

Grain Storage Hermetically Sealed Storage Systems

What is hermetically sealed storage?

Hermetically sealed storage systems involve storing the rice grains in an airtight container (e.g., drum or plastic bag, etc.) that stops oxygen and water movement between the outside atmosphere and the stored grain. The system can use specially-designed PVC containers such as the volcanic cube or the smaller 50kg super bags or locally available containers made from steel, plastic or clay. The size of the systems can range from 3 liters-300 tons. The system can be used for paddy, milled rice and other cereal crops such as corn and also coffee



Why is sealed storage important?

Hermetically sealed grain storage systems improve grain quality and seed viability because they maintain the original storage moisture content and reduce pest damage without using pesticides. Seed viability can be increased from 6-12 months and head rice yields increased by 10%. The system works because the insects and grain respire which reduces the oxygen levels in the grain to 5-10% at which time insect activity stops. Bird and rodent damage are also reduced



How to store your grain hermetically

- Clean the seed or grain and dry to the correct moisture content. (seed 12%, grain 14%).
- Place seed or grain in a clean airtight container
- Seal the container according to the manufactures recommendation
- When using a container with a screw top or press fitted closer use grease or silicon to seal the opening
- When using clay pots or vessels made from pervious material, paint inside and outside of the container with paint
- All recycled containers must be cleaned thoroughly before use
- Store the containers either undercover or in the shade



NOTE: If containers are not sealed properly, oxygen leakage will occur and insect activity will increase.

Management Issues

- Intermittent opening and closing allows oxygen re-entry which can lead to the rapid re-infestation of some insects such as lesser grain borer which can pierce plastic liners.
- In containers that are only partially filled, the large air space to grain ratio may not allow oxygen levels to reduce to a level that will control insects
- Large commercial plastic storage can be damaged by rodents if not managed correctly. Pull plastic liners tight and keep a clear space around the containers.



Cost

- Large commercial systems cost from \$50-100 per ton, with an expected life of at least 10 years.
- 50kg recyclable storage bags cost \$0.5-1.00
- Locally constructed systems depend on the purchase price of recycled containers or clay pots. 200 liter oil drums may cost from \$2-5.

For more information:

Visit <http://www.knowledgebank.irri.org>

Prepared by M. Gummert with input from Joe Rickman (2004), updated by M. Gummert (2010)

For more information, visit the Rice Knowledge Bank: <http://www.knowledgebank.irri.org> or email: IRRIPostHarvest@cgiar.org