Welcome to the world of Silo Bags
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1.0 Welcome to the world of Silo Bags

1.1 Overview

The Revolutionary Storage System For Dry & Wet Grains, And Forages

The revolutionary new silo bag system is a breakthrough in low cost, efficient, chemical free, grain storage for both wet and dry grains.

In this manual you will find safety instructions for the use of associated silo bag machinery, and also helpful hints in gaining the best from your silo bag storage.

1.2 General Safety Principles

Each machine has its own separate operating manual.

Please note:

- Operator safety is of the utmost concern. *A great percentage of accidents occur by neglect or incorrect operation of the machinery.*

- A good operator of machinery will use and maintain the machine adequately, taking the maximum precautions to avoid accidents.

- The decals referring to safety, precaution and safety defences as well as other safety protection measures, which have been incorporated into the machines, are there for your safety, as well as all other persons.

- Do not paint over them.

- Maintain them in a clean and legible state.

- In case of deterioration, please contact your authorized dealer for replacement decals.

- Please read carefully all decals attached so you fully understand their meanings, and their importance. If you do not understand any aspect of the decal, or operation of the machine, please contact your authorized dealer for a clear interpretation and understanding.
IMPORTANT SAFETY WARNING

When towing the Mainero model 2230 dry grain bagger:

• It is important to never try to attempt to tow the Mainero Model 2230 dry grain bagger down a road in the working position behind a light vehicle.

The weight distribution of the bagger, and the effect that this can have on a light vehicle, could cause the light vehicle to become unstable.

The Mainero Model 2230 dry grain bagger therefore must always be towed in the transport position when towing on a roadway behind a light vehicle.

THIS IS A VERY IMPORTANT SAFETY MESSAGE
If at any time you require a new safety and instruction manual for any machines associated with Silo Bags, please contact your authorized Silo Bag dealer for a replacement.

For your safety considerations, these are provided free of charge!

There is a separate manual for the safe operation and correct operating procedure for the

MAINERO 2230 bagger

MAINERO 2330 x-tractor

AKRON 180 E x-tractor

MARTINEZ & STANECK M series of machines

Before the operation of any of these machines, or any machine for that matter, it is essential that EVERY operator and supervisor read and learn thoroughly the contents of each separate manual applicable to that machine. This way, most hazardous situations will be avoided for the operator, for third parties and for any goods placed near the area.

To achieve this, it is fundamental that all operators and supervisors WITHOUT EXCEPTION read and understand clearly the manual relating to each machine individually. The training should include every detail of the machines operation, and should also be backed by written records.

*ANY GUARDS THAT ARE PLACED ON THE MACHINES ARE THERE FOR A REASON; TO PROTECT THE OPERATORS AND THIRD PERSONS!*

MAKE SURE THAT AT ALL TIMES, ALL GUARDS ARE SECURELY IN PLACE. IF ANY GUARD BECOMES LOST OR DAMAGED, PLEASE HAVE IT REPLACED BEFORE CONTINUING TO OPERATE THE MACHINE/MACHINES.

UNDER NO CIRCUMSTANCES SHOULD ANY PERSON CLIMB ONTO THE MACHINERY AS IT IS ABOUT TO START OPERATION OR WHILE BEING OPERATED*
1.3 Bag Specifications

BAG DURABILITY

Silo Bags are well made, and comply with ISO 9001 certification.

They are constructed from three (3) layers of film (white-black) and are treated for UV protection.

This material will however be degraded over time by the action of solar radiation and variations in temperatures.

The outer layer is white in colour, and has been treated with special additives that retard (but not avoid) its degradation, and its variables.

**IT IS RECOMMENDED AS A GENERAL RULE THAT THE SILO BAGS ARE NOT EXPOSED TO THE ELEMENTS FOR MORE THAN 'TWO YEARS'**.

1.4 Bag Warranty

**IMPORTANT**

*When ever a new piece of machinery is being delivered to you and started up, please sign the triplicate warranty form that will be provided by the dealer.*

*SIGN ONLY AFTER you have been fully instructed in the safe use of the machinery, and you and others that use, or will use the machinery, fully understand the safe use and correct operation of the machine/machines.*

*Please retain a completed and signed form for your records.*
2.0 Simple Rules to get the most from your Silo Bags

* The optional attachment for the Mainero bagger that allows filling of the bags via trucks maybe a valuable tool for those Silo Baggers that want to cart the grain by truck to a central location. Please ask your accredited dealer for further information about this optional attachment.

2.1 Site Selection

When selecting your site, it is important to look to the future and those conditions when extracting the grain.

While it is hot and dry during the bagging season, it maybe wet and cold when extracting. These conditions may cause access problems for trucks and other machinery that is being utilized to transport the grain away from the site.

It may be advisable in such conditions to locate beside a farmed road/track, allowing the easy movement of loaded trucks.

2.1.1 Ground Conditions

It is important for good grain storage and conservation that the ground for bag filling is to be prepared in anticipation, with the following characteristics:
2.1.2 High and Dry

The best results are found by having the bags located on a slightly raised, hard base. By forming these beds and stabilizing them in advance of the harvest, the forward thinking Silo Bagger will be well rewarded.

- High ground, and an area that does not flood. Select an area away from trees.
- Select hard ground, not soft. Ground that does not mark from the footprints of both the tractor and bagger.
- Make sure the ground is free from weeds and sharp stubble's that might pierce the bag. Also make sure that the ground does not contain sharp stones, sticks and/or other objects that may pierce the bag.
- It is best to keep the perimeter of each individual bag free from vegetation.

An application of chemical to control the weeds/grasses around the perimeter of the bag is advisable.

This procedure and maintenance helps in the control of rodent attack and damage from animals that may gnaw next to the bag.

2.1.3 Ideal Slope

* If possible, it is preferable to bag downhill, as this helps to prevent moisture entry to the bag via the end opening.

* An ideal slope would be a slight inclination of 1-3%.

* It is not recommended to work across slopes. This could overload one side of the bag, causing it to over stretch the plastic. This may possibly result in the premature failure of the bag.

* If livestock are grazing in adjoining paddocks (or in the same paddock but with a fence around the silo bags) it is advisable to keep the bags away from the fenceline by 2 meters or 6 feet.

2.1.4 Stubble Issues

Silo Bags are sometimes placed directly on the stubble in a paddock.

The common mistake made in such situations is to cut the stubble very short with the combine harvester. This is not recommended, as the sharp short stubble can perforate the membrane and the tiny holes can allow moisture into the base of the bag.

It is advisable to run over the stubble and flatten it rather than cut it.

If the ground is hard, a very light scraping of the ground to remove the stubble is a good procedure, but care must be taken not to loosen the soil too much.
2.1.5 Tree Issues

**DO NOT PLACE BAGS UNDER TREES!**

**Trees drop limbs**

These limbs can strike the bag on the top of it, where the most stretch and strain is found on the bag. This sudden impact on the bag at this point could cause the bag to split open along its entire length.

Please be aware of this potential hazard when selecting your sites.

2.1.6 Secure the site

Once the bags are made, a perimeter wire fence should be constructed to prevent damage from animals.

Prevent attack from rodents, as they can damage the bags.

Keep the site cleared and use baits when necessary.

---

2.2 Bag Placement

2.2.1 Separation Between Bags

When placing bags side by side, it must be remembered that they have to be emptied one day.

With this in mind, please allow enough room between the bags to allow easy and unrestricted loading for the xtractor and associated grain bins and/or trucks.

It is suggested that the distance between the bags be enough to allow the grain bins or trucks to pass between the bags while unloading with an xtractor.

Our recommendation is a distance of 5 metres/16.5 feet.

2.2.1.1 Placement of bags on farm

It is recommended when bagging on farm, away from depot type conditions, that the bags be placed in a line and not beside each other. This is to prevent animals, like rodents and other pests using the bags as a safe haven where they cannot be seen by natural predators.
*Remember
It is hot and dry at bagging, but at x-traction it may be wet and cold and very muddy. Therefore careful consideration should be given as to accessibility during x-traction, for both truck and machinery. Placement in a line beside firm hard track/roadway is strongly recommended.

**Separation between bags**

The separation between bags must be sufficient to be able to transit the self unloading wagon by side to the bagger, during bag filling and with a truck during grain removal [reference minimum 5 m /16.5 ft] Fig. 1.

If you require the bags to be closer together, then we recommend that the silo bags be end for end. As follows:

![Figure 2](image)

### 2.2.1.2 Placement of bags in depot situations

It is recommended to place the bags in batteries of two separated from the next battery with a spacing of 5 metres.

The bags should be bagged in an end-to-end situation, in different directions. These bags should be 1.5 metres apart. This will allow enough space for the x-tractor to work without rupturing the adjacent bag, and enough space to create a pathway where an operator could control the integrity of the bag during storage. It is important to leave a path of at least 5 metres wide on the side that the x-tractor works so there is room for the transport vehicle.
2.2.2 North South Orientation

North South.....important

It is recommended to place the bags NORTH/SOUTH because it is desirable for the sun to hit both sides of the bag evenly.

Uneven Exposure to the sun may result in:

• Potential damage to the materials of the bag
• If the sun is always only on the same side some discoloration of the grain may occur on that side as a result.
• More condensation can occur on that side if you have bagged the grain with high moisture content.

Australia is in a very austral position of the Southern Hemisphere, and for that reason, the sun describes its way from East to West always by the North quadrant. Hence, if the bags are set in the East-West direction, the North face will be exposed over the whole day to the solar radiation, which may lead to over stretching of the bag a premature failure/breakage of the bag.

2.2.3 Bagging Downhill

***Downhill bagging vs. Uphill bagging

If your machine is correctly and adequately braked for the bag stretching desirable [10%] then it is safe to bag downhill.

However it may be more appropriate to bag upslope, because in this way the slope helps the machine brake which assists in a more uniformly filled bag.
2.3 Filling the Bag

2.3.1 Keep the Bag Straight

For best results, when bagging, the Mainero bagger should be kept working in a straight line.

**Handy Hint**
It is important to keep the bag straight.

However, slight deviations may occur before you notice it.

Therefore to assist you in keeping your bag aligned in a straight line, we strongly suggest that you lay a string line along the bagging pad, with the front wheel of the tractor running along the string line.

You will quickly notice if the tractor is deviating from the straight string line. Please keep a constant eye on this important point, and correct when, and if necessary.

2.3.2 Bag Stretching

The Silo Bag is designed to stretch. This stretching helps expel the oxygen and make a compacted, tight bag.

The healthy and dry grains that are placed inside the silo bags tend to behave like a liquid. This liquid nature of the grains has an impact on the interior of the Silo Bag.

The grains do not ‘cling’ together, and as a result, they tend to scatter towards the sides of the silo bag.

Different grain types react differently within the silo bag. Some grains become more ‘liquid’ and thus the silo bag will be in a more flattened and oval shape, while other grain types will make the silo bag more upright and round.

At a higher hectolitre weight, better grain cleanliness in the sample and lower moisture content of the sample will mean that the grains in the silo bags will have a higher tendency to flow. This will lead, in turn, to a higher stretching and deformation of the bag.

It is not advisable to exceed the stretching levels recommended by the bag manufacturers.

**IT IS RECOMMENDED THAT THE BAG NOT BE STRETCHED BY MORE THAN 10%**
The bag is designed to stretch to the maximum 10% to allow as much air as possible to be extracted during the bagging process. This is a very important part of the whole hermetic storage system of the Silo Bag.

The aim is to extrude as much air as possible during the bagging process, thus you should take great care to make sure you achieve the maximum allowable stretching of the bag. If the bagger is not braked correctly and you are not achieving the desired stretch of the bag, then you allow more air to stay inside the bag.

How do I gauge the stretch of the bag?

You will note a series of vertical marks (guide bars) printed in ink on the silo bag. These vertical marks (guide bars) are spaced regularly along the entire length of the bag, with a spacing of approximately 43cm or 17 inches. The length of these vertical marks (guide bars) is 400mm or 40cm.

The vertical stretching bar in 9ft bags today is separated by 52cm with the bag not stretched.

Because of the vertical stretch of the bag, the bag shortens. This is easily seen when you stretch a piece of plastic between your fingers. You will see that the middle part gets thinner. This also happens with the bag. To see this in the field you can measure between the bars at the end of the bag where the polyethylene is not stretched. In today’s 9ft bags that will measure 52 cm. That is a fixed distance given by the circumference of the printing head. If you measure that distance at the middle of the bag you will see that the distance comes down to 49 to 51 depending on stretch. So to measure that, your bag has the 60 M you have to count the number of prints in 60 M should be 115 and a third. Because 115, 36 by 0.52 M results in 60 M.

If the bar has different separation as perhaps in 5 ft bags just measure it at the not stretched end and then use that number instead of 0.52. When counting prints don’t forget to count the ones that are under the bag at the end end beginning.

A WELL STRETCHED BAG WILL BE 54 TO 56 M LONG.
THIS IS DUE TO PLASTIC USED AT THE BEGINNING, END AND SHORTENING BECAUSE OF STRETCH.

* IMPORTANT NOTE

It is very important that the above referred to stretching marks be located at the side of the machine.

If the stretch marks (guide bars) are not located at the side of the bagging machine, then rotate the bag until the guide bars are in fact located at the side of the bagging machine.
If the stretch marks (guide bars) are not located in this position BEFORE BAGGING COMMENCES it may not be possible to check the stretching of the bagging operation at all, or the guide bars will be located at the incorrect position for the correct indication of the bag expansion/stretching.

It MUST be noted that the bag and the expansion/stretching will react differently depending upon the following

* The type of grain being bagged
* The condition of the sample, which includes the moisture content, amount of weeds and foreign material etc.
* The time of the day and ambient temperature,

(NOTE: usually as the day becomes hotter, the bag will stretch more, requiring LESS braking pressure. Likewise in the cool of the evening, the bag may require more stretching and the bagging machine require MORE braking pressure)

NOTE: When adjusting the braking pressure on the bagging machine
  * the adjustments should be done in small progressions of a recommended 10-15 KG/CM2 (140-210psi)

If this recommendation is followed, then this will avoid excessive 'bumps' and sudden height increases/decreases in the surface of the bag. A more uniform bag surface will result, which is what we are trying to achieve. (A more uniform top surface on the silo bag lessens the likelihood of condensation forming in the hollows)

Note: The disc brakes on the bagger should be checked if starting the machine after storage for the first time, and if left outside in the rain overnight.

Rust may form on the brake disc surface, which may impede the performance of the bagger.

Please check the brake discs regularly to make sure that rust has not formed on the surface. Any rust on the disc brake surface can easily be removed using fine sandpaper.

The guide bars should be checked regularly to confirm that correct braking pressure is being applied to the bagger to achieve the correct stretch on the silo bag.

To increase the stretch on the silo bag; increase the braking pressure on the disc breaks.

To decrease the stretch on the silo bags; decrease the braking pressure on the disc breaks.

* Please refer to page 31 of the MAINERO 2230 DRY GRAIN BAGGER INSTRUCTION MANUAL, WHICH YOU SHOULD HAVE.

(If your copy of the instruction manual cannot be located, in the interests of safety please contact your authorised Silo Bag dealer for your free copy)
2.3.3 Sealing the Bag

The bag closure for "Start" can be done in the following ways:

1. Use 1" x 4" of 2.5 or 3 m (8 or 10 ft) long wood planks, with an inner slot as in Fig. 4, fold the ends from outside to the centre and down, being left on the ground a bag width smaller than the table slot. Roll downwards three of four turns and put a staple in each end of the table to attach it to the ground Fig. 4.

2. Use 1" x 4" of 2.5 or 3 m (8 or 10 ft) long wood planks, with an inner slot like in Fig. 3, fold the ends from outside to the centre and down and roll it downwards the bag 3 or 4 turns. When it is well sealed, put a plank above and other below Fig. 5, and put nails or bolts every 300 or 400 mm (1 ft), to achieve a good sealing.

3. Using a tough rope, join the plastic from both sides of the bag, in folds of 50 - 60 cm (1.5 - 2 ft) towards the centre and down. Get the entire bag in the centre and tie firmly with a rope at 20-30 cm (8-12 in) from the end Fig. 6.

**NOTE:** Once sealed, pull out 3 m (10 ft) of the bag backwards of the tunnel and place the tie at the machine centre before you start filling.

The bag closure for the "end" can be done the following way:

1. Flatten the bag end from above downwards to take out the inner air, make folds downward on the bag, to prevent water entrance Fig. 7.

**NOTE:** Once accomplished the end bag closure, it is convenient to cover it with tires or any other element to avoid water entrance.
* When the bag has been filled, it is advisable to seal the bag immediately.

By doing this, it will assist in the establishing a stable internal atmosphere.

This is very important, as once the grain has been put into the Silo Bag, and is sealed all the available oxygen is consumed, which then produces an atmosphere that is rich in carbon dioxide thereby inhibiting its own respiratory process and assuring an optimum conservation environment free from added chemicals.

This sealed ATMOSPHERE WILL KEEP STABLE OVER TIME, PREVENTING NOT ONLY THE DEVELOPMENT AND REPRODUCTION OF FUNGUS AND INSECTS, BUT ALSO THE INCREASE OF GRAIN TEMPERATURE.

* By sealing the bag immediately, it eliminates the danger of storm water entering the unsealed bag from unexpected thundersstorms and the excessive runoff that may occur as a result.

* It is strongly recommended that when the bag is completed, and has been sealed, that any loose creases that may exist be taped down flat.

Alternatively, some users fill empty containers with water and place these on the loose end to hold the excess bag firm, or even old motor tires.

However we recommend that some soil be placed over the sealed end of the bag

This will help attack from rodents and birds.

It has been found that rodents and birds can attack the bag where it is left loose at the sealed end. By placing a small quantity of soil at this end, this will help eliminate rodent attack and bird attack.

* We also recommend that when the silo bags have been filled, that a suitable fence be placed around the bags to

* Protect the bags from damage from animals

* To keep children safely from the bags.

** An example of well filled, sealed and fenced bags is illustrated over the page.
Please note the placement of soil over the sealed end is recommended for better control of rodent attack, bird attack and the better establishment of a stable internal environment.

2.3.4 Bag Finishing

When your bag is completed, it is important to make sure that all loose parts of the bag are secured. Our strong recommendation is the placement of soil over the end of the bag. Old tyres or drums with water, and even the use of tape, all can be used to make the loose bag tighter. This prevents attacks from rodents and birds where they can attack the loose folds in the bag.

Further, this practice prevents the mechanical breakdown of the material from fatigue caused by flapping in the wind.

Caution; uneven breaking adjustments and too much variation of breaking pressure.

As mentioned, you should increase or decrease breaking pressure progressively, with increments of 10-15kg/cm² [140-210 psi] each time you adjust the breaking pressure.

This is important because uneven and abrupt changes create bumps on the top of the bag.

These bumps can create pockets of air. This air contains moisture. When the sun heats up the top of the bag, this moisture will condense in the pockets of air created.

Careful and progressive changes in the breaking system help overcome these lumps in the bag.
2.3.5 Protecting the Bag

2.3.5.1 Rodent Control

We keep stressing the importance of good house keeping. Most problems can be prevented with good house keeping and regular checking and maintenance of the bags and sites.

Mice

Great results have been achieved with the control of mice by Silo Baggers.

If you are concerned with mice attacking the bags, then it has been found that a light application of Urea on the site where the bags are to be laid is a well worth while task. Others have found that by applying some light soil along the edge of the bag (along its side) and filling in the curve at ground level help prevent mice from burrowing in under the bag.

Another simple idea that had been found effective is the placement of a pipe at the sealed ends of the bags. The rodents will travel through this section and it is found that this pipe makes a great location for a bait station.

Other Important Steps

The steps to take are the following:

- The ground over which the bags are to be placed must be free of grass and undergrowth.
- Do not leave loose grains around the bags because they are very appealing to the rodents.
- If a mouse got into the bag, the best thing to do is to introduce by the same hole, a Foxtoxin pill [aluminium phosphor] and seal the hole with the tape that is sent with the bag.
- If it is possible, lay the bags parallel to the main winds.
- Some farmers spray the ground beneath the bags with gas-oil.

2.3.5.2 Fencing

As a suggestion, a cheap insurance for the protection of your silo bag from damage from animals is the creation of an electric fence.

It is suggested that this fence consist of three wires, placed 5, 15 and 30 cm from the ground (2.6 & 12 inches from the ground)
2.3.5.3 Fire Danger/Fire Breaks
It must be remembered that Silo Bags are made from PVC (plastic material).
As such, if exposed to extreme heat from a close fire, it may in fact melt, or catch fire.
In positioning your bags, it is best to be mindful of this fact to allow maximum protection of your asset.
Dry stubble paddocks in the middle of summer are a natural fire hazard.
We recommend the positioning of a suitable fire break around your Silo Bags.

2.3.5.4 Fire Extinguishers
You should always have a fully charged fire extinguisher close at hand when working around farm machinery. This is a sensible precaution, and a legal requirement.
The operator must know how to operate this fire extinguisher before any machinery is started up or worked on.
It is especially important when working in and near dry stubble.
As a further safety precaution, it is also recommended that all dust and dry straw be cleaned from all working machinery regularly. This will lessen the risk of fire.

2.3.5.5 Inspect After Storms
* Remember
A sudden storm could occur at any time. Please seal the bag before leaving unattended overnight to prevent rain damage to the bagged grain.

Hail: after a hail storm the bags must be checked immediately to see if any damage has occurred. If the damage is light, it can be repaired with appropriate tape. If it is serious then the only safe solution is to empty and rebag. Remember that a higher stretch of the bag, increases the risk of hail damage.

2.3.5.6 Regular Inspections
The success of your Silo Bag system will largely depend on your level of housekeeping once the bags are filled.
Please refer to the previous sections on such topics as site selection etc.
It is important to look after your valuable asset after the bags have been filled.

It is important that regular inspections be carried out on your Silo Bags.
It is important that all possible efforts are taken to maintain the integrity of the plastic membrane, or repair it quickly if found damaged and / or perforated.
Remember that holes in the membrane can cause material degradation

You can control most prospective problems; so good housekeeping will reward you.
2.4 Emptying the Bag

2.4.1 Preparing to Open the Bag

*IMPORTANT NOTE*

Opening the filled silo bag under pressure

The silo bag is filled under pressure. The bag is designed to stretch.

Because of this characteristic, it is extremely important that great care is taken when opening the silo bag, or using machinery such as front-end loader etc. to empty the silo bag.

Failure to observe the following rules could result in the bag opening quickly along its entire length. This will result in leaving the bagged material exposed to the elements. The bag will open along the top of the silo bag where the most amount of pressure is applied.

To avoid this occurrence

**ATTENTION**

Never slash the Silo Bag longitudinally. If you do, the bag will open completely. If you have to perform any cut on the bag, however small it is, it must be made transversally.

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**Figure 8**

<table>
<thead>
<tr>
<th>Diagram</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>20 cm deep cut down to 2 m.</td>
</tr>
<tr>
<td>b</td>
<td>2 m deep cut</td>
</tr>
<tr>
<td>c</td>
<td>Transversal cut</td>
</tr>
</tbody>
</table>

---
2.4.2 Safety During Outloading

Extra care should be taken while working with front-end loaders etc., while extracting material.

Make sure that the top of the bag that is under extreme pressure is not subjected to longitudinal pressure cuts.

At all times, children should not be near the silo bags.

Children, machinery and grain do not mix.

Children are by nature curious and like to play on machinery and objects.

2.5 Grain Storage

2.5.1 Storage Moisture

As a basic rule, the moisture % of grains going into Silo Bag should be the same moisture % as required for conventional/traditional storage methods.

To store grains with higher moisture % could result in losses in grain quality such as protein quality, germination % loses, and hectolitric loses.

The risks to grain with higher moisture % will increase with the storage time.

2.5.2 Regular Sampling

It is recommended that periodically samples of bagged material be taken from the silo bag. This will be helpful in the control of the evolution of the quality of the stored material.

These samples can be taken with a probe, in the part of the bag of less stretch or by putting two tape sections in vertical direction and overlapped, in the zone of less bag stretch, and do the cut above these overlapped tapes.
3.0 Further Information

3.1 Instructional CDs

Sealing of the bag using IPESA Sealing Strip

*We have for our valued IpesaSilo clients, a CD which instructs you on the correct sealing procedures of the Ipesa Hermetic Seal.*

*If you have lost or require another free copy, please contact your accredited IpesaSilo dealer.*

*By using these seals, you achieve:*  
1. Excellent hermetic sealing  
2. More grain in bag (tonnages)  
3. Better x-tracting of the grain
Welcome to the world of Silo Bags should be used in conjunction with your IpesaSilo Silobag CD.

This instructional CD will take you through the correct steps of installing the bag and the IpesaSilo hermetic seal.

If you do not have a copy of this important CD, please contact your authorised IpesaSilo dealer for a FREE copy.