



BUSINESS SMART
CARBON SMART

GRAIN CONDITIONING GUIDE



TRAINING AND DEVELOPMENT

Key Factors - Practical Checklist

CONDITIONING

Conditioning refers to the process of adding conditioned moisture to grain, and allowing it to soak into the grain before rolling. Conditioning improves the appearance of the rolled grain, producing a flat, robust product. A Surfactant Mould Inhibitor is added to the water to prevent the growth of moulds in the finished rolled product.

The following are the key factors to consider prior to the conditioning process.

KEY FACTORS

- To achieve the target moisture accurately it is essential to know the moisture content of the grain prior to conditioning. Moisture contents can vary depending on the process used at harvest. For maize, 9%- 14% is typical, depending on the source etc.
- No more than 6% moisture should be added at any one time. This should be allowed to soak in for a minimum of 6 hours. For maize, no more than 5% added, and 8 hour minimum soak in time.
- If Aerated Grain or Farm Supplied Grain is to be used it needs to be analysed prior to conditioning. Mould levels in these grains can be higher than in Dried or Treated grain so a minimum 25% higher level of Surfactant Mould Inhibitor will be needed.
- Grain temperature may increase by 4-8°C in the rolling process. This can have a bearing on the shelf life of the grain after rolling depending on the ambient temperature and the level of Surfactant Mould Inhibitor used. Aeration/cooling of the grain after rolling can be of benefit. At minimum allow the rolled grain to cool naturally before outloading.
- The liquid application system should be calibrated at least twice per year to ensure the dosage levels are correct. This is scheduled and done by the Adesco engineer. The conveying equipment throughput should also be measured regularly.
- Samples should be taken and moisture content checked at different stages in the process to establish moisture retention rates.
- Records should be kept of the Conditioning / Rolling process, see page numbers 3 and 4. These records should be in place from the beginning and should, if possible, include the following: Initial and Final Moisture Content, Moisture Addition Levels (from meter readings), Soaking Time, Throughput of Conditioning Equipment and Roller i.e. Start and Finish Times for the Run against Tonnage processed, Ambient & Product Temperatures, Problems / Issues arising during the process.
- The variety/origin of the Maize is also important: in general Brazilian Maize is not suitable as it has a more rounded shape, a harder shell and does not absorb moisture as easily as French Maize. As a result it is more difficult to roll and should be avoided. Also check the grain for cleanliness.

Overview

WHY CONDITION?

Conditioning softens the kernel of the grain which makes it easier to roll and produces a flat robust rolled grain that looks well, holds its shape and is not dusty. Conditioning also improves the digestibility of the grain.

HOW IS IT DONE?

Conditioned moisture is sprayed onto the grain and mixed in an augur/conveyor at pre-determined rates depending on the starting moisture of the grain, the time of year, the final moisture content required and its intended use.

IMPORTANT ISSUES IN THE GRAIN CONDITIONING PROCESS

- 1) Understand the quality of the grain to be conditioned. Grain treated at harvest with Adesco Grain preservation products or grain dried to below 14% moisture is the most suitable for conditioning. This is because the mould counts are lowest in this grain.
- 2) Confirm the starting and target moisture and apply the correct rate of conditioned moisture. Rate of application varies as the table below shows so it is important to apply the correct rate for the grain type and time of year.
- 3) Record what is done: record the date, the type of grain, the initial moisture, the tonnes conditioned, the amount of conditioned moisture used, and conditioned grain moisture.

RECOMMENDED APPLICATION RATES FOR ADESCO SURFACTANT MOULD INHIBITORS:

BARLEY & WHEAT	SUMMER (grams/10lt water added)	WINTER (grams/10lt water added)
Adesco Treated	400 - 500	300 - 400
Dried to <14% at Harvest	400 - 500	300 - 400
Dried 14% - 15.5%	525 - 625	400 - 500
Aerated max 18%	1000	750
Farmer Supplied	Not Recommended	1000 Minimum
Maize	750 - 1000	500 - 600

*Mould levels in Maize can be higher than in Dried or Treated Barley or Wheat.

In addition to the above there are also target values set for maximum final moisture which is generally at 21% for winter and 18% for summer.

A maximum addition (6%) in one application of conditioned moisture is set depending on the type of grain and efficiency of the mixing augur.

There are also higher rates set for bagged product which is minimum 25% higher than those set out in the table above.

Conditioning - Recommended operating procedures

BEFORE STARTING THE CONDITIONING PROCESS

- 1) Management and the Operator should agree a target moisture prior to rolling of conditioned grain.
This target moisture should be reviewed regularly.
- 2) Sample, test and record moisture of grain prior to conditioning. Regular checks are essential.
- 3) Calculate the percentage moisture to be added to the grain to achieve the target moisture.
Remember 5-6% moisture maximum in one pass.
- 4) Refer to Calibration chart for appropriate pump settings and set pumps accordingly.

DURING CONDITIONING

- 1) Record all parameters of the conditioning process:
 - a. Date, start and finish time
 - b. Throughput of conditioning system
 - c. Pump settings: Water and Adesco Surfactant Mould Inhibitor
 - d. Tonnes conditioned
 - e. Meter readings
 - f. Actual application per tonne
 - g. Moisture of conditioned grain after soaking
 - h. Comments/signature
- 2) Record any issues encountered throughout the conditioning process.
- 3) Retain analysed samples for future reference.



An example of an Adesco Grain Conditioning Application System

GRAIN CONDITIONING GUIDE

CONDITIONING PROCESS RECORD SHEET

OPERATOR					DATE					
TARGET MOISTURE PRE ROLLING					<input type="checkbox"/> 20 – 21% WINTER/SPRING <input type="checkbox"/> 18% SUMMER					
THROUGHPUT (TONNES PER HOURS)										
Time	Initial Moisture of Grain %	Required Application %	*Pump Settings		Tonnes Cond.	Meter Reading		**Actual Application per tonne	Moisture of Cond. Grain %	Comments/ Signature
			Water (Lit/min)	Product (%'age)		MCESL	Water			

* Refer to Calibration document and recommended settings
 **Actual Application = (Water Meter Reading) ÷ Tonnes Conditioned

Grain Rolling – Operating Procedures

BEFORE START-UP OF ROLLING PROCESS:

- 1) Management and the Operator should agree target moisture prior to rolling. This target moisture should be reviewed monthly
- 2) Target moisture for Winter/Spring pre rolling is 20/21% and for Summer 18%
- 3) Sample, test and record moisture of selected grain prior to rolling. Regular checks are essential
- 4) If moisture of grain is too low, calculate percentage moisture to be added to the grain and follow the Grain Conditioning procedures to achieve the target moisture.

ROLLING:

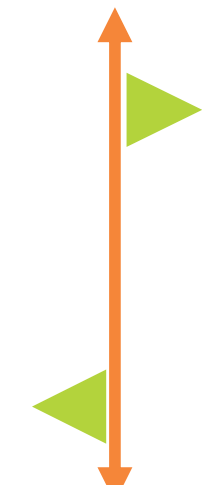
- 1) If grain has been conditioned to achieve the target moisture allow the grain to soak for a minimum 6 hours, ideally overnight.
- 2) Check roll condition and settings – schedule annual maintenance to ensure rolls are not damaged and are even
- 3) When rolling record ALL process parameters on the GRAIN ROLLING RECORD SHEET
 - a) Date, start and finish time
 - b) Grain moisture pre rolling
 - c) Grain Temperature pre rolling
 - d) Tonnes rolled
 - e) Appearance of rolled product
 - f) Rolled grain temperature pre dispatch
 - g) Rolled grain moisture pre dispatch
 - h) Comments/signature
- 4) Record any issues encountered throughout the rolling process

Note: Retain analysed samples for future reference

ROLLED BARLEY



HIGH MOISTURE



LOW MOISTURE

ROLLED CONDITIONED BARLEY



GRAIN CONDITIONING GUIDE



ROLLING PROCESS RECORD SHEET

OPERATOR					DATE			
TARGET MOISTURE PRE ROLLING					<input type="checkbox"/> 20 – 21% WINTER/SPRING <input type="checkbox"/> 18% SUMMER			
Date	Time	Grain Moisture pre-rolling	Grain Temperature pre-rolling	Tonnes Rolled	Appearance	Rolled Grain Temperature pre dispatch	Comments	Signature

Calculating inclusion rates to achieve target moisture

Use this table to calculate the moisture addition required to achieve a specific moisture rate from your initial moisture

Initial MC	Target Moisture					
	16%	17%	18%	19%	20%	21%
12%	4.8%	6.0%	7.3%	8.6%	10.0%	11.4%
13%	3.6%	4.8%	6.1%	7.4%	8.8%	10.1%
14%	2.4%	3.6%	4.9%	6.2%	7.5%	8.9%
15%	1.2%	2.4%	3.7%	4.9%	6.3%	7.6%
16%		1.2%	2.4%	3.7%	5.0%	6.3%
17%			1.2%	2.5%	3.8%	5.1%
18%				1.2%	2.5%	3.8%
19%					1.2%	2.5%
20%						1.3%

GRAIN CONDITIONING GUIDE

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ABOUT ADESCO

Adesco is committed to helping grain processors to quickly and significantly improve competitiveness by reducing the cost of high quality grain production.

Adesco's innovative science-led solutions work with nature to reduce the cost of consistently producing higher quality grain with improved nutritional yield that is cleaner and more environmentally sound.

Adesco offers a range of advanced products, measurement and application systems and ongoing grain performance programmes.

For more information on the programme, email info@adesco.ie

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