

# safe storage for oilseeds



# Maintaining the quality and market value of your stored oilseeds

Oilseeds are one of the most difficult commodities to store – significantly more difficult than cereal grains. This AOF guide will help you ensure your stored oilseeds maintain the highest market value possible.

Good storage practices are essential to maintaining quality and market value. Growers wishing to store oilseeds on-farm for extended periods should have a white, fully sealed gas-tight bin for insect control. It must be equipped with well controlled aeration for cooling to maintain quality.

Temperature, moisture content and the overall condition of the stored oilseeds must be constantly monitored. An alternative to the investment in appropriate on-farm storage infrastructure is to deliver to a local grain handler who has the management skills and infrastructure to maintain the product in good condition.



## 1. What are Oilseeds?

Oilseeds are seeds from various plant species which contain significant quantities of oil. The oil is used in the production of cooking oils and a wide range of other products.

There are many oilseed species grown in Australia, the main ones include:

- Canola
- Cottonseed
- Linseed
- Safflower
- Soybeans
- Sunflower

## 2. What is Oilseed Quality?

To maintain its market value, oilseeds must:

- Have a high oil content
- Be of good colour
- Contain no residues of unregistered chemicals or residues above permitted registered limits
- Be low in free fatty acids
- Be relatively low in moisture and temperature
- Be free of stored product insect pests, moulds and mycotoxins

The storage conditions and processes affect many quality parameters. The most appropriate storage conditions are to maintain the temperature of the seed below 20°C and seed moisture less than 7%. Under these conditions there should be no mould development, free fatty acid formation is minimised and oil colour is retained. Insect infestation is restricted, though some insect control treatment may be needed if the commodity is to be stored for more than a few weeks.

If incorrectly stored, the quality of the oilseed may deteriorate, thus lowering its market value and the quality of the oil and other products made from the seed.

## 3. Type of Storage Facilities Available

Oilseeds may be stored on-farm for later marketing or delivered to a grain handler for warehousing or sale at the time of delivery. Storage types vary from vertical to horizontal, but in all instances only appropriate storage infrastructure and operator skill will maintain the quality of the product.

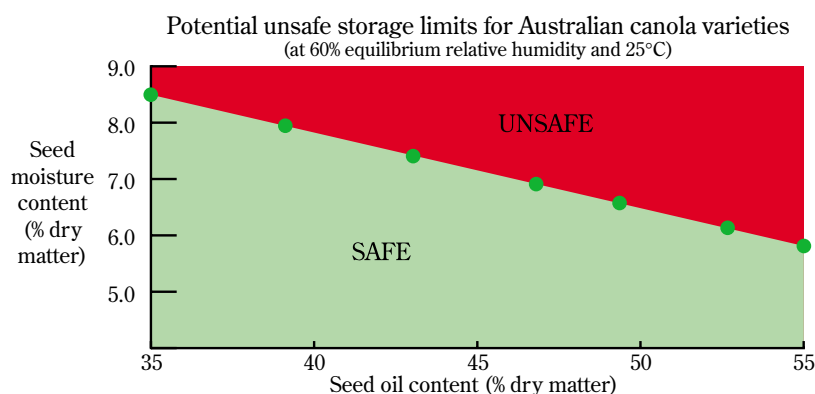
If oilseeds are to be stored on farm, it is important that the same good industry practices as used by the bulk grain handlers are implemented so that oilseed quality is maintained and growers do not risk losing valuable returns upon sale of their product.

## 4. Factors to Control when Storing Oilseeds

There are a range of quality parameters to consider and / or control when storing oilseeds. The main ones relate to the food safety aspects of the use of oilseeds and include:

### 4.1 Oil Content

The issue - The higher the oil content and storage temperature, the lower the moisture content must be for safe storage. The following graph shows how this affects stored canola.



The remedy - Measure the oil and moisture content and determine on the graph the suitability of the canola for storage. Canola falling into the potentially unsafe area above the line should not be stored for any lengthy period of time unless appropriate action is taken such as lowering the moisture content and seed temperature.

### 4.2 Moisture and Temperature

The issue - For best quality, oilseeds should be stored cool and dry. Typically this means below 25°C (but preferably below 20°C) and at less than 7% moisture content (even less for high oil content seed). When oilseeds are harvested, they are often higher than this in temperature. Moisture may also be higher.

The remedy - lower the temperature and moisture content to a safe level. This can generally be done using aeration. Well-controlled aeration should maintain safe conditions. Painting the storage white will help passive cooling by reducing heating by sunlight.

### 4.3 Insect Infestation

The issue - Most oilseeds, even canola, can become infested with stored product insects in storage, particularly at the surface of the stack. Other oilseeds such as sunflowers are very prone to insect attack. Insects and mites may cause seed damage, heating and subsequent rejection or downgrading by buyers. There is a nil tolerance for live stored product insects on export.

The remedy - kill insects using phosphine in a gas-tight sealed storage or control insects using aeration. Inspect regularly to ensure the commodity remains free from insects. At present, both automated and manual aeration systems are available for use in a wide variety of storage types. The automated systems provide well-controlled aeration. Phosphine is the only registered treatment for use on oilseeds. Phosphine fumigation requires the correct dosage, length of exposure and a fully sealed gas-tight storage to be effective. Phosphine is available in a number of forms such as tablets, pellets, sachets and blankets. The tablet and pellet formulations, while reacting with moisture in the grain and air to gradually release phosphine gas, may leave unreacted residue. This is a major issue for the industry and can lead to very serious problems. Thus, it is preferable to use the sachet and blanket forms where appropriate, with all fumigation products removed at the end of the fumigation.

## 5. Problems with Incorrect Storage or Procedures

Several problems with quality arise when oilseeds are stored incorrectly. Longer storage periods may increase these risks, including:

### 5.1 High Moisture

If left unchecked, high moisture and/or high temperature in the oilseed may lead to moisture migration, crusting on the surface of the stack, mould, heating of the oilseed and eventually spontaneous combustion. Even one load of high moisture oilseeds in a bulk can result in significant damage.

### 5.2 High Temperature

Closely related to high moisture, high temperature may cause increased free fatty acid content, poor colour and tainting.

### 5.3 Mould

If water leaks into the storage facility or moisture migration occurs, crusting and mould may develop on the stored seed surface.

### 5.4 Insect Infestation Treatments

Failure to treat stored grain against insect infestation, or incorrect treatment, may enable insects to survive and be detected in the oilseed when outturned to the market. All chemical treatments must occur as per label recommendations. If treatment recommendations are not followed, the risk of surviving insects remaining in the commodity is increased. In addition, residues of the chemical including phosphine may remain, leading to rejection of the commodity by the buyer.

### 5.5 Aeration

The aeration system must be sized specifically for the commodity and storage design. For example, canola has a higher resistance to airflow than many other commodities. Incorrect fans and inappropriate ductwork may cause inadequate aeration.

### 5.6 Handling

Small oilseed commodities such as canola readily leak from handling, storage and transport equipment. To prevent loss of commodity and infestation, all infrastructures must be well constructed and free of leaks.

Produced on behalf of the oilseeds industry by the Australian Oilseeds Federation.



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