

# AWB Wheat Quality Fact Sheet

## Artificial Grain Drying

### AWB Receival Standards

There are two Receival Standards designed to detect grain that has been damaged by overheating during artificial drying.

- Grain tendered for delivery that is over 50°C; and / or
- Grain that is greater than 10% visually sprouted or exhibits other evidence of weather damage but no corresponding decrease in Falling Number.

Falling Number can be used to detect grain damaged during artificial drying because it measures enzyme activity.

Enzymes are proteins that are readily denatured by over- heating and thus the absence of low Falling Number with significant visual sprouting is a clear indicator of heat-damaged grain.

Grain that is over 50°C on delivery and/or is greater than 10% visually sprouted and no equivalent reduction in Falling Number will be classified as Feed.

### Nature

Artificial Grain Drying is the process by which hot dry air is passed through/over grain to remove excess moisture.

In Australia it is generally used when grain has reached maturity but excess moisture within the grain prevents the crop from being harvested.

In this situation the grower may choose to commence harvesting and artificially dry the grain at a latter stage to a moisture content that will meet the Receival Standards.

When conducted properly, Artificial Grain Drying is an effective and useful process that can be used to avoid potential weather damage by harvesting crops prior to the arrival of inclement weather.

### Cause

In most instances the grain moisture content is dependent upon the stage at which it is harvested.

When to commence harvesting is a critical decision growers have to make which will be influenced by the likelihood of rainfall, as moisture absorption by mature grain may cause Sprouting to occur and the subsequent downgrading of grain tendered for delivery.

If growers decide to harvest early and artificially dry grain it is important that the drying is conducted in accordance with the manufacturers' instructions.

This is because grain can be damaged by overheating during the drying process, which is primarily caused by setting the drying temperature too high or by exposing the grain to heat for too long.

### Impact

If grain is damaged during the drying process, the functionality of proteins within the grain will be lost. In extreme cases the grain may be visually burnt with a glossy brown appearance and emit an odour. However grain that appears normal but is dried incorrectly may still be irreversibly damaged by protein denaturation.

The damage caused by overheating initially occurs at a molecular level within the grain making it difficult to detect at the receival stand. However, the fundamental quality of proteins within the grain is altered and this in turn has significant adverse affects on the performance of end products produced from the grain.

In bread dough or noodle sheets, denatured proteins are unable to form the unique structures or perform the unique functions expected of wheat flours.

The end product and dollar value of heat-damaged grain is very limited.

### What can be done?

The majority of growers rely on natural field conditions to dry their crops to moisture contents below the Receival Standard requirements. High moisture grain is only a problem when crops are harvested early or when inclement weather necessitates harvesting to avoid weather damage.

If Artificial Grain Drying is required, it is important that the manufacturers' instructions are followed. AWB prefers that growers use the lowest air temperature that will achieve grain drying at all times, without heating the grain to unacceptable levels. This means that a minimum time for the drying process will be required. However, it is recognised that reduced grain throughput and cost may not permit low temperatures and a lengthy grain drying process.

There are various types of grain dryers with the majority having a relatively low throughput capacity.

Where smaller scale dryers are used, caution must be taken to ensure the grain and air is adequately mixed so that a uniform grain temperature is achieved. When using artificial dryers the grain temperature must not exceed 60°C, meaning that air temperatures should not exceed 65°C. The time limits for the period that grain is exposed to hot air must be strictly adhered to otherwise the grain will be at a significant risk of becoming heat damaged.

After grain has passed through an artificial dryer, it must be cooled either as part of the drying operation or by other means prior to delivery.