS
- FEED SILOS

founded in 1985

# quality commitment

ROMANIA, 49.705 m³


Our products are recognized worldwide for their strength, durability, reliability and easy assembly. Silos are made of galvanized corrugated steel, with **a Z600 and ZM310 on the roof**, ensuring **a double service life more than other suppliers**. All used material raw are certied and of the highest quality.

We also have a growing line of accessories and options allowing us to offer a product that completely meets your needs.

Our commitment to quality is not limited to the product, but to a technical and commercial service.

03

EXPERIENCE, RELIABILITY AND QUALITY

# capacity of production

Our SGA and MES Systems powered by inteligent digital technology allow a more efficient control of our raw material and finished product warehouse, leading to an increase on efficiency and productivity.

SGA optimizes the raw material reception, order picking, and the loading processes. MES automates the quality control and improves production management.

Quality control procedures, conducted from material reception through every phase of the manufacturing process, ensure that we maintain the highest quality standards right up to delivery.

# SYMAGA team

We are a family owned company with a close relationship with our colleagues.
We promote professional development through training and an internal promotion process which increases the commitment with the project. As pioneers in safety and occupational risk prevention in the industry, we have been certified under ISO 45001 since 2018.

We strengthen our team spirit through interdepartmental meetings that underline the importance of human resources as one of the company's main assets.


# 04 MAIN REFERENCES

*REFERENCES IN MORE THAN*

150

COUNTRIES

**GERMANY** 12.248 m³

**GERMANY** 126.735 m³

**SPAIN** 69.954 m³

**SPAIN** 20.241 m³

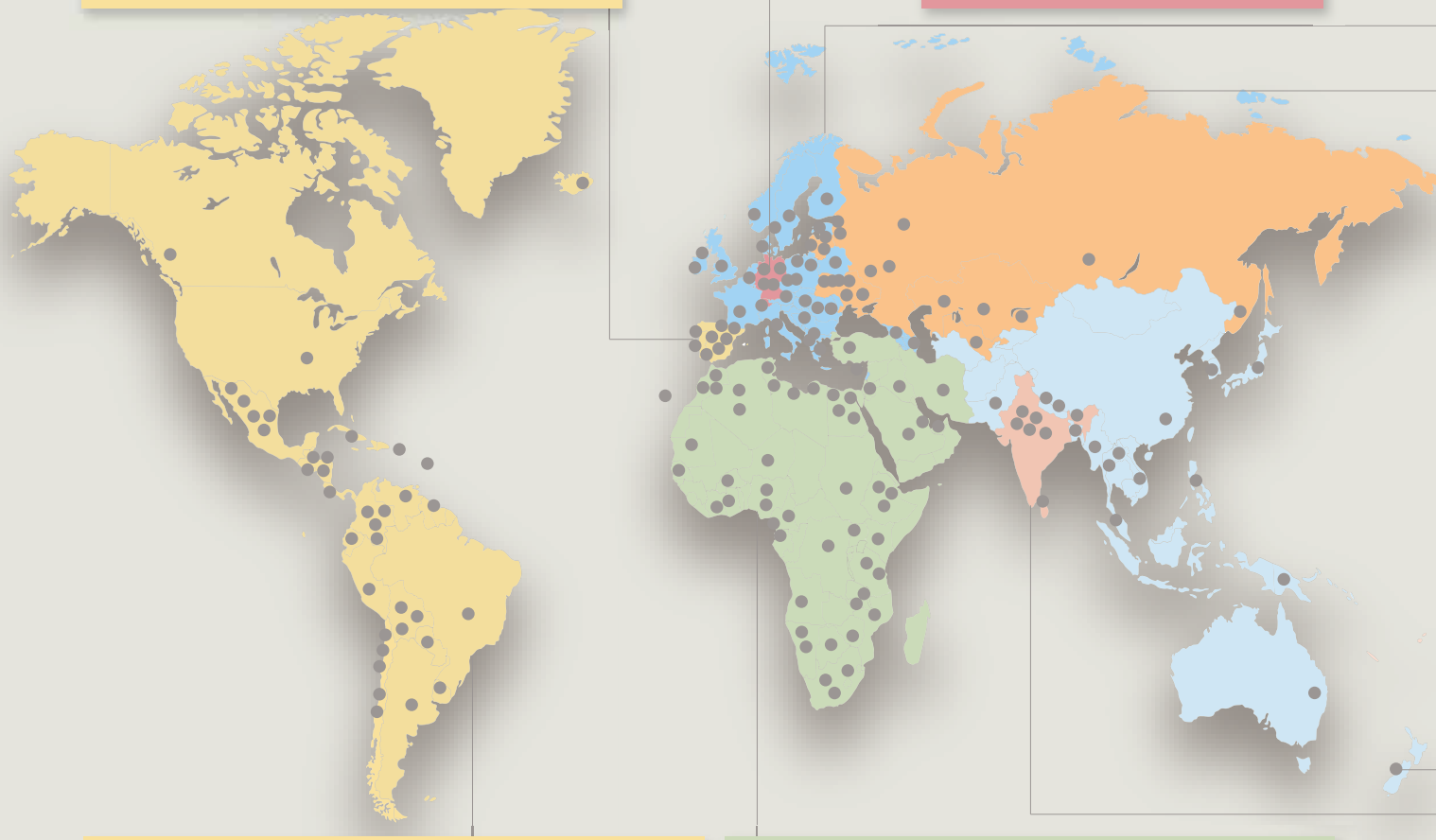
**SPAIN** 27.370 m³

**SWITZERLAND** 2.049 m³

**GERMANY** 23.696 m³

LATIN AMERICA , SPAIN & PORTUGAL

GERMANY, AUSTRIA & SWITZERLAND



LATIN AMERICA , SPAIN & PORTUGAL

AFRICA & MIDDLE EAST

**MEXICO** 7.960 m³

**MEXICO** 9.683 m³

**BOLIVIA** 18.004 m³

**SOUTH AFRICA** 1.232 m³

**ETHIOPIA** 28.109 m³

**EGYPTO** 38.526 m³

**COLOMBIA** 28.965 m³

**CHILE** 52.316 m³

**URUGUAY** 35.643 m³

**ARGENTINA** 26.382 m³

**IRAN** 30.618 m³

**LIBYA** 9.672 m³

**SAUDI ARABIA** 77.172 m³

**HUNGARY** 3.343 m³

**NORWAY** 11.529 m³

**CZECH REP.** 15.128 m³

**ROMANIA** 150.608 m³

**SERBIA** 12.728 m³

**SWEDEN** 13.497 m³

**GREECE** 33.600 m³

**CYPRUS** 1.110 m³

**ITALY** 24.549 m³

EUROPE

CIS COUNTRIES

**RUSSIA** 58.244 m³

**RUSSIA** 78.977 m³

**RUSSIA** 13.616 m³

**RUSSIA** 9.917 m³

**RUSSIA** 28.878 m³

**LATVIA** 79.168 m³

**RUSSIA** 139.778 m³

**RUSSIA** 55.975 m³

**RUSSIA** 25.100 m³

**KAZAJSTAN** 65.890 m³

**UZBEKISTAN** 1.689 m³

**UKRAINE** 704.887 m³

**UKRAINE** 126.290 m³

**UKRAINE** 212.220 m³

KAZAJSTAN 65.890 m³

**UKRAINE** 12.880 m³

**UKRAINE** 316.386 m³

**LITHUANIA** 39.096 m³

INDIA, NEPAL & SRI LANKA

ASIA & OCEANIA

**INDIA** 15.870 m³

**INDIA** 57.402 m³

**INDONESIA** 101.900 m³

**PHILIPPINES** 28.688 m³

**MALAYSIA** 7.960 m³

**NEW ZEALAND** 1.925 m³

**NEPAL** 6.426 m³

**SRI LANKA** 6.952 m³

**KOREA** 12.945 m³

**THAILAND** 55.004 m³

**AUSTRALIA** 224 m³

**VIETNAM** 5.888 m³

05

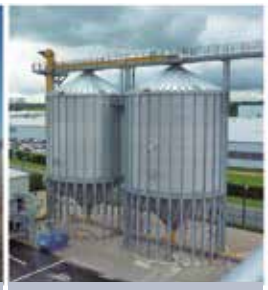
# SYMAGA SILOS

The versatility of our products makes them available for **different industries** such as breweries, animal feed, port facilities, our mills, ethanol, drying, our mills, and storage of raw materials for the plastic industry and biofuels.

The growing product line allows us to offer a storage system that fully meets the needs of our customers by offering silos from **5 m³ to 25,000 m³ capacity**.

Symaga offers a wide range of silos that can be classied into the following types:

**FLAT BOTTOM SILOS (OR WITH CONICAL CONCRETE FOUNDATION)** FOR LONG TERM STORAGE OF LARGE QUANTITIES OF GRAIN, SEEDS...



**SILOS WITH LOWER STEEL HOPPER, WITH 45° OR 60° DEGREES** DEPENDING ON THE FLOWING OF THE PRODUCT STORED. DISCHARGE BY GRAVITY

**HOPPER SILOS FOR ELEVATED STRUCTURE,** UNLOADING TO TRUCK OR TRAIN

**INDOOR SILOS** DIAMETERS FROM 4.60 TO 12.23M, MAXIMUM HEIGHT 11.45M

**MASS DISCHARGE SILOS**

**SMALL CAPACITY FEED SILOS SUITABLE FOR LIVESTOCK**

GERMANY, 23.696 m³

GREECE, 33.600 m³

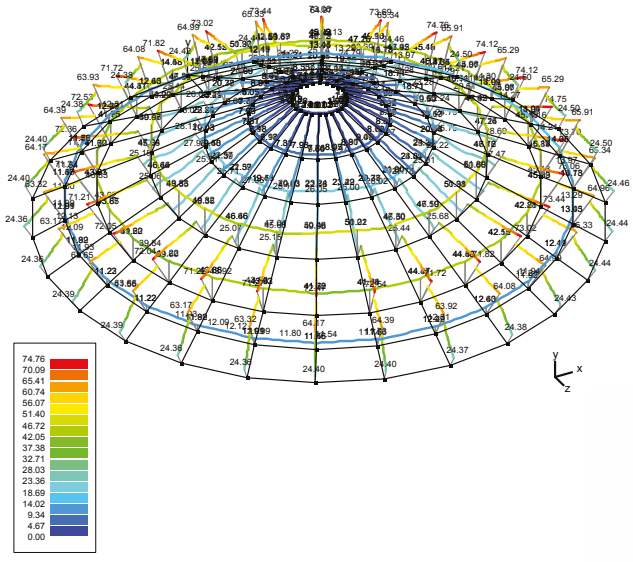
06

# COMPONENTS


## COVERING ROOF

GALVANIZATION
ZM 310

- **30º degrees roof** to optimize storing capacity, and adapted to the natural slope of the grain.
- **Supplied with or without structure** depending on the diameter of the silo and roof loads.
- **They are composed by trapezoidal sectors** of special conguration, which gives a better sealing and waterproof.
- **Roof has a special geometry**, due to the wave of the roof and longitudinal folds, which gives high strength and stiffness.
- **Different design depending of snow load** location of the installation.
- **Manufactured with structural steel**, with optimized special galvanized coating, ZM310, for best results in terms of resistance to corrosion (zinc, aluminum and magnesium).




CYLINDRICAL BODY

GALVANIZATION Z600

**BODYSHEETS**

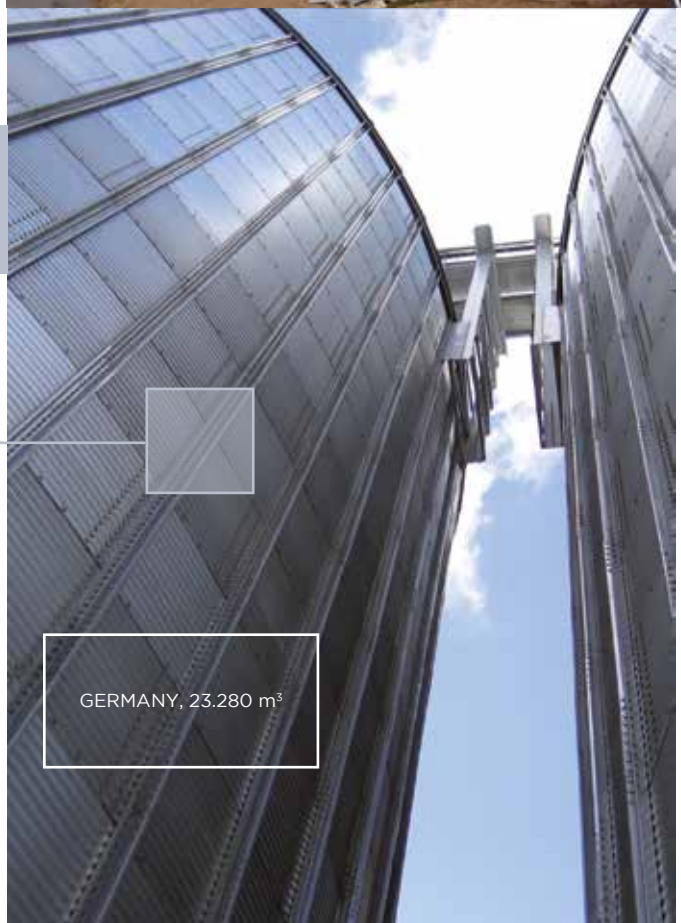
**Bodysheets:**

• They are manufactured from a **structural steel S 450 GD Z600.**

• Our modern machinery guarantees perfect shaping of the bodysheets, avoiding assembling difficulties.

• Our bodysheet's pitch with 76 mm width and 14 mm depth improves and optimizes the perfect flowing of the grain as well as silo strength.


**STIFFENERS**




**Stiffeners:**

• Symaga uses **2 or 3 stiffeners per bodysheets**, depending on the silo model.

• Stiffeners are manufactured with **structural steel S 450 GD Z600**.

Both bodysheets and stiffeners **are marked with its thickness and type of joint in each piece**, facilitating pieces identification, so that minimizing assembly mistakes.

## HOPPER


Hopper is made up of sector of structural **steel S 450 GD – Z600**, and can be performed with **45°, 60° or 66°** degrees, depending on the owing of the stored material.

## GALVANIZATION Z600

## LEGS AND BRACES

Legs and bracing of our **structural steel silos are hot-dip galvanized**. Symaga has wide experience in the design of these critical elements, depending on the seismic zone in which the project will be performed.

## HOT DIP

## COMPRESSION RING

From certain height and volume, our metal hopper silos have hot dip galvanized compression ring welded on both sides which gives the silo a **higher quality and faster structural assembly**.

## BOLTING

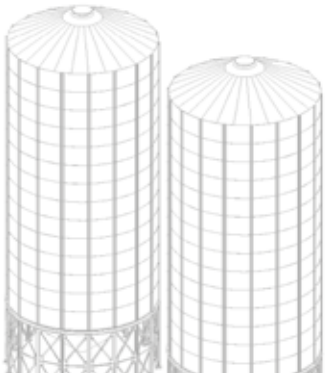
**Quality 8.8 and 10.9** (ISO 898 -1:2009 and 898 - 2:2003). Supplied preassembled bolting is hot dip galvanized with a coating of 70-85 microns (UNE – EN ISO 10684:2006).

Nuts are of **category 8**.

**Neoprene EPDM washers** guarantee sealing.

## BUTTYL RUBBER COMPOUND

It is supplied in a preformed way to ensure optimal sealing.



06

# COMPONENTS

## INSPECTION DOOR

Inspectioning the content and condition of the grain and treatments.

## ROOF STEPS

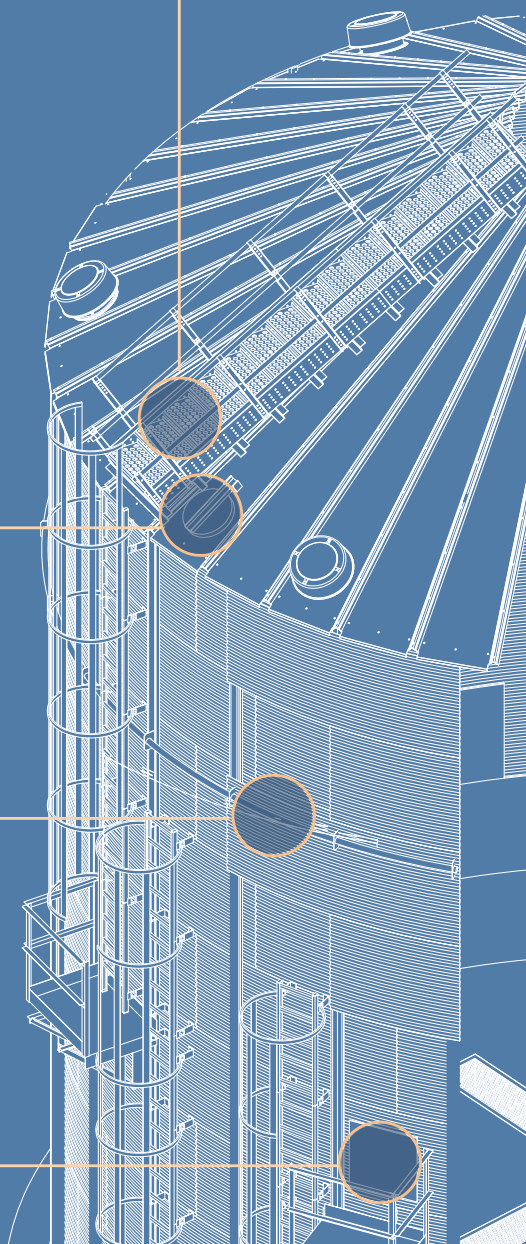
Roof scale with universal rungs.

## WIND RINGS


Are provided in order to resist the wind forces and to prevent deformation of the silo.

## ACCESS DOOR

Placed in the second ring. The bodysheet is supplied with the door already implemented.



07

# OPTIONAL ACCESORIES

## LADDERS


• **With a safety ring and rest platforms**, handrails and non-slip steps. They are according to all current safety regulations. (UNE EN ISO 14122-1/2/3/4: 2002).

• **Galvanized**, increasing its service life of the tting. In addition, our ladders are modular, which speeds installation and allows greater flexibility.


LADDER TO ROOF

To get the roof of the silo by climbing up the cylinder wall. With a safety cage and intermediate rest platforms, according to the UNE EN ISO 14222-1/2/3/4: 2002.


LADDER TO ACCESS DOOR

Includes a support platform.


ROOF STAIRWAY
Easy and safe access, with handrail roof ladder.

SPIRAL STAIRWAY
Distributed spirally around the silo.

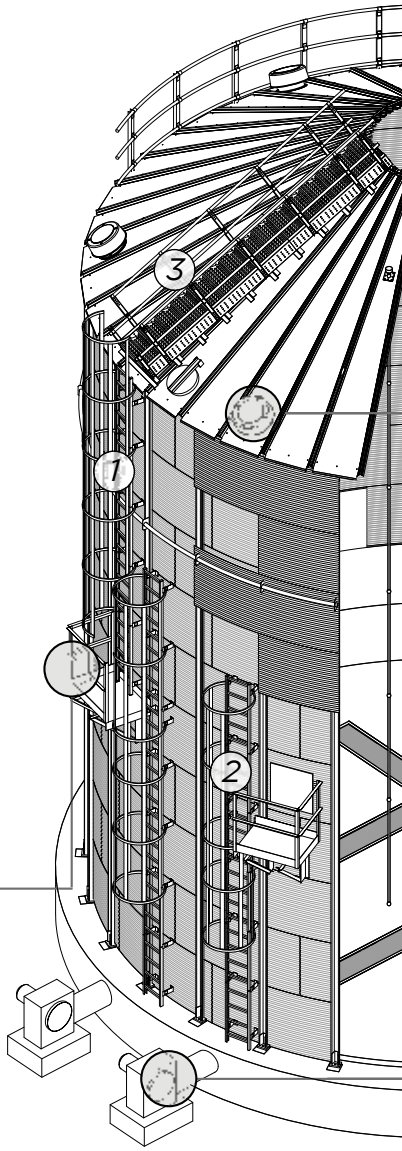
ZIGZAG STAIRWAY
We provide this stair in zigzag patterns facilitating the access to the top of the silo, to an elevator tower or to a work tower.


INSIDE LADDER

a) It connects access door on the slope to the ground.

b) As an option, it may connect the inspection door to the ground.

REST PLATFORM



## AERATION SYSTEM

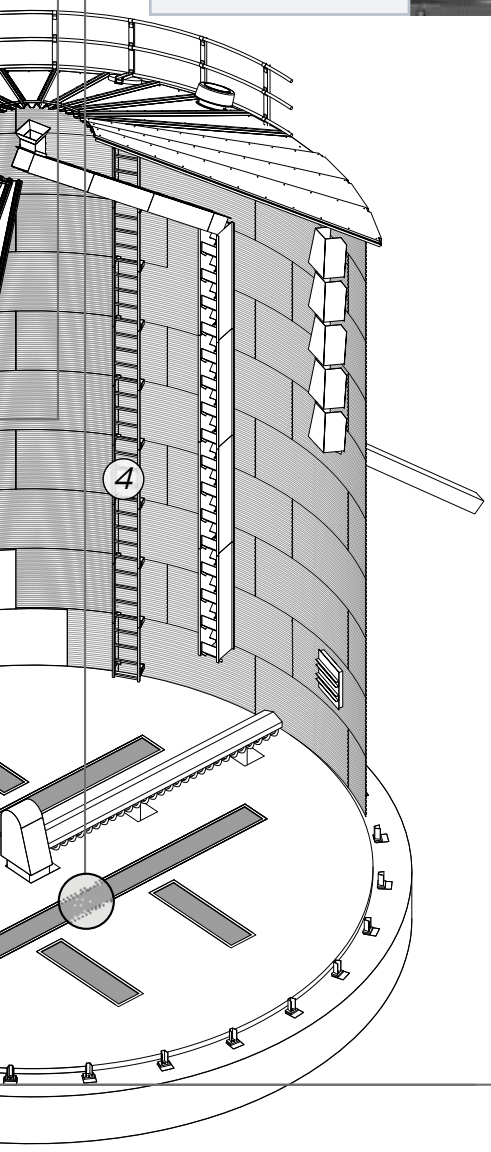
### ROOF VENT

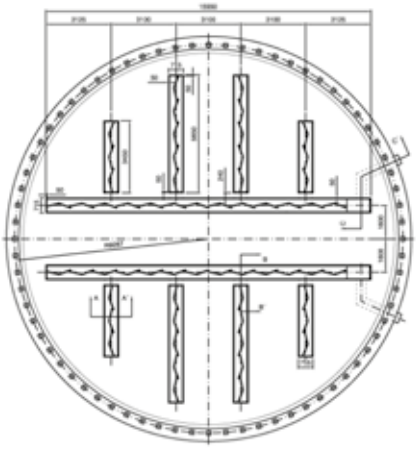
- **With circular design preventing the accumulation of water, snow and rubbish and opposes less air resistance**.
- It is easy-assembly, embossed, perfect-sealed with the roof section, and it comes with anti-bird net.
- It is prepared with a special sealing system for fumigation, and ready for the installation of an exhaust fan coil to avoid condensation.

### AERATION GUTTERS SYSTEM

**Aeration channels**

- Designed **to cover 12.5%** of the total area of the base of the silo.
- They are made up of foundation channels that are covered **with special galvanized boxes, corrugated and multi-perforated of diameter 1 or 1.5 mm**. The channels may have shape of “Y” or “H”, depending mainly on the volume of storing product.



### EXTRACTOR FANS

- **Helicoidal fan** on the roof as part of an aeration roof vent.

### FANS

- **Avaliable supply air fan, or exhaust fan**. IE3 certification, ensuring energy efficiency.

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# OPTIONALS ACCESORIES

## AERATION SYSTEM

### FULL PERFORATED FLOOR

The fully perforated floor is supported by a floor galvanized steel structure. Perforations are of a diameter of 1 or 1.5 mm, depending on the stored grain. Brackets are made of hot dip galvanized steel, which allows a better airflow and therefore a better ventilation.

### PREFABRICATED GUTTERS

Gutters are installed in silo foundation. This element is manufactured in 3 mm thickness galvanized steel, depending on installation characteristics (size, width and depth of the silo and foundation, and the total volume of the stored grain). “Y”, “H” and “C” types available.

### HOPPER AERATION SYSTEM

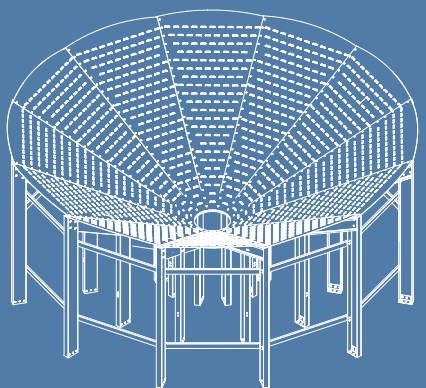
Aeration channel system with drillings, fixed to a hopper sector and prepared for the connexion with the fan.

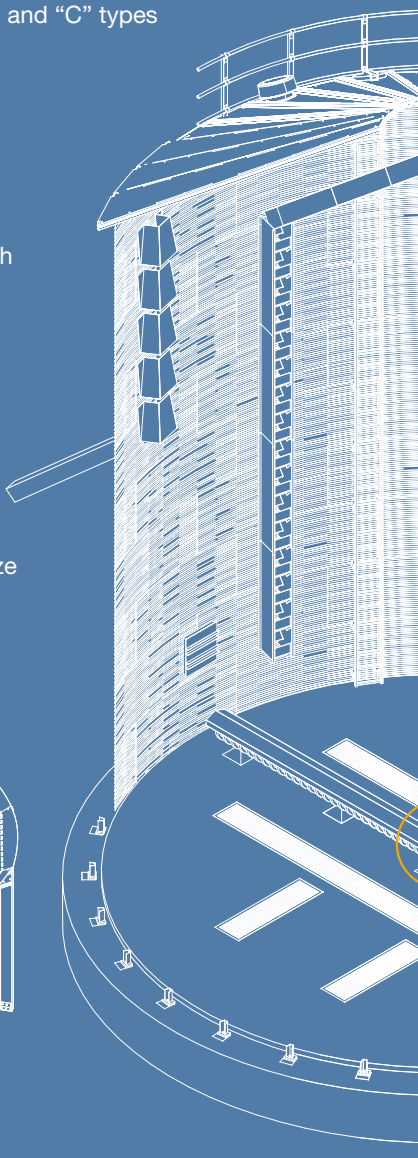
### GRAIN CHILLER

Improve grain preservation, avoiding fumigation. Minimize weight loss. Allows cooling regardless of environmental conditions.

### INSIDE PERFORATED CONE

Elevated cone made of galvanized steel inside the silo. The system avoids contact between the ground and grain, making civil works cheaper.





# ADDITIONAL SYSTEMS

## TEMPERATURE MONITORING SYSTEM

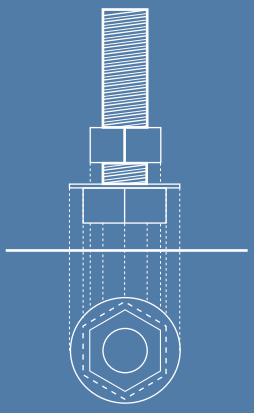
Symaga offers 2 types of temperature control systems: automatic with PC software and smartphone app; and a portable with an app.
The sensors detect temperature, humidity and approximated filling level. They are supported on two beams, so their weight is not supported by roof sector. They can be replaced without emptying the silo, without maintenance. ATEX certified.

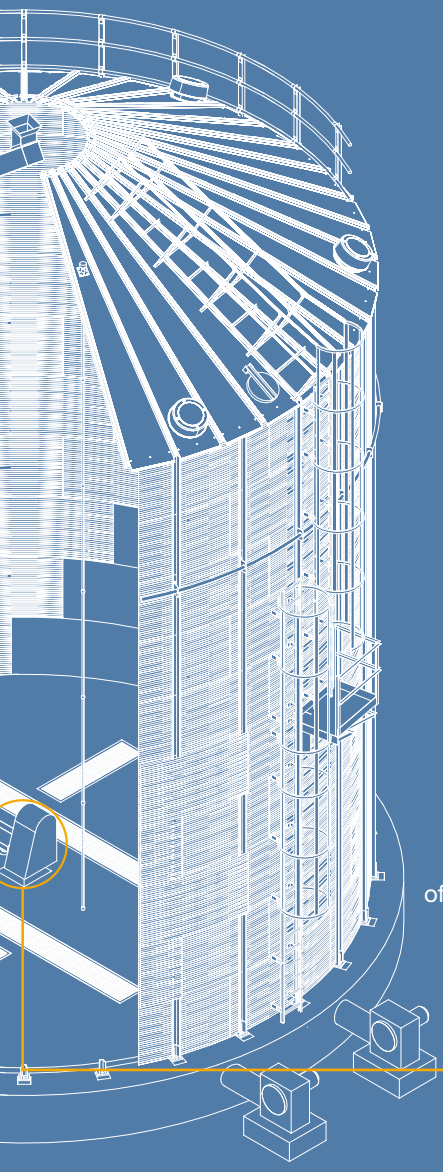
## MAXIMUM AND MINIMUM LEVEL SENSORS

They are used to indicate when the silo is full, and when it is empty. They may be supplied rotating, capacitive or membrane type.

## VENTING SYSTEM

Venting system is based on polyamide bolt-nut system in sector joints which gives rise to a venting anti-explosions surface according to EN 14491 2012 norm and anti-explosions ATEX norm.





## ERECTION TOOLS

Complete set of tools for silo mounting.

It is used to empty completely the flat bottom silo. Symaga offers industrial sweep augers with ATEX certification.

## SWEEP AUGER

07

# OPTIONAL ACCESORIES

## ROOF

### METALLIC EAVE SKIRT

Metallic eave skirt avoiding water and snow entrance, made in galvanized steel.

### EAVE CATWALK

Perimetral catwalk around eave, allowing the path around the eave. Exterior and interior.

### FOAM EAVE CLOSE

Symaga proposes a system for closing eave between silo cylinder and roof, to prevent water and snow entry into the silo and to guarantee the tightness of the silo. This eave close is made of FOAM.

### ANTI-AVALANCHE

Galvanized rail on the roof avoiding snow avalanches.

### EAVE HANDRAIL

It consists of a perimeter handrail and upper stiffeners support it. This item increases operator safety.

### ROOF ACCESS DOOR

Entrance to the silo from roof.

### ROOF HANDRAIL

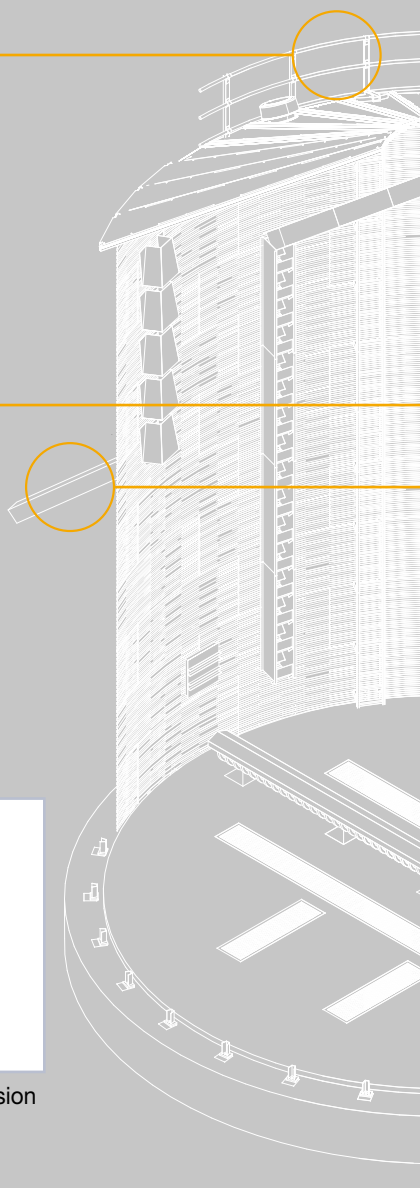
Ensuring the transit from roof inlet until the inspection door.

### SEMIAUTOMATIC GATE

Allow opening from the ground.

### PNEUMATIC CHARGE FILLING

Channel system with charge and decompression pipe to fill the silos with air pressure.



07

# OPTIONAL ACCESORIES

## CYLINDER

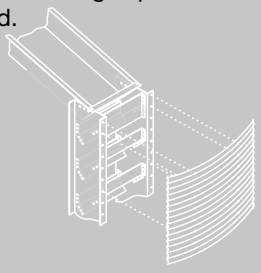
Sizes 400x400 and 250x250. Different activation: manual, electric, pneumatic and double.

## SLIDE GATE FOR HOPPER SILOS OUTLET

Allow the entry of machinery inside the silo.
Anchor plate to the floor and reinforcements.
Lock system included.
Galvanized finishing.

## GRAIN STOPPER SYSTEM

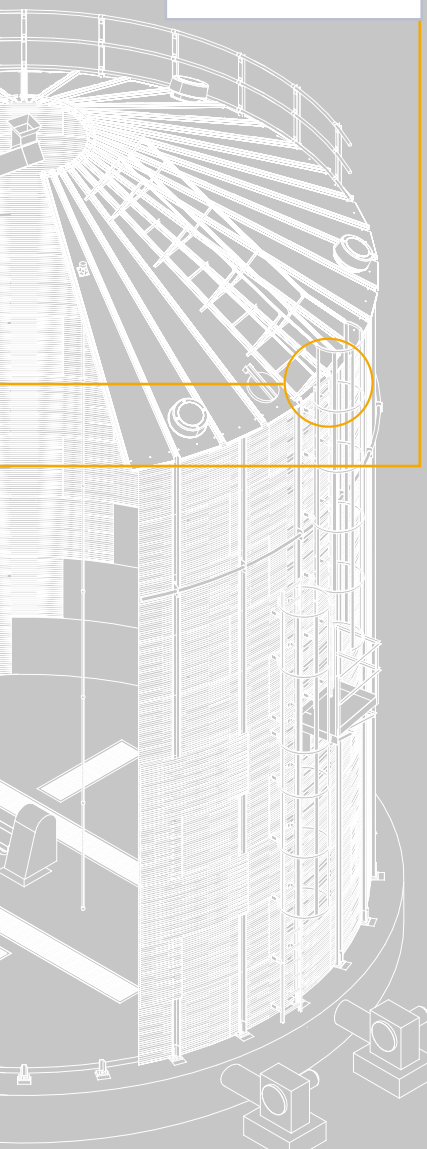
This accessory avoid grain damage and breakage with deflector plates, as well grain disaggregation by weight or dust creation, thus minimizing explosion hazard.



## ACCESS DOOR FOR HEAVY MACHINERY

## SIDE DISCHARGE SYSTEM

It empties the silo down to 70% of the capacity without energy spending or maintenance. Unloading could be performed to truck, train or conveyor.



## DOUBLE BODYSHEET ACCESS DOOR

Double door for easier access into the silo. Placed in the first and second rings. The inner door is divided into 3 sections to avoid grain leak.

## INNER FLAT LINING

The inner flat sheets are a smooth lining to improve the flowing of the material and the cleanliness of the silo.

## ANCHORAGE SYSTEM

We provide standard, mechanical and chemical anchor bolts.

## CLOSING ANGLE

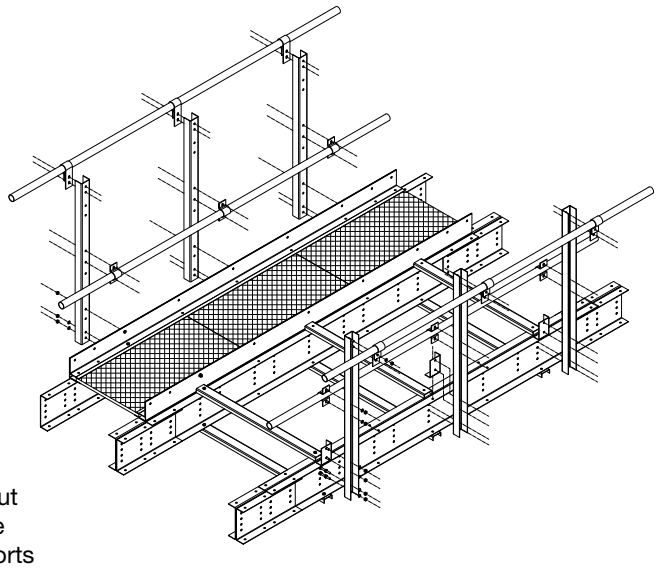
Perimetral closing for silo with non-elevated inner slab.

## FOUNDATION SEALING

Butylic paint and compound sealing the foundation.

# 07 OPTIONAL ACCESORIES


## SUPPLEMENTARY STRUCTURES



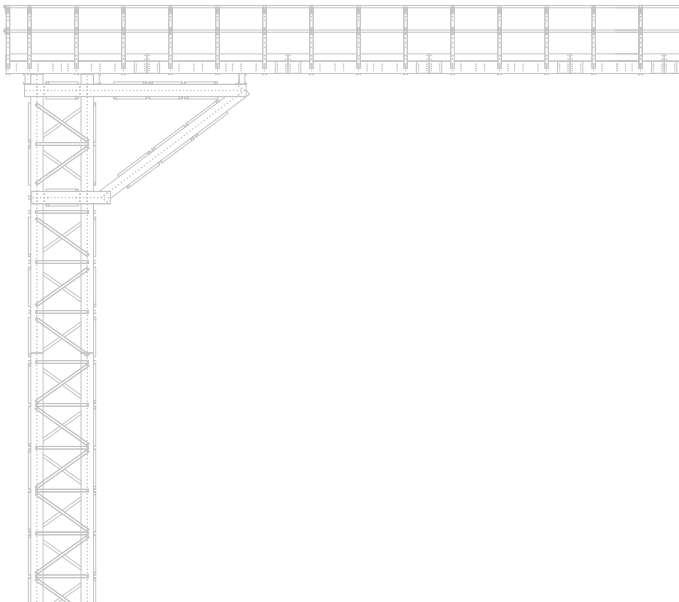
## COLUMNS AND SUPPORTS

We design supports according to the load out conveyor, snow load and the diameter of the silos. Symaga engineers columns and supports according to installation configuration, according to UNE EN ISO 1993 norm.

## CATWALKS

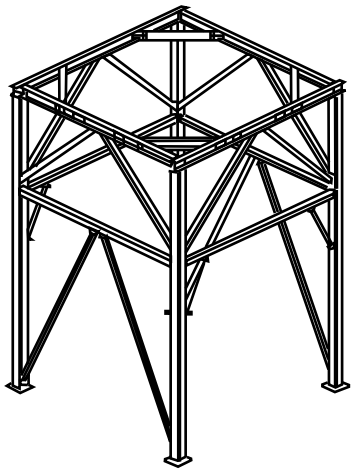
Our catwalks are modular, consequently adjustable to each project. Design is made according to UNE EN ISO 14122. Closed catwalk is available.

## ROOF SUPPORT



Galvanized supports on silo dome for conveyor.

## SUPPORT STRUCTURE FOR DELIVERY SILO



Support structure for delivery silo with free total height of 5 metres for truck or train transit.

## REDLER SUPPORT

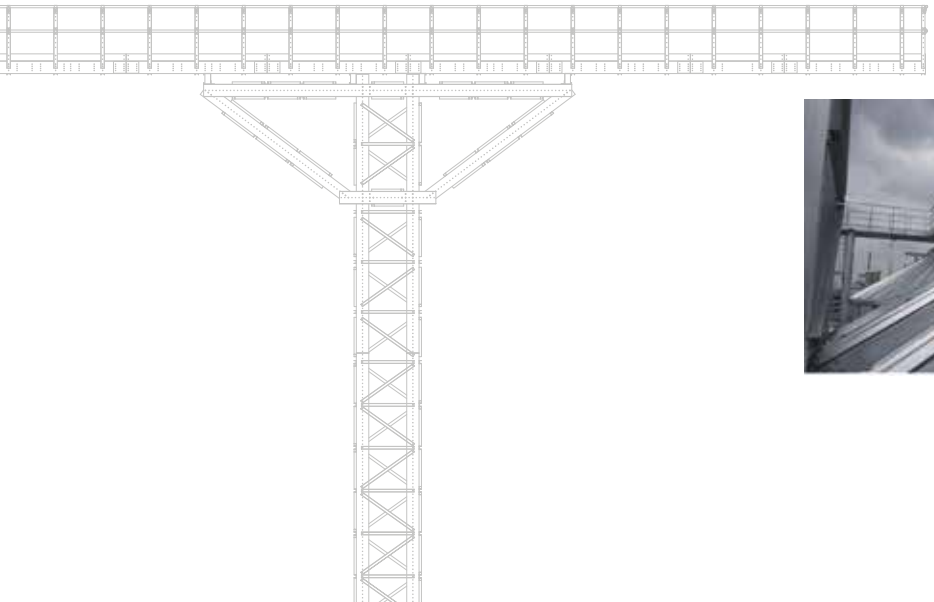
Hot dip galvanized conveyor supports, with adjustable height.

## PLATFORM BETWEEN SILOS

To give access to the inspection door.

## ELEVATOR TOWER

Easy-access elevator tower.



## MAINTENANCE PLATFORM

Modular metallic structures of 700, 900 or 1100 mm. wide that adapted to the installation to ease the maintenance. Options on standard or tramex floor.

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# OPTIONAL ACCESORIES

## EXTERNAL FINISHES

### SILO LINING

The outer lining adds extra protection against corrosion and provides extra insulation. It is available for roof, cylinder and hopper, in different colours (white, green and blue).

### POWDER PAINTING

Coating with polyester resins. Minimum thickness applied 80 µm each side. Thickness and colour RAL on demand. Food use painting in option.

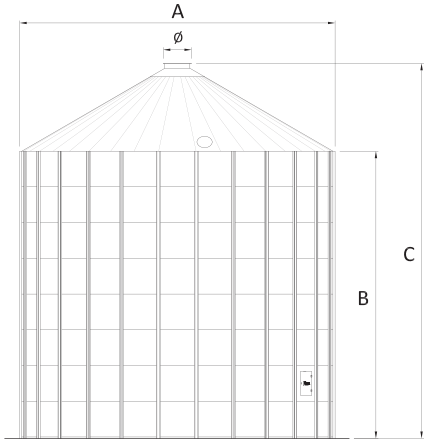
### PRE-LACQUERED ROOF

Roof galvanized steel S280GD+Z225 GS sector are previously pre-lacquered with 25/7 µm polyester. Available in white, green and blue.

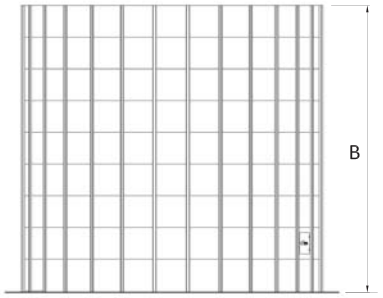
08

# TECHNICAL SHEET

FLAT BOTTOM SILOS


INDOOR SILOS



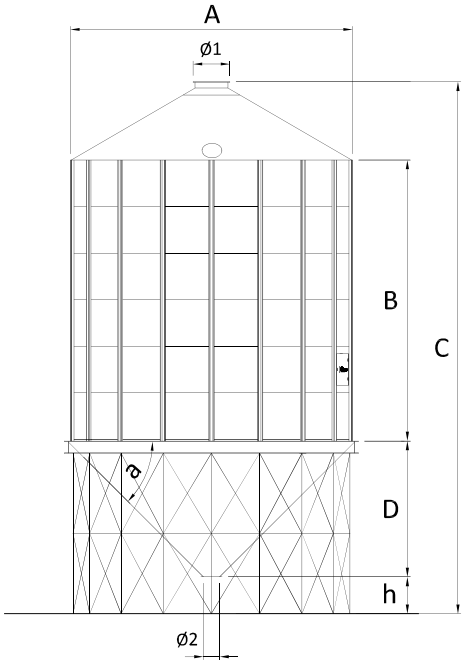

SYMAGA SILOS

## SBH - FLAT BOTTOM SILO - VOLUME

| FLAT BOTTOM SILOS | SILO Ø (m) A | 3,00 | 3,50 | 4,60 | 5,35 | 6,10 | 6,87 | 7,60 | 8,40 | 9,20 | 9,93 | 10,70 | 11,45 | 12,23 | 12,98 | 13,75 | 14,51 | 15,28 | 16,04 | 16,80 | 17,57 | 18,34 | 19,86 | 20,62 | 21,39 | 22,15 | 22,92 | 23,68 | 24,44 | 25,98 | 27,50 | 32,08 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ALTURA DEL TECHO (m) C-B | 0,69 | 0,79 | 1,26 | 1,48 | 1,69 | 1,92 | 2,14 | 2,36 | 2,59 | 2,81 | 3,03 | 3,25 | 3,47 | 3,70 | 3,90 | 4,13 | 4,35 | 4,56 | 4,79 | 5,10 | 5,30 | 5,77 | 5,99 | 6,21 | 6,41 | 6,65 | 6,87 | 7,09 | 7,53 | 7,65 | 8,96 |
| RINGS NUMBER | CYLINDRICAL HEIGHT (M) B | VOLUMEN (m3) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 4,61 | 35 | 47 | 83 | 115 | 152 | 195 | 244 | 299 | 361 | 430 | 505 | 587 | 677 | 774 | 878 | 991 | 1.111 | 1.229 | 1.377 | 1.530 | 1.684 | 2.024 | 2.206 | 2.401 | 2.601 | 2.816 | 3.040 | 3.273 | 3.773 | 4.252 | 6.143 |
| 5 | 5,75 | 44 | 58 | 102 | 140 | 185 | 237 | 296 | 363 | 437 | 518 | 608 | 705 | 811 | 925 | 1.047 | 1.179 | 1.320 | 1.459 | 1.630 | 1.807 | 1.985 | 2.377 | 2.587 | 2.810 | 3.040 | 3.287 | 3.542 | 3.808 | 4.377 | 4.930 | 7.064 |
| 6 | 6,89 | 52 | 69 | 121 | 166 | 219 | 280 | 349 | 426 | 512 | 606 | 710 | 823 | 944 | 1.076 | 1.216 | 1.368 | 1.529 | 1.689 | 1.883 | 2.083 | 2.286 | 2.731 | 2.968 | 3.220 | 3.480 | 3.757 | 4.044 | 4.343 | 4.981 | 5.607 | 7.986 |
| 7 | 8,03 | 60 | 80 | 140 | 192 | 252 | 322 | 401 | 489 | 587 | 695 | 812 | 940 | 1.078 | 1.227 | 1.386 | 1.557 | 1.738 | 1.920 | 2.135 | 2.359 | 2.587 | 3.084 | 3.348 | 3.630 | 3.919 | 4.227 | 4.547 | 4.878 | 5.585 | 6.284 | 8.908 |
| 8 | 9,17 | 69 | 91 | 158 | 217 | 286 | 364 | 453 | 552 | 662 | 783 | 915 | 1.058 | 1.212 | 1.378 | 1.555 | 1.745 | 1.947 | 2.150 | 2.388 | 2.636 | 2.888 | 3.437 | 3.729 | 4.040 | 4.359 | 4.698 | 5.049 | 5.413 | 6.189 | 6.961 | 9.830 |
| 9 | 10,31 | 77 | 102 | 177 | 243 | 319 | 407 | 505 | 616 | 738 | 871 | 1.017 | 1.175 | 1.346 | 1.529 | 1.724 | 1.934 | 2.156 | 2.380 | 2.641 | 2.912 | 3.189 | 3.790 | 4.110 | 4.449 | 4.798 | 5.168 | 5.551 | 5.948 | 6.794 | 7.639 | 10.751 |
| 10 | 11,45 | 85 | 113 | 196 | 268 | 353 | 449 | 558 | 679 | 813 | 960 | 1.120 | 1.293 | 1.480 | 1.680 | 1.894 | 2.123 | 2.365 | 2.611 | 2.894 | 3.189 | 3.490 | 4.144 | 4.490 | 4.859 | 5.238 | 5.638 | 6.053 | 6.483 | 7.398 | 8.316 | 11.673 |
| 11 | 12,59 | 94 | 124 | 215 | 294 | 386 | 491 | 610 | 742 | 888 | 1.048 | 1.222 | 1.410 | 1.613 | 1.832 | 2.063 | 2.311 | 2.574 | 2.841 | 3.147 | 3.465 | 3.791 | 4.497 | 4.871 | 5.269 | 5.677 | 6.109 | 6.555 | 7.018 | 8.002 | 8.993 | 12.595 |
| 12 | 13,73 | 102 | 135 | 234 | 320 | 419 | 534 | 662 | 805 | 963 | 1.136 | 1.325 | 1.528 | 1.747 | 1.983 | 2.232 | 2.500 | 2.783 | 3.071 | 3.400 | 3.742 | 4.092 | 4.850 | 5.252 | 5.678 | 6.117 | 6.579 | 7.058 | 7.553 | 8.606 | 9.670 | 13.517 |
| 13 | 14,87 | 110 | 146 | 252 | 345 | 453 | 576 | 714 | 869 | 1.039 | 1.225 | 1.427 | 1.646 | 1.881 | 2.134 | 2.402 | 2.688 | 2.929 | 3.302 | 3.653 | 4.018 | 4.393 | 5.203 | 5.632 | 6.088 | 6.556 | 7.049 | 7.560 | 8.089 | 9.210 | 10.347 | 14.439 |
| 14 | 16,01 | 119 | 157 | 271 | 371 | 486 | 618 | 767 | 932 | 1.114 | 1.313 | 1.529 | 1.763 | 2.015 | 2.285 | 2.571 | 2.877 | 3.201 | 3.532 | 3.906 | 4.294 | 4.694 | 5.557 | 6.013 | 6.498 | 6.996 | 7.520 | 8.062 | 8.624 | 9.814 | 11.025 | 15.360 |
| 15 | 17,15 | 127 | 168 | 290 | 396 | 520 | 661 | 819 | 995 | 1.189 | 1.401 | 1.632 | 1.881 | 2.149 | 2.436 | 2.740 | 3.066 | 3.410 | 3.763 | 4.159 | 4.571 | 4.995 | 5.910 | 6.394 | 6.907 | 7.435 | 7.990 | 8.564 | 9.159 | 10.418 | 11.702 | 16.282 |
| 16 | 18,29 | | 179 | 309 | 422 | 553 | 703 | 871 | 1.058 | 1.264 | 1.490 | 1.734 | 1.998 | 2.282 | 2.587 | 2.909 | 3.254 | 3.619 | 3.993 | 4.412 | 4.847 | 5.296 | 6.263 | 6.775 | 7.317 | 7.875 | 8.460 | 9.066 | 9.694 | 11.022 | 12.379 | 17.204 |
| 17 | 19,43 | | 190 | 328 | 448 | 587 | 745 | 923 | 1.122 | 1.340 | 1.578 | 1.837 | 2.116 | 2.416 | 2.738 | 3.079 | 3.443 | 3.828 | 4.223 | 4.665 | 5.124 | 5.597 | 6.616 | 7.155 | 7.727 | 8.314 | 8.931 | 9.569 | 10.229 | 11.626 | 13.056 | 18.126 |
| 18 | 20,57 | | | 347 | 473 | 620 | 788 | 976 | 1.185 | 1.415 | 1.666 | 1.939 | 2.234 | 2.550 | 2.889 | 3.248 | 3.632 | 4.037 | 4.454 | 4.918 | 5.400 | 5.898 | 6.970 | 7.536 | 8.136 | 8.754 | 9.401 | 10.071 | 10.764 | 12.230 | 13.733 | 19.047 |
| 19 | 21,71 | | | 365 | 499 | 654 | 830 | 1.028 | 1.248 | 1.490 | 1.755 | 2.042 | 2.351 | 2.684 | 3.040 | 3.417 | 3.820 | 4.246 | 4.684 | 5.170 | 5.677 | 6.199 | 7.323 | 7.917 | 8.546 | 9.193 | 9.871 | 10.573 | 11.299 | 12.834 | 14.411 | 19.969 |
| 20 | 22,85 | | | 384 | 524 | 687 | 872 | 1.080 | 1.311 | 1.565 | 1.843 | 2.144 | 2.469 | 2.817 | 3.191 | 3.587 | 4.009 | 4.455 | 4.914 | 5423 | 5.953 | 6.500 | 7.676 | 8.297 | 8.956 | 9.633 | 10.341 | 11.075 | 11.834 | 13.439 | 15.088 | 20.891 |
| 21 | 23,99 | | | 403 | 550 | 720 | 915 | 1.133 | 1.374 | 1.641 | 1.931 | 2.246 | 2.586 | 2.951 | 3.342 | 2.756 | 4.198 | 4.664 | 5.145 | 5.676 | 6.230 | 6.801 | 8.029 | 8.678 | 9.366 | 10.072 | 10.812 | 11.577 | 12.370 | 14.043 | 15.765 | 21.813 |
| 22 | 25,13 | | | 422 | 576 | 720 | 957 | 1.185 | 1.438 | 1.716 | 2.019 | 2.349 | 2.704 | 3.085 | 3.493 | 3.925 | 4.386 | 4.873 | 5.375 | 5.929 | 6.506 | 7.102 | 8.383 | 9.059 | 9.775 | 10.512 | 11.282 | 12.080 | 12.905 | 14.647 | 16.442 | 22.735 |
| 23 | 26,27 | | | 441 | 601 | 787 | 999 | 1.237 | 1.501 | 1.791 | 2.108 | 2.451 | 2.822 | 3.219 | 3.644 | 4.095 | 4.575 | 5.082 | 5.605 | 6.182 | 6.782 | 7.403 | 8.736 | 9.439 | 10.185 | 10.951 | 11.752 | 12.582 | 13.440 | 15.251 | 17.119 | 23.656 |
| 24 | 27,41 | | | | 627 | 821 | 1.042 | 1.289 | 1.564 | 1.866 | 2.196 | 2.554 | 2.939 | 3.353 | 3.795 | 4.264 | 4.763 | 5.221 | 5.836 | 6.435 | 7.059 | 7.704 | 9.089 | 9.820 | 10.595 | 11.391 | 12.223 | 13.084 | 13.975 | 15.855 | 17.797 | 24.578 |
| 25 | 28,55 | | | | 653 | 854 | 1.084 | 1.342 | 1.627 | 1.942 | 2.284 | 2.656 | 3.057 | 3.486 | 3.946 | 4.433 | 4.952 | 5.500 | 6.066 | 6.688 | 7.335 | 8.005 | 9.442 | 10.201 | 11.004 | 11.830 | 12.693 | 13.586 | 14.510 | 16.459 | 18.474 | 25.500 |
| 26 | 29,69 | | | | 678 | 888 | 1.126 | 1.394 | 1.691 | 2.017 | 2.373 | 2.759 | 3.174 | 3.620 | 4.097 | 4.602 | 5.141 | 5.709 | 6.296 | 6.941 | 7.612 | 8.306 | 9.796 | 10.581 | 11.414 | 12.270 | 13.163 | 14.088 | 15.045 | 17.063 | 19.151 | |
| 27 | 30,83 | | | | | 921 | 1.169 | 1.446 | 1.754 | 2.092 | 2.461 | 2.861 | 3.292 | 3.754 | 4.248 | 4.772 | 5.329 | 5.918 | 6.527 | 7.194 | 7.888 | 8.607 | 10.149 | 10.962 | 11.824 | 12.709 | 13.634 | 14.590 | 15.580 | 17.667 | 19.828 | |
| 28 | 31,97 | | | | | 955 | 1.211 | 1.498 | 1.817 | 2.167 | 2.549 | 2.963 | 3.409 | 3.888 | 4.399 | 4.941 | 5.518 | 6.127 | 6.757 | 7.447 | 8.165 | 8.908 | 10.502 | 11.343 | 12.233 | 13.148 | 14.104 | 15.093 | | | | |
| 29 | 33,11 | | | | | 988 | 1.253 | 1.551 | 1.880 | 2.243 | 2.638 | 3.066 | 3.527 | 4.022 | 4.550 | 5.110 | 5.707 | 6.336 | 6.988 | 7.700 | 8.441 | 9.209 | 10.855 | | | | | | | | | |
| 30 | 34,25 | | | | | 1.022 | 1.296 | 1.603 | 1.943 | 2.318 | 2.726 | 3.168 | 3.645 | 4.155 | 4.701 | 5.280 | 5.895 | 6.545 | 7.218 | 7.953 | 8.717 | | | | | | | | | | | |

**Mass-Discharge Silos.** Silo calculated according to EUROCODE standard.
**Indoor silos.** Available with diameters ranging 3m to 12.23m, with the following SBI models: 3.00, 3.50, 4.60, 5.35, 6.10, 6.87, 7.60, 8.40, 9.20, 9.93, 10.7, 11.45 y 12.23. Maximum height for SBI is limited to 10 rings of body sheets, or 11,45m. SBI silos are marked in grey in technical data table.
Silos capacity are calculated assuming a 27° angle of repose. Silos are designed to comply with wind loads of 100 kg / m² , snow loads of 80 kg / m² on the roof.

# SILOS WITH HOPPER


## SCE - T45 - 400 - VOLUME - h = 900 mm

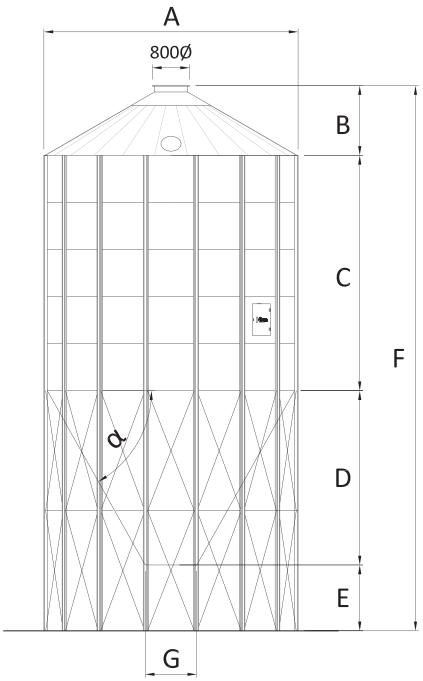
| HOPPER SILOS T-45 | SILO Ø (m) A | 4,60 | 5,35 | 6,10 | 6,87 | 7,60 | 8,40 | 9,20 | 9,93 | 10,70 | 11,45 | 12,23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | OUTPUT Ø2 (mm) | 400 | 400 | 400 | 400 | 400 | 400 | 400 | 400 | 400 | 400 | 400 |
| | HOPPER HEIGHT (m) D | 2,18 | 2,57 | 2,54 | 3,33 | 3,72 | 4,11 | 4,48 | 4,86 | 5,36 | 5,74 | 6,12 |
| | ROOF HEIGHT (m) | 1,26 | 1,48 | 1,69 | 1,92 | 2,14 | 2,36 | 2,59 | 2,81 | 3,03 | 3,25 | 3,47 |
| RINGS NUMBER | CYLINDRICAL HEIGHT (M) B | VOLUME (m³) | | | | | | | | | | |
| 4 | 4,61 | 95 | 134 | 180 | 236 | 300 | 375 | 459 | 554 | 665 | 784 | 915 |
| 5 | 5,75 | 114 | 159 | 214 | 278 | 353 | 438 | 534 | 643 | 767 | 901 | 1.049 |
| 6 | 6,89 | 133 | 185 | 247 | 321 | 405 | 501 | 610 | 731 | 869 | 1.019 | 1.183 |
| 7 | 8,03 | 151 | 211 | 281 | 363 | 457 | 565 | 685 | 819 | 972 | 1.136 | 1.316 |
| 8 | 9,17 | 170 | 236 | 314 | 405 | 509 | 628 | 760 | 908 | 1.074 | 1.254 | 1.450 |
| 9 | 10,31 | 189 | 262 | 348 | 448 | 562 | 691 | 835 | 996 | 1.177 | 1.371 | 1.584 |
| 10 | 11,45 | 208 | 287 | 381 | 490 | 614 | 754 | 911 | 1.084 | 1.279 | 1.489 | 1.718 |
| 11 | 12,59 | 227 | 311 | 414 | 532 | 666 | 817 | 986 | 1.173 | 1.382 | 1.607 | 1.852 |
| 12 | 13,73 | 245 | 339 | 448 | 575 | 719 | 881 | 1.061 | 1.261 | 1.484 | 1.724 | 1.985 |
| 13 | 14,87 | 264 | 364 | 481 | 617 | 771 | 944 | 1.136 | 1.349 | 1.586 | 1.842 | 2.119 |
| 14 | 16,01 | 283 | 390 | 515 | 659 | 823 | 1.007 | 1.212 | 1.438 | 1.689 | 1.959 | 2.253 |
| 15 | 17,15 | 302 | 415 | 548 | 702 | 875 | 1.070 | 1.287 | 1.526 | 1.791 | 2.077 | 2.387 |
| 16 | 18,29 | 321 | 441 | 582 | 744 | 928 | 1.134 | 1.362 | 1.614 | 1.894 | 2.195 | 2.521 |
| 17 | 19,43 | 340 | 467 | 615 | 786 | 980 | 1.197 | 1.437 | 1.703 | 1.996 | 2.312 | 2.654 |
| 18 | 20,57 | 358 | 492 | 649 | 829 | 1.032 | 1.260 | 1.513 | 1.791 | 2.099 | 2.430 | 2.788 |
| 19 | 21,71 | 377 | 518 | 682 | 871 | 1.084 | 1.323 | 1.588 | 1.879 | 2.201 | 2.547 | 2.922 |
| 20 | 22,85 | 396 | 543 | 716 | 913 | 1.137 | 1.387 | 1.663 | 1.968 | 2.304 | 2.665 | 3.056 |
| 21 | 23,99 | 415 | 569 | 749 | 956 | 1.189 | 1.450 | 1.738 | 2.056 | 2.406 | 2.783 | 3.190 |
| 22 | 25,13 | 434 | 595 | 749 | 998 | 1.241 | 1.513 | 1.814 | 2.144 | 2.508 | 2.900 | 3.323 |
| 23 | 26,27 | 452 | 620 | 816 | 1.040 | 1.293 | 1.576 | 1.889 | 2.233 | 2.611 | 3.018 | 3.457 |
| 24 | 27,41 | | 646 | 849 | 1.083 | 1.346 | 1.640 | 1.964 | 2.321 | 2.713 | 3.135 | 3.591 |
| 25 | 28,55 | | 671 | 883 | 1.125 | 1.398 | 1.703 | 2.040 | 2.409 | 2.816 | 3.253 | 3.725 |
| 26 | 29,69 | | 697 | 916 | 1.167 | 1.450 | 1.766 | 2.115 | 2.492 | 2.918 | 3.370 | 3.858 |
| 27 | 30,83 | | | 950 | 1.210 | 1.502 | 1.829 | 2.190 | 2.586 | 3.021 | 3.488 | 3.992 |
| 28 | 31,97 | | | 983 | 1.252 | 1.555 | 1.892 | 2.265 | 2.674 | 3.125 | 3.606 | 4.126 |
| 29 | 33,11 | | | 1.017 | 1.294 | 1.607 | 1.956 | 2.341 | 2.762 | 3.225 | 3.723 | 4.260 |
| 30 | 34,25 | | | 1.050 | 1.337 | 1.659 | 2.019 | 2.416 | 2.851 | 3.228 | 3.841 | 4.394 |

## SCE - T60 - 1250 - VOLUME - h = 1650 mm

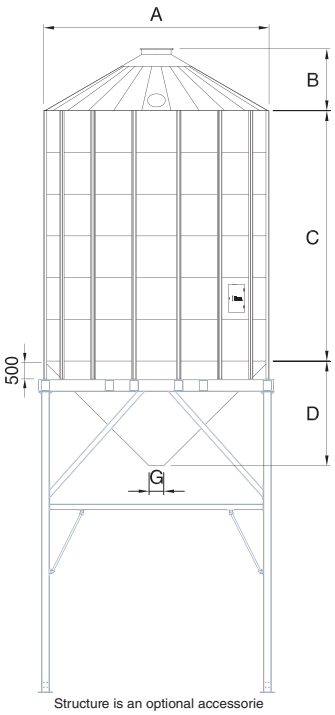
| HOPPER SILOS T60 | SILO Ø (m) A | 4,60 | 5,35 | 6,10 | 6,87 | 7,60 | 8,40 | 9,20 | 9,93 |
|---|---|---|---|---|---|---|---|---|---|
| | OUTPUT Ø2 (mm ) | 1250 | 1250 | 1250 | 1250 | 1250 | 1250 | 1250 | 1250 |
| | HOPPER HEIGHT (m) D | 2,98 | 3,62 | 4,28 | 4,93 | 5,63 | 6,30 | 6,96 | 7,62 |
| | ROOF HEIGHT (m) | 1,26 | 1,48 | 1,69 | 1,92 | 2,14 | 2,59 | 2,59 | 2,81 |
| RINGS NUMBER | CYLINDRICAL HEIGHT (M) B | VOLUME (m³) | | | | | | | |
| 4 | 4,61 | 99 | 142 | 193 | 256 | 330 | 415 | 514 | 626 |
| 5 | 5,75 | 118 | 167 | 227 | 298 | 382 | 479 | 589 | 714 |
| 6 | 6,89 | 137 | 193 | 260 | 340 | 434 | 542 | 664 | 802 |
| 7 | 8,03 | 156 | 218 | 294 | 383 | 486 | 605 | 739 | 891 |
| 8 | 9,17 | 175 | 244 | 327 | 425 | 539 | 668 | 815 | 979 |
| 9 | 10,31 | 193 | 270 | 361 | 467 | 591 | 732 | 890 | 1.067 |
| 10 | 11,45 | 212 | 295 | 394 | 510 | 643 | 795 | 965 | 1.156 |
| 11 | 12,59 | 231 | 321 | 428 | 552 | 695 | 858 | 1.040 | 1.244 |
| 12 | 13,73 | 250 | 346 | 461 | 594 | 748 | 921 | 1.116 | 1.332 |
| 13 | 14,87 | 269 | 372 | 494 | 637 | 800 | 985 | 1.191 | 1.421 |
| 14 | 16,01 | 287 | 398 | 528 | 679 | 852 | 1.048 | 1.266 | 1.509 |
| 15 | 17,15 | 306 | 423 | 561 | 721 | 905 | 1.111 | 1.342 | 1.597 |
| 16 | 18,29 | 325 | 449 | 595 | 764 | 957 | 1.174 | 1.417 | 1.686 |
| 17 | 19,43 | 344 | 474 | 628 | 806 | 1.009 | 1.237 | 1.492 | 1.774 |
| 18 | 20,57 | 363 | 500 | 662 | 848 | 1.061 | 1.301 | 1.567 | 1.862 |
| 19 | 21,71 | 382 | 526 | 695 | 891 | 1.114 | 1.364 | 1.643 | 1.951 |
| 20 | 22,85 | 400 | 551 | 729 | 933 | 1.166 | 1.427 | 1.718 | 2.039 |
| 21 | 23,99 | 419 | 577 | 762 | 975 | 1.218 | 1.490 | 1.793 | 2.127 |
| 22 | 25,13 | 438 | 603 | 796 | 1.018 | 1.270 | 1.554 | 1.868 | 2.216 |
| 23 | 26,27 | 457 | 628 | 829 | 1.060 | 1.323 | 1.617 | 1.944 | 2.304 |
| 24 | 27,41 | | 654 | 862 | 1.102 | 1.375 | 1.680 | 2.019 | 2.392 |
| 25 | 28,55 | | 679 | 896 | 1.145 | 1.427 | 1.743 | 2.094 | 2.480 |
| 26 | 29,69 | | 705 | 929 | 1.187 | 1.479 | 1.807 | 2.169 | 2.569 |
| 27 | 30,83 | | | 963 | 1.229 | 1.532 | 1.870 | 2.245 | 2.657 |
| 28 | 31,97 | | | 996 | 1.272 | 1.584 | 1.933 | 2.320 | 2.745 |
| 29 | 33,11 | | | 1.030 | 1314 | 1.636 | 1.996 | 2.395 | 2.834 |
| 30 | 34,25 | | | 1.063 | 1.356 | 1.688 | 2.060 | 2.470 | 2.922 |

Silos capacity are calculated assuming a 27° angle of repose. Silos are designed to comply with wind loads of 100 kg / m² , snow loads of 80 kg / m² on the roof.

## SILOS WITH HOPPER NO RING




## DELIVERY SILOS WITH HOPPER NO RING




Structure is an optional accessorie

### SC - SCPC - T45 - 400 - VOLUME - E = 900

| SILOS WITH HOPPER T45 NO RING | SILO Ø (m ) A | 3,00 | 3,50 | 4,60 | 5,35 | 6,10 |
|---|---|---|---|---|---|---|
| | OUTPUT Ø (mm ) G | 400 | 400 | 400 | 400 | 400 |
| | HOPPER HEIGHT (m) D | 1,33 | 1,52 | 2,10 | 2,48 | 2,86 |
| | ROOF HEIGHT (m) B | 0,69 | 0,79 | 1,26 | 1,48 | 1,69 |
| RINGS NUMBER | CYLINDRICAL HEIGHT (M) C | VOLUME (m ) | | | | |
| 1 | 1,14 | 13 | 18 | 37 | 55 | 78 |
| 2 | 2,28 | 22 | 29 | 56 | 81 | 111 |
| 3 | 3,42 | 30 | 40 | 75 | 107 | 145 |
| 4 | 4,61 | 38 | 51 | 94 | 132 | 178 |
| 5 | 5,75 | 47 | 62 | 113 | 158 | 212 |
| 6 | 6,89 | 55 | 73 | 131 | 183 | |
| 7 | 8,03 | 63 | 84 | 150 | 209 | |
| 8 | 9,17 | 72 | 95 | 169 | | |
| 9 | 10,31 | 80 | 106 | | | |

### SC - SCPC - T60 - 1250 - VOLUME - E = 1650

| SILOS WITH HOPPER T60 NO RING | SILO Ø (m ) A | 4,60 | 5,35 | 6,10 |
|---|---|---|---|---|
| | OUTPUT Ø (mm ) G | 1250 | 1250 | 1250 |
| | HOPPER HEIGHT (m) D | 2,98 | 3,62 | 4,28 |
| | ROOF HEIGHT (m) B | 1,26 | 1,48 | 1,69 |
| RINGS NUMBER | CYLINDRICAL HEIGHT (M) C | VOLUME (m ) | | |
| 1 | 1,14 | 42 | 63 | 91 |
| 2 | 2,28 | 61 | 89 | 125 |
| 3 | 3,42 | 79 | 115 | 158 |
| 4 | 4,56 | 98 | 140 | 192 |
| 5 | 5,7 | 117 | 166 | 225 |
| 6 | 6,84 | 136 | 191 | 259 |
| 7 | 7,98 | 155 | 217 | |
| 8 | 9,12 | 173 | | |

### SC - SCPC - T66 - 1050 - VOLUME

| SILOS WITH HOPPER T66 NO RING | SILO Ø (m ) | 3,00 | 3,50 |
|---|---|---|---|
| | OUTPUT Ø (mm ) | 1050 | 1050 |
| | HOPPER HEIGHT (m) | 2,25 | 2,71 |
| | ROOF HEIGHT (m) | 0,69 | 0,79 |
| RINGS NUMBER | CYLINDRICAL HEIGHT (M) | VOLUME (m ) | |
| 1 | 1,14 | 16 | 22 |
| 2 | 2,28 | 24 | 33 |
| 3 | 3,42 | 32 | 44 |
| 4 | 4,56 | 41 | 55 |
| 5 | 5,7 | 49 | 66 |
| 6 | 6,84 | 57 | 77 |
| 7 | 7,98 | 66 | 88 |
| 8 | 9,12 | 74 | 99 |
| 9 | 10,26 | 82 | 110 |

**Delivery silos.** With capacities ranging from 27m³ until 267m³.
Silos capacity are calculated assuming a 27° angle of repose. Silos are designed to comply with wind loads of 100 kg / m² , snow loads of 80 kg / m² on the roof.

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