

HORIZONTAL POLYETHYLENE SILOS

The most economical storage system for cereals

- Minimum investment
- Possibility to store small quantities
- Perfect for storing organic cereals
- High hourly capability during either bagging or extraction
- Suitable for agricultural companies, groups of farmers and contractors
- Ideal for creating or expanding a storage centre
- No building permission needed
- No disinfestation needed

BOSCHI SERVIZI srl

Storage of cereals in horizontal silos

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Machineries for storage of cereals in horizontal polyethylene silos



STORAGE OF CEREALS IN HORIZONTAL SILOS
The safest and most economical way of storing cereals, other seeds, fertilizers, etc.

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BOSCHI SILO
FOR ALIMENTARY USE - EUROPEAN UNION REGULATIONS N° 1831/11

INTRODUCTION

Cereal storage has always been a logistical, technical and economical **problem**.

Logistical, given that particularly during harvesting and straight afterwards, warehousing space is generally insufficient, causing expensive product transfers and/or incorrect storage. Moreover, cereals and oily seeds generally vary in price, both when buying and selling, and this does not allow to adequately cover expenditures related to storage and transportation costs that exceed the relatively short distances existing between the producer and the storage centre.

Technical, given that storage conditions often have a negative effect on the quality of the product at the moment of usage. The main problems derive from infestation from insects and rodents, overheating and the development of mould. Furthermore, new problems related to the need to keep different qualities of the same variety separate make silos particularly expensive and inadequate for storage. Last but not least, it is also necessary to conform to the ATEX regulations, which, where correctly applied, make silo storage problematic and expensive. This system, instead, requires no type of building concession or requirement and, furthermore, the bags can, in some cases, be positioned on agricultural land, being careful to avoid wells or rough land which could damage the base.

Economical, due to the excessive cost of silos, the necessity for periodic and expensive maintenance and running of movement systems, operating costs of ventilation, cooling and not least the costs of the much-discussed anti parasite treatments, both in the human and animal food chain.

THE INNOVATIVE SYSTEM OF HORIZONTAL SILOS MADE OF POLYETHYLENE

Born in North America at the beginning of the 90 s, this system was developed from a mechanization point of view, and researched for technical and product aspects towards the end of the same decade in Argentina.

This technique immediately arose the curiosity of Argentinean producers and storers, as well as that of those regions where the largest worldwide producers are concentrated (South Africa, the United States, Canada, Australia and currently Eastern Europe).

The use of horizontal polyethylene silos, which have been certified as non-toxic, is ideal for both private companies and cooperatives that produce significant quantities of cereals as well as for companies producing organic cereals (in so much as the system lends itself to storing even small stocks separately).

It is of particular interest, also for traders who want to amplify or create storage centres without relying on further fixed structures (silos or warehouses).

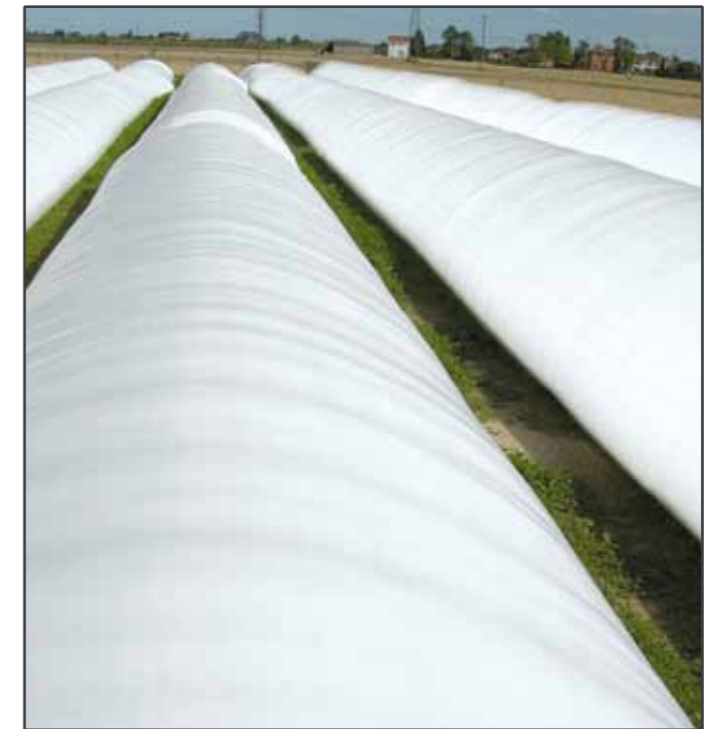


MECHANIZATION

The machines required for this type of storage are mainly two: **grain bagger and unloader**.

The grain bagger is a very simple machine powered by the power take off (PTO) shaft of an agricultural tractor of average power (at least 55HP) which must be fed by the product to be bagged using a self-propelled auger wagon fitted with hydraulic motor circuit. Alternatively the grain bagger can be fed using an **auger conveyor** driven by a hydraulic circuit. The operative capability of the latter is near or above 250 tonnes per hour.

The unloader is also powered by the power take off (PTO) shaft of an agricultural tractor (80/100 HP). It is a basic machine and consists of a mobile auger with a central conveyor equipped with a roller that is able to roll out the plastic sack enabling the entire product to be extracted without waste. In this case the operative capability is around 500 tonnes per hour.



TECHNICAL ASPECTS OF THE STORAGE

Research carried out has shown how stored cereals can be conserved for long periods of time without sustaining any product damage on the one condition that they have been bagged at the correct percentage of humidity for the type of storage. Raised humidity progressively reduces such storage times. The basic conservation principle is that the sacks are hermetically sealed; therefore, in their normal "respiratory" activity, the seeds consume the oxygen present in the folds/pits and emit carbon dioxide. In other words the cereal is conserved in a controlled atmosphere of self produced CO₂. This is an environment that inhibits the development of insects and mould.

The bag is made of three co-extruded layers of plastic polyethylene material of remarkable thickness (235/250 MICRON) UV protected. White on the outside to reflect the sun's rays and black on the inside so as to block light from penetrating. Resistance to outside elements is guaranteed by the best makers for the last two years. The diameter of the bags is 2.7 metres (9 feet) and they contain around 3.30 tonnes of cereals per lineal metre. The standard length of the bags varies from 60 to 75 metres. The bag can be cut and sealed at any point to acquire the length desired.

This technology was introduced in Italy in 2006 for storing 4,000 tons of cereals. In 2009, more than 100,000 were stored, and the technique is constantly expanding nowadays.

