



Grain Terminals Presentation

Silos Córdoba

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Silos Córdoba deals with the engineering, development and assembly of facilities and plants for industrial and agricultural purposes and offers full services, from defining the needs and setting the possible solutions to the conception and implementation of the project.

Depending on your needs, we design your silos using the most up-to-date technology, employing the best quality products and in compliance with the current European laws.

All our silos are made of high quality steel and offer an innovative metal coating up to 10 times more resistant to environmental corrosion than traditional galvanisation.



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Storage plants

CONDITIONING
PLANTS

INDUSTRIAL
PROCESS

AGRICULTURAL – INDUSTRIAL
PROCESSING

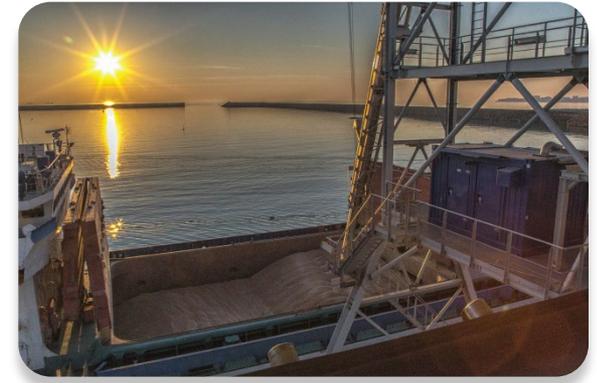
GRAIN
TERMINALS



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Grain Terminals

- ✓ Port facilities (exterior, interior and inland ports) to transfer agricultural bulk, optimizing time and quality.
- ✓ Specialized in the reception, handling, storage, dispatch and processing of bulks.



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Silos - Specifications

- ✓ Silos manufactured with galvanized steel S450GD of high elastic tolerance and with Z600 minimum coating equivalent to 600 g/m² of zinc.
- ✓ 8,8 quality dichromate high tensile bolts in all of our product range.
- ✓ Washers with neoprene to ensure a waterproof seal.
- ✓ Galvanized reinforced exteriors, regardless of thickness, that provide excellent anti-corrosion qualities.
- ✓ Galvanized cross section roof structure on models with a diameter superior to 12,22 meters.
- ✓ Our method for calculating thickness is more demanding than that established by standard EUROCODIGO 1.
- ✓ Stairs and platforms comply with regulation UNE-EN ISO 14122.

Silos - Specifications

We offer features which cater to region-specific requirements:

- ✓ Ventilation systems or cooling mechanisms to keep the grains safe inside the silos and to accommodate to different climates.
- ✓ Double-wall rings that create an air space between the wall sheets, which insulates the interior from the external temperature to avoid problems like condensation, lumping or caking.
- ✓ Wind reinforcements for high wind speeds, when it is raining or snowing.
- ✓ Roof extractors to remove air from the interior of the silos.
- ✓ Ventilation channels.
- ✓ Tempering silos.

Innovation products showcase

Enhanced durability silos

Silos Córdoba has established Z-600 galvanized steel as standard. With 600 gr/m² on both sides or 42 microns coating per side it means the highest zinc coating in the market. As an example the speed corrosion of Zinc in different atmospheres (according to ISO 9223) is shown.

When required Silos Cordoba manufactures its silos with extra long durability silos manufactured with

- ✓ Magnesium, Aluminin and Zinc carbon steel alloy (Suitable for high salinity and chemical contamination).
- ✓ Thermosetting paint galvanized steel (suitable for Chemical contamination).

Innovation products showcase

Speed corrosion of Zinc in different atmospheres (according to ISO 9223)

Corrosion category	Atmosphere description	Average loss of Zinc per year (µm)
C1 Very low	Interior: dry	0,1
C2 Low	Interior: occasional condensation	0,1 a 0,7
C3 Medium	Interior: High moisture and certain air pollution.	0,7 a 2,1
	Exterior: Urban non marine and marine with low salinity	
C4 High	Interior: Swimming pools, Chemical facilities, etc.	2,1 a 4,2
	Exterior: No marine industrial areas, and marine urban areas	
C5 Very high	Exterior: Industrial very high moisture or with high salinity content	4,2 a 8,4

Corrosion category	Average loss of Zinc per year (µm)	Spotless life (years)				
		Z275	Z350	Z450	Z600	ProMag
C1 Very low	0,1	206,00	263,00	320,00	480,00	-
C2 Low	0,4	51,50	65,75	80,00	120,00	-
C3 Medium	1,4	14,71	18,79	22,86	34,29	-
C4 High	3,15	6,54	8,35	10,16	15,24	65,00
C5 Very high	6,3	3,27	4,17	5,08	7,62	33,50

Innovation products showcase

Metallic coatings features comparison						
Product features	HDG Zn		ZA	Aluzinc		ProMag
Anti-corrosion properties						
In a chloride environment (marine site, swimming pool)	Reference		+	++		+++
In an ammonia environment (stable, farm, greenhouse)	Reference		+	-		++
In an SO ₂ environment (acid industrial environment)	Reference		+	++		+
Temporary protection (transport, storage)	Reference		+	+++		+++
Edge protection (heavy gauge, perforated sheet)	Reference		+	-		+++
Corrosion of a deformed part (bent or stamped)	Reference		+	-		++
Forming properties						
Bending & roll-forming	Reference		-	-		+
Drawing	Reference		+	-		+
Assembling properties						
Spot welding (equivalent thickness)	Reference		-	--		=
Aspect						
Visual appearance	Reference		-	+		=
<i>= Equivalent + Superior - Inferior</i>						
Range						
ProMag coating range	ZM90	ZM120	ZM175	ZM195	ZM250	ZM310
Coating thickness (um/per side)	7	10	14	16	20	25
Steel grades	DX51D to DX57D + ZM HX260LAD to HX420LAD + ZM		S220GD to S390GD + ZM		H240D + ZM	
Surface aspect	MA		MB			
Surface treatment	C (E-Passivation CrVI-free)		O (oiled)			
Thickness range	From 0,45 mm to 2 mm					
Width range	Up to 1630 mm					

Our References





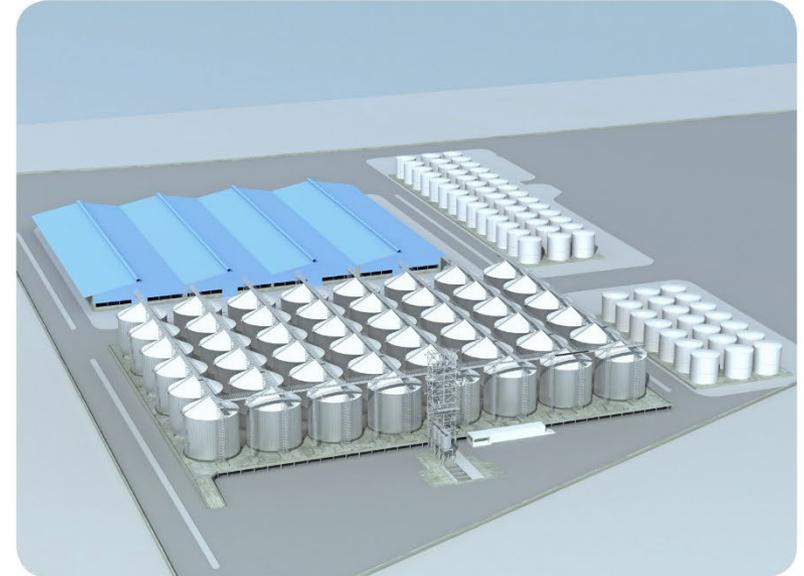
Under construction NKF - IRAN: 48 silos mod. 24,45/17 - Total capacity : 367.000 T

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Under construction | NKF Irán

Plant conceived for the storage of soya bean, corn and wheat.
The total capacity of the plant is 489.792 m3 for the storage of 367.000 T of cereal.
The project includes:

- ✓ 48 silos model 24.45/17 of 10.204 m3 capacity each.
- ✓ Intake conveying capacity: 1.200 T/h (600 T/h double).
- ✓ Discharge capacity: 800 T/h (400 T/h double).





2018 PORT OF ANTWERP - BELGIUM: 37 Hopper silos mod. 07.64/16 45° -
Total capacity: 25.750 T

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2018 | Port of Antwerp Belgium

Grain terminal conceived for the storage of malt and barley.

The total capacity of the plant is 34.336 m³ for the storage of 25.750 T of cereals.

The project includes:

- ✓ 37 hopper silos model 07.64/16 45° of 928 m³ capacity each.
- ✓ New reinforced silo design for high grain transfer and flow rates, up to 400 T/h.
- ✓ Accessories to preserve the quality of grain: ventilation, temperature control system, level sensors, etc.
- ✓ Structures that are fully adapted to the project needs: stair tower, wide catwalks and different types of supports.
- ✓ Turn-key project entirely made by Silos Cordoba.





2015 OBRINEL - URUGUAY: 12 silos mod. 27,50/17 - Total capacity: 121.000 T

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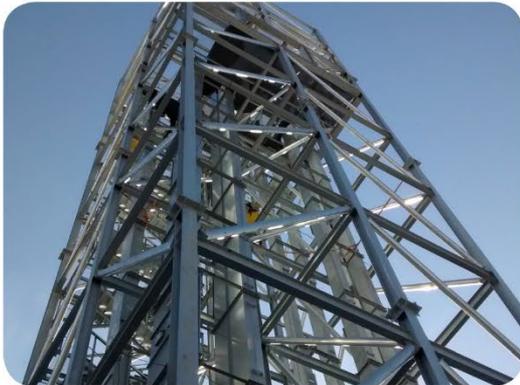
2015 | Obrinel Uruguay

Planta conceived for the storage of wheat at Montevideo Port.

The total capacity of the plant is 161.312 m3 for the storage of 121.000 T of cereal.

The project includes:

- ✓ 12 silos model 27.50/17 of 13.083 m3 capacity each.
- ✓ 1 hopper silo model 10.70/16 45° of 1.893 m3 capacity each.
- ✓ 2 hopper silos model 5.35/6 60° of 194 m3 capacity each.
- ✓ 2 hopper silos model 8.40/13 45° of 944 m3 capacity each.
- ✓ 1 truck load silo model 4.65/6 60° of 147 m3 capacity each.
- ✓ Central handling tower of 9,3 X 9,3 X 45m height.
- ✓ Secondary central handling tower of 9 X 7 X 28m height.
- ✓ Weighting area 12 X 6,5m.
- ✓ Loading and unloading is done at 800 T/h.
- ✓ It includes as well a truck dumper platform, conveyors, bucket elevators and accesories.





2015 AKT - KAZAKHSTAN: 6 silos mod. 27,50/18 - Total capacity: 62.000 T

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2015 | AKT Kazakhstan

Plant focused on the storage of maize at Aktau Port. This plant is conceived for the storage and expedition at bulk carriers. The collection of maize on this plant is done through train. The total capacity of the plant is 82.560 m³ for the storage of 62.000 T of cereal.

The project includes:

- ✓ 6 flat silos model 27.50/18 of 13.760 m³ capacity each.

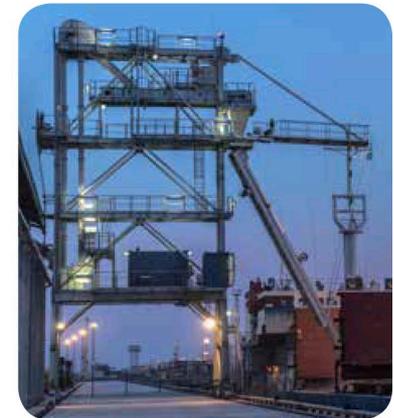
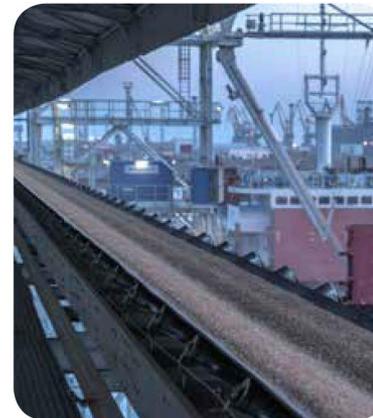
The storage plant can be divide into three main areas of work:

- ✓ Reception of cereals at 500 T/h.
- ✓ Storage of cereals.
- ✓ Dispatch of cereal from silos to ship at 500 T/h through a ship loader.

The facility has as well:

- ✓ Dust aspiration system in intake pit and handling equipment.
- ✓ Pre-cleaner system.
- ✓ Electrical pannel with PLC and SCADA.
- ✓ Lightning system.
- ✓ Fire extinguishing systems.
- ✓ Water drainage.
- ✓ Weighting system using a continuous flow scale of 500 T/h.

Erection and commissioning has been done by Silos Cordoba Kazakhstan.





2013 TIRYAKI - TURKEY: 19 silos mod. 18,33/22 – 11 silos mod. 14,51/22 –
27 truck load silos mod. 4,65/6 – 6 silos mod. 21,39/22 – Total capacity: 200.000 T

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2012 | Tiryaki Turkey

Project conceived for the storage of wheat and canola.

The total capacity of the plant is 250.168 m³ for the storage of 200.000 T of cereal.

The project includes:

- ✓ 19 silos model 18.33/22 of 7.110 m³ capacity each.
- ✓ 11 silos model 14.51/22 of 4.395 m³ capacity each.
- ✓ 27 truck loading silos mod. 4.65/6 of 147 m³ capacity each.
- ✓ 4 45° conic silos model 9.17/12 of 1.063 m³ capacity each.
- ✓ The conveying machinery has been delivered by Silos Córdoba.
- ✓ Loading and unloading is done at 300 T/h.





2009 CONSTANZA - ROMANIA: 17 silos mod. 24,45/22 – Total capacity: 165.000 T

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2009 | Constanza Romania

Plant conceived for the storage of wheat, barley, rape, corn, sunflower...
The total capacity of the plant is 218.960 m3 for the storage of 164.000 T of cereal.
The project includes:

- ✓ 17 silos model 24.45/22 of 12.880 m3 capacity each.
- ✓ Filling up is done at 1.200 T/h





2007 BAKU – AZERBAIJAN: 5 silos mod. 16,81/14 – Total capacity: 15.000 T

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2007 | Baku Azerbaijan

Plant for the receipt of ships with two slip extractors with a capacity of 300 tn, transfer belt to silos and filling up system. The total capacity of the plant is 19.627 m³ for the storage of 14.500 T of cereal.

The project includes:

- ✓ Manufacture and assembly of 5 flat silos model 16.81/14 of 3.901 m³ capacity each.
- ✓ Continuous flow scale at the entry and at the expedition from silos to railroad and trucks.
- ✓ The project includes as well ventilation and temperature monitoring systems and clearing machines.
- ✓ Regarding conveying systems, Silos Córdoba provides two belt conveyors, two bucket elevators and five chain conveyors.





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