



GRAIN TRADE AUSTRALIA

Section 2 – CEREAL RYE & TRITICALE TRADING STANDARDS

2014/15 SEASON

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SECTION 1 INTRODUCTION

General

Since 1999 Grain Trade Australia has on an annual basis reviewed, produced and published on behalf of industry Cereal Rye and Triticale Trading Standards (Standards) through its Standards Committee (Committee).

In order to provide a consistent message to both domestic industry and international buyers, Grain Trade Australia (GTA) encourages input into development of these Standards. Additionally, we urge industry to use the Standards contained within this Manual as applicable when buying and trading Australian Cereal Rye and Triticale.

Considerations to the Standards

This section of the Manual relating to Cereal Rye and Triticale has been produced following the annual review by GTA of Standards. There are various sections of this Manual relating to Standards and associated procedures and industry is encouraged to take account of all relevant sections when applying these Standards to Cereal Rye and Triticale bought and traded domestically or internationally.

The Grades referred to in this document are a combination of:

- Grades commonly introduced across the country on an annual basis and are generally the same in each State where Cereal Rye and Triticale is grown or traded
- Grades that may not be introduced every season or only introduced in a regional area. These grades may be created for various reasons including to meet the specific quality requirements of a customer, as specific varietal segregations or to deal with specific quality issues with harvested grain in a localised area

Industry should note the list of Grades in this Manual is not exhaustive.

Variations to Standards

Whilst the information in this Manual is current at time of publication, you will need to monitor the GTA Member Updates, the GTA website (www.graintrade.org.au) and other applicable information to ensure that you are aware of the changes to the Standards and the impact on your own trading arrangements.

Varieties

Approved and recommended varieties to be grown and acceptable within each grade are listed within this document. Variety integrity and correct variety assessment is an integral part of the grain classification and Standards application process. GTA endorses the varietal classifications as listed in this Manual and encourages all industry to follow the approved varietal list as listed in this Manual where relevant.

Changes to varietal classifications may occur at any time during the season following the publication of this Manual. As these changes will not necessarily be included in this Manual industry should implement their own procedures for monitoring the varietal classification process.

Timing of Standards Development

The Standards outlined in this Manual are applicable for the entire season of 2014/15. Standards apply to grain assessed as per these Standards from 1 August 2014 to 31 July 2015.



SECTION 2 DEFINITIONS

Unless otherwise stated, the definitions listed below refer to the commodities Cereal Rye and Triticale as listed in this Manual.

As Is

In terms of sample assessment, is the representative sample as taken from the load tendered for delivery without any interference to the sample. That is, there has been no cleaning or screening of the sample prior to analysis. The sample may also be referred to as a “dirty” sample.

Cereals

In the context of these Standards, cereals refer to wheat, barley, oats, cereal rye, triticale, sorghum, maize and rice.

Cereal Rye

Cereal Rye includes grains of the species *Secale cereale*.

Cereal Smuts

Cereal Smuts include all smuts on all cereal grains. This includes but is not limited to:

Ball Smut

Are those infected by the spores of the fungus *Tilletia caries*. They have the appearance of pale, plump, slightly oversized grains. These grains are easily crushed between the fingers and contain a mass of black powder (spores) with a distinctive rotten egg smell. This may also be called Stinking Smut or Bunt.

Covered Smut

Covered smut is caused by various fungi of the *Ustilago spp.*

Loose Smut

Loose smut is the result of the fungus *Ustilago tritici* developing in the head during the growing phase. The tolerance applies to the number of blackened pieces of backbone in the sample.

A nil tolerance applies to all smuts in cereal kernels.

Chemicals not Approved for Cereal Rye and Triticale

Refers to the following:

- Chemicals used on the growing crop in the State or Territory where the Cereal Rye or Triticale was grown in contravention of the label
- Chemicals used on stored Cereal Rye or Triticale in contravention of the label
- Chemicals not registered for use on Cereal Rye or Triticale
- Cereal Rye or Triticale containing any artificial colouring, pickling compound or marker dye commonly used during crop spraying operations that has stained the Cereal Rye or Triticale
- Cereal Rye or Triticale treated with or contaminated by Carbaryl, Organochloride chemicals, or diatomaceous earth

- Chemical residues in excess of Australian Commonwealth, State or Territory legal limits (see Maximum Residue Limit and National Residue Survey)

For further information on this topic, refer to the document “Australian Grains Industry Post Harvest Chemical Usage Recommendations and Outturn Tolerances 2014/15” - see GTA website www.graintrade.org.au/chemical_tolerances.

Clean Seed Basis

For the purposes of assessment of various defective grains, clean seed includes all Cereal Rye or Triticale seed remaining above the screen following the Screening process.

Contaminants

Contaminants are defined individually in these Standards and consist of the following:

- Cereal Ergot
- Chemicals not Approved for Cereal Rye or Triticale
- Chemicals in excess of the MRL
- Earth
- Foreign Seeds
- Insects – Large
- Insects – Small
- Objectionable Material
- Other Foreign Material
- Pickling Compounds or Artificial Colouring
- Ryegrass Ergot
- Sand
- Snails
- Stones
- Stored Grain Insects and Pea Weevil – Live

Contaminants may be referred to as foreign material, being all material other than whole or broken seeds or hulls of the Cereal Rye or Triticale being assessed.

Damaged Grains – Cereal Rye

Damaged Grains for Cereal Rye refers to whole or part kernels that are Dry Green or Sappy, affected by Field Fungi, Frost Damaged, Germ Damaged, Insect Damaged, Sprouted or Weather Damaged.

Defective Grains

Defective grains refer to Cereal Rye or Triticale that has been damaged to some degree, as outlined in these Standards. Note that the following table lists all defects within a commodity type – some of these defects may be sub-categories within each defect type. Refer to the individual definitions for each commodity for further information.

An individual kernel may only have one defect, being the defect type with the tightest tolerance in the standard.

Defective Grain Type	Cereal Rye	Triticale
Bin Burnt	Y	Y
Damaged Grains – includes Sprouted, Weather Damaged, Frost Damaged, Field Fungi, Germ Damaged, Insect Damaged, Dry Green or Sappy	Y	
Dry Green or Sappy	Y	Y
Field Fungi	Y	Y
Frost Damaged	Y	Y

Defective Grain Type	Cereal Rye	Triticale
Heat Damaged	Y	Y
Insect Damaged	Y	Y
Musty or Mouldy	Y	Y
Pink Stained	Y	Y
Shot		
Sprouted	Y	Y
Stained - Includes Weather Stained, Field Fungi, Pink Stained		Y
Storage Mould	Y	Y
Weather Damaged	Y	
Weather Stained Grains		Y

Dry Green or Sappy

Dry Green refers to green grains arising from harvesting of grain before it has matured. Dry Green grains are those whose surface is distinctively green. Dry Green grains are usually dry and hard.

Sappy grains are those that have been harvested before maturity. Sappy grains are generally soft when pressed. They may or may not be green. Any level of sappiness is classified as defective.

Earth

Earth is defined as a clod of dirt, being 5mm or less in diameter.

Ergot

Ergot is a purplish black fungal body, which contaminates cereal and ryegrass kernels when they are infected by the fungus *Claviceps purpurea*.

Ryegrass Ergot

Ryegrass ergot is *Claviceps purpurea* infection of ryegrass kernels. Tolerances are defined in terms of overall length in cm when pieces found in the sample are aligned end on end.

Cereal Ergot

Cereal ergot is *Claviceps purpurea* infection of any cereal kernels. Tolerances are defined in terms of the total number of pieces or whole affected kernels of any cereal found in the sample.

Field Fungi

Field Fungi refers to individual grains where the seed coat has grey to black spotting occurring anywhere on the grain. Coverage greater than 15% of the grain surface is considered defective.

Grains that show staining but no fungal growth are to be classified as Weather Stained Grains (Triticale) or Weather Damaged Grains (Cereal Rye) as applicable.

Grains that are soft (that are not classified as Sappy) and /or emit a mouldy odour are to be classified as Musty or Mouldy.

Foreign Seeds

Foreign Seeds are defined as seeds of any plant, other than the species of crop being tendered for delivery. Foreign Seeds are classified into two broad groups; those with specific tolerances listed in the Standards, and those without. The latter are termed "Small Foreign Seeds".

Seeds with specific tolerances have been categorised into several groups. These are generally referred to below, however variations by commodity may exist as listed below and industry should refer to the relevant commodity Standards chart for further details.

Type 1

Colocynth (*Citrullus colocynthis*)
 Double Gees / Spiny Emex / Three Cornered Jack (*Emex australis*) – Triticale only
 Jute (*Corchorus olitorius*)
 Long Head Poppy (*Papaver dubium*)
 Mexican Poppy (*Argemone mexicana*)
 Poppy (Field) (*Papaver rhoeas*)
 Poppy (Horned) (*Glaucium flavum*)
 Wild Poppy (*Papaver hybridum*)
 Parthenium Weed (*Parthenium hysterophorus*)
 New Zealand Spinach (*Tetragonia tetragonoides*)

Type 2

Castor Oil Plant (*Ricinus communis*)
 Coriander (*Coriandrum sativum*)
 Crow Garlic/Wild Garlic (*Allium vineale*)
 Darling Pea (*Swainsona spp*)
 Opium Poppy (*Papaver somniferum*)
 Peanut seeds and pods (*Arachis hypogaea*)
 Ragweed (*Ambrosia sp*)
 Rattlepods (*Crotalaria sp*)
 Starburr (*Acanthospermum hispidum*)
 St. Johns Wort (*Hypericum perforatum*)
 Cutleaf Mignonette seeds or pods (*Reseda lutea*) – Cereal Rye only

Type 3a

Bathurst Burr (*Xanthium spinosum*)
 Bellvine (*Ipomoea plebeia*)
 Branched Broomrape (*Orobanche ramosa*)
 Bulls Head / Caltrop / Cats Head (*Tribulus terrestris*)
 Cape Tulip (*Homeria spp*)
 Cottonseed (*Gossypium spp*)
 Dodder (*Cuscuta spp*)
 Noogoora Burr (*Xanthium pungens*)
 Thornapple (*Datura spp*)

Type 3b

Vetch (Commercial) (*Vicia spp*)
 Vetch (Tare) (*Vicia sativa*)
 Saffron Thistle (*Carthamus lanatus*) – Cereal Rye only

Type 3c

Heliotrope (Blue) (*Heliotropium amplexicaule*)
 Heliotrope (Common) (*Heliotropium europaeum*)

Note included in this Type are tolerances for seeds or pods

Type 4

Bindweed (Field) (*Convolvulus arvensis*)
 Cutleaf Mignonette seeds or pods (*Reseda lutea*) – Triticale only
 Darnel (Drake Seed) (*Lolium temulentum*)

Hexham Scent / King Island Melilot (*Melilotus indicus*) only acceptable if no tainting odour is present

Hoary Cress (*Cardaria draba*)
 Mintweed (*Salvia reflexa*)
 Nightshades (*Solanum spp*)
 Paddy Melon (*Cucumis myriocarpus*)
 Skeleton Weed (*Chondrilla juncea*) – Triticale only
 Variegated Thistle (*Silybum marianum*)

Type 5

Knapweed (Creeping/Russian) (*Acroptilon repens*)
 Paterson's Curse / Salvation Jane (*Echium plantagineum*)
 Sesbania Pea (*Sesbania cannabina*)

Type 6

Colombus Grass (*Sorghum almum*) – Triticale only
 Johnson Grass (*Sorghum halepense*) – Triticale only
 Melilotus (*Melilotus spp*) – Cereal Rye only
 Saffron Thistle (*Carthamus lanatus*) – Triticale only
 Skeleton Weed (*Chondrilla juncea*) – Cereal Rye only

Type 7a

Broad Beans (*Vicia faba*)
 Chickpeas (*Cicer arietinum*)
 Colombus Grass (*Sorghum almum*) – Cereal Rye only
 Corn (Maize) (*Zea mays*)
 Cowpea (*Vigna unguiculata*)
 Faba Beans (*Vicia faba*)
 Johnson Grass (*Sorghum halepense*) – Cereal Rye only
 Lentils (*Lens culinaris*)
 Lupin (*Lupinus spp*)
 Peas (Field) (*Pisum sativum*)
 Safflower (*Carthamus tinctorius*)
 Soybean (*Glycine max*)
 Sunflower (*Helianthus annuus*)
 And any other seeds or pods greater than 5mm in diameter

Type 7b

Barley (2 row) (*Hordeum distichon*)
 Barley (6 row) (*Hordeum vulgare*)
 Bindweed (Australian) (*Convolvulus erubescens*)
 Bindweed (Black) (*Polygonum convolvulus*)
 Durum (*Triticum durum*)
 Red / Spring Feed Wheats (Various)
 Oats (Black or Wild) (*Avena fatua*) – Triticale only
 Oats (Sand) (*Avena strigosa*)
 Oats (Common) (*Avena sativa*)
 Rice (*Oryza sativa*)
 Rye (Cereal) (*Secale cereale*) – Triticale only
 Sorghum (Grain) (*Sorghum bicolor*)
 Sorghum (Forage) (*Sorghum spp*)
 Triticale (*Triticosecale spp*) – Cereal Rye only
 Turnip Weed (*Rapistrum rugosum*)
 Wheat (*Triticum aestivum*)

Type 7b includes any other Foreign Seeds not specified in Types 1 - 7a or elsewhere in Small Foreign Seeds or Unmillable Material Above the Screen.

Variations

Double Gees / Spiny Emex / Three Cornered Jack (*Emex australis*) – Cereal Rye only
Other Pulses, Other Oilseeds, Wild Oats and Other Cereal Grains not listed – Cereal Rye only

Note that Wild Radish pods and Milk Thistle pods are not classified as Foreign Seeds but are defined as Unmillable Material Above the Screen. All other Foreign Seed Pods not listed and that are not greater than 5mm in diameter (Type 7a) are included as Unmillable Material Above the Screen, whether whole pods or part thereof.

Frost Damaged

Frost Damaged refers to grain damaged as a result of frost during the maturation phase. The definition does not include grain pinched as a result of dry conditions or disease during maturation.

For Triticale, Frost Damaged grains generally have the appearance of full sized kernels with little or no structure on the sides of the grain.

Germ Damaged – Cereal Rye

Germ Damaged refers to any physical damage to the germ, including partial or full removal of the germ.

Grade

Grade refers to the classification given to the load after it has been sampled and tested, and has been classified according to these Standards.

The Grade into which a load is classified shall be determined by its variety, and then by the various physical quality specifications detailed in these Standards.

Heat Damaged, Bin Burnt, Storage Mould

Heat Damaged or Bin Burnt

Heat Damaged or Bin Burnt refers to those kernels that have become discoloured due to exposure to severe heat during storage or an incorrect artificial drying technique. Affected grains appear reddish brown, or in severe cases, blackened.

Storage Mould Affected

Storage Mould refers to kernels that have become affected by the development of fungi or bacteria due to an increase in grain moisture levels during storage. Affected grains appear discoloured and visibly affected by mould.

The above grain defects are often categorised together as the differences between them can be difficult to distinguish.

Hit and Miss

In relation to screen slots, refers to the sequence of slots on the screen when viewing along a row facing the direction of the slots. That is, the screen is made of a series of slots and “no slots” in sequence equidistant.

Insect Damaged

These are grains eaten in part by Stored Grain Insects and any field pest of grains including *Heliothis spp.* Any visible insect damage to the grain is classified as defective.

Insects – Large and Small

These are insect contaminants of grain that do not cause damage to stored grains. There are separate tolerances for Large and Small Insects. They include but are not restricted to:

Large Insects	Small Insects
Desiantha Weevil (<i>Desiantha spp.</i>)	Aphids
Grasshoppers, Locusts	Minute Mould Beetle (<i>Corticaria spp.</i>)
Hairy Fungus Beetle (<i>Typhaea stercorea</i>)	Mites (<i>Acarina spp.</i>)
Ladybirds	Stored Grain Insects (dead only)
Pea Weevil (<i>Bruchus pisorum</i>) (dead only)	
Sitona Weevil (<i>Sitona spp.</i>)	
Wood Bugs	

Tolerances apply to either Live or Dead whole Insects for most species, however note for Live Pea Weevil and Live Stored Grain Insects, a nil tolerance applies – refer to the definition of Stored Grain Insects.

For all Insects, pieces of Insects are classified as Other Foreign Material.

Load

A load is a bulk unit tendered for delivery.

Maximum Residue Limits

Maximum Residue Limits (MRLs) are the maximum amount of a chemical residue or its metabolite that is legally permitted on or in an agricultural commodity. The Australian Pesticides and Veterinary Medicines Authority (APVMA) sets MRLs. These MRLs are set at levels which are not likely to be exceeded if the agricultural or veterinary chemicals are used in accordance with approved label instructions and can be found on the ComLaw website at the following address <http://www.comlaw.gov.au/Details/F2014C00821>.

Australian MRLs may differ significantly from those prescribed by foreign countries and the International Codex Alimentarius Commission. Consequently grain exporters must be aware of MRLs of importing countries and which countries accept Codex MRLs. Foreign country MRLs may be accessed directly from foreign government websites or the NRS grains database at <http://www.daff.gov.au/agriculture-food/nrs/nrs-australian-and-overseas-mrl-database>. Industry should always confirm the accuracy of these MRL listings through their own means.

Moisture

This is the amount of water present in the sample as determined by the appropriate analytical method.

N/A

In these Standards means not applicable. That is, no minimum or maximum tolerance exists. The quality parameter may exist at unlimited levels in the sample.

National Residue Survey

The National Residue Survey (NRS) gathers information and supplies chemical residue results on domestic and export grain commodities. The NRS results show Australian grain is of a high quality with respect to residues and contaminants. All grain exporters, container packers, bulk export

terminal operators, Bulk Handling Companies and processors are encouraged to actively participate in the NRS grains residue monitoring program. Contravention of an overseas MRL may cause the rejection of cargoes resulting in severe financial cost being incurred and potentially jeopardising Australian grain into that market. Information about the NRS is located at <http://www.daff.gov.au/agriculture-food/nrs>.

Nil

Nil in these Standards means a level of zero in a half litre sample representative of the entire load (or parcel of grain being assessed) and/or not detected in the load or in/on the delivery vessel at any stage of the receival process.

Objectionable Material

Objectionable Material refers to objectionable foreign matter that may or may not be otherwise stated in these Standards which has the ability to degrade the hygiene of Cereal Rye or Triticale, become a food safety issue of concern or has a commercially unacceptable odour. This includes but is not limited to the following:

Animal Material

This refers to meat meal, bone meal, poultry offal, meal or any other animal proteins. Animal Material also includes carcasses of dead animals such as rats and mice.

Odour

A commercially unacceptable Odour is defined as a sour, musty or other objectionable odour emanating from the Cereal Rye or Triticale which is not natural or normally associated with Cereal Rye or Triticale. Odour may be caused by various means which may or may not be physically discernible in the sample being assessed.

Stick

A Stick is defined as ligneous material greater than 1cm in length and 0.5cm in diameter. Note that crop stubble greater than 3cm in length and 1cm in diameter is defined as a Stick. Smaller material is classified as Other Foreign Material.

Tainting Agents

A Tainting Agent is any contaminant that imparts a smell or taint to Cereal Rye or Triticale. It includes but is not limited to plant parts and seeds of *Eucalyptus spp.*

Water

The addition of water to grain prior to delivery is a prohibited practice.

Other

This refers to any other commercially unacceptable contaminant such as animal excreta, glass, concrete, fertiliser or metal.

Other Foreign Material

Refers to other material not otherwise specified as having a tolerance in these Standards that has the ability to degrade the quality of Cereal Rye or Triticale. It includes, but is not limited to the following:

Fine Material

This refers to material such as dust and soil (<0.06mm in diameter) and minerals.

Snail Shell and Stored Grain Insects

This includes pieces of Snail Shell (less than half an entire shell), pieces of Stored Grain Insects (not whole) and pieces of Insects Large and Small.

Other

This includes pieces of Sticks that are smaller than the dimensions specified under Objectionable Material, and other non-vegetative material.

Pea Weevil

Pea Weevil refers to all life stages of insects of the species *Bruchus pisorum*.

Note that a separate tolerance applies to Live and Dead Pea Weevils:

Live

- A nil tolerance applies to all live Pea Weevils

Dead

- Dead Pea Weevil are included in the definition for Insects – Large
- Pieces of Pea Weevils are classified as Other Foreign Material

As Pea Weevils are commonly found inside field pea seeds, it is recommended that a number of field peas present in a load of grain should be broken and assessed for the presence of this insect.

Pickling Compounds or Artificial Colouring

Pickling Compounds are those chemicals added to grain as a seed treatment or as a seed dressing prior to sowing. This includes grains that may be affected by marker dye commonly used during crop spraying operations that has stained the grain. They are usually associated with a colouring agent.

Grains contaminated in this way may be identified by an unnatural surface colour and/or a colour that rubs off. Any grains that are artificially coloured regardless of intensity are defective.

Pink Stained

This is a grain defect arising from infection by certain fungal species. The pink discolouration of these grains cannot be rubbed off from the grain surface (refer Pickling Compounds or Artificial Colouring).

This defect may be included as a sub-category in the tolerance for “Stained”.

Sand

A grain of sand is defined as a particle of unconsolidated (loose), rounded to angular rock fragment or mineral grain larger than 0.06mm that falls below the 1.6mm screen (Cereal Rye) or 2.0mm screen (Triticale) during the screening process. Smaller material is classified under Other Foreign Material. Material that is retained above the 1.6mm screen (Cereal Rye) or 2.0mm screen (Triticale) is classified as Earth or Stones.

Screenings

See “Unmillable Material below the Screen”.

Small Foreign Seeds

These are all small foreign seeds in the Unmillable Material fraction which have fallen below the screen during the screening process, except those specifically mentioned in the Foreign Seeds definition.

Snails

This refers to whole or substantially whole (more than half) Snail shells, irrespective of size. These include but are not limited to:

- Common White Snail (*Ceruella virgata*)
- White Italian Snail (*Theba pisana*)
- Pointed Snail (*Cochlicella actua*)
- Small Pointed Snail (*Cochlicella abarbara*)
- Any other snail

Pieces of Snail Shell that are less than half an entire shell are classified as Other Foreign Material.

Sprouted

Sprouted grains are those in which the grain has begun the germination process. A kernel that is Sprouted is one where the shoot is visibly seen growing out from the germ.

Grains that have had the germ knocked off or scalloped out due to header damage are not included in this definition for Cereal Rye (refer Germ Damaged).

Stained - Triticale

Refers to a defect on the grain or kernel caused by either exposure to wet and damp conditions during growth and maturation phases or a stress related biochemical reaction, which causes individual grains to become visually discoloured.

The definition includes grains that display the following:

- A distinct dark brown to black discolouration on the germ end that, in severe cases, may progress to other parts of the grain such as the crease. These grains are commonly referred to as “black point” or “black tip”. The Staining on the germ must cover more than 50% of the germ.
- A light grey to black fungal like discolouration that is usually on the brush end of the grain. In some cases it may extend to other areas of the grain.
- Pink Stained grains arising from infection by certain fungal species. Refer to the definition of “Pink Stained”.
- Grains classified under the term Weather Stained.

Grains that exhibit small dots covering less than approximately 5% of the surface area of the kernel (a small proportion) are not to be classified as Stained and are otherwise whole sound grains. This discolouration does not significantly affect the appearance of the grain.

Standards

Standards means all the test parameters listed in this Manual for the specific commodity. Loads presented for delivery or samples to be assessed under these Standards must be analysed for all the parameters listed in the relevant Standards, unless otherwise specified in individual Storage and Handling Agreements.

Stone

A Stone or gravel is defined as a lump or mass of hard consolidated mineral matter that is retained above the 1.6mm screen (Cereal Rye) or 2.0mm screen (Triticale) during the screening process. Material falling through the 1.6mm screen (Cereal Rye) or 2.0mm screen (Triticale) is defined as Sand.



Note a maximum weight of 4.0g applies to the total weight of all Stones per 2.5L retained above the 1.6mm screen (Cereal Rye) or 2.0mm screen (Triticale).

Stored Grain Insects

These are insects which cause damage to stored grain and the tolerance applies to all life stages of the insect.

These include:

- Angoumois Grain Moth (*Sitotroga cerealella*)
- Confused Flour Beetle (*Tribolium confusum*)
- Flat Grain Beetle (*Cryptolestes spp*)
- Granary Weevil (*Sitophilus granarius*)
- Indian Meal Moth (*Plodia interpunctella*)
- Lesser Grain Borer (*Rhyzopertha dominica*)
- Maize Weevil (*Sitophilus zeamais*)
- Psocids/Book lice (*Psocoptera sp*)
- Rice Weevil (*Sitophilus oryzae*)
- Rust-red Flour Beetle (*Tribolium castaneum*)
- Saw Tooth Grain Beetle (*Oryzaephilus surinamensis*)
- Tropical Warehouse Moth (*Ephestia cautella*)
- Warehouse Beetle (*Trogoderma variable*)

Note that a separate tolerance exists for dead and live Stored Grain Insects.

Live

- A nil tolerance applies to all live Stored Grain Insects

Dead

- Dead Stored Grain Insects are included in the definition for Insects – Small
- Pieces of Stored Grain Insects are classified as Other Foreign Material.

Test Weight

Test Weight is a measure of the density of grain.

Triticale

Triticale refers to grains of the species *Triticosecale spp*.

Unmillable Material Above the Screen

This consists of whiteheads (with grains removed), chaff, backbone, Wild Radish pods, Milk Thistle pods, other seedpods and other light material which remains above the 1.6mm screen for Cereal Rye or 2.0mm screen for Triticale after a sample of grain is subjected to the screening process. It excludes contaminants for which tolerances have been stated in the relevant Standards.

- Chaff is defined as the protective material surrounding the mature seed prior to thrashing or harvesting.
- Backbone is the material to which seeds are attached to the plant stem.

Unmillable Material Below the Screen (Screenings)

This is the total material passing through the relevant screen after a sample of grain is subjected to the screening process. It includes Small Foreign Seeds. Screen slot sizes vary by commodity:

- Cereal Rye – 1.6mm x 19.0mm slotted
- Triticale - 2.0mm x 12.7mm slotted

Variety

This is the next lowest level taxonomic rank of a plant below that of the term “species”. Differing varieties have differing genetic compositions which may endow them with differing agronomic characteristics, and/or differing end product quality characteristics. For this reason, varieties are best segregated into groups which have similar quality characteristics and/or are best suited to particular end product uses.

Varietal Master List

This list designates the varietal group into which each variety may be assigned. The Varietal Master List appears in Section 4 of these Standards.

Varietal Restrictions

Are restrictions to the varieties able to be received into each grade. Refer to Varietal Master List for the maximum classification of each variety.

Weather Damaged – Cereal Rye

Weather Damaged Grains are those grains exhibiting staining such as dark tipping / poor colour etc caused by damp weather prior to harvest, above and beyond the normal colour of the variety.

Grains that are affected by Mould are not included in the definition of Weather Damaged Grains.

Weather Stained – Triticale

Weather Stained Grains are caused by damp weather prior to harvest. Weather Stained Grains are those grains exhibiting various forms of staining such as dark tipping, poor colour, weather affected etc, above and beyond the normal colour of the variety.

Various colours such as grey, brown to black may be represented by this defect.

Grains that are affected by Mould are not included in the definition of Weather Damaged Grains.

SECTION 3 GRAIN QUALITY STANDARDS

The following tables represent the grades of Cereal Rye and Triticale as defined in this Manual.

To fully understand and accurately implement the Cereal Rye and Triticale Standards, reference should be made to other relevant sections in this Manual, this includes:

- Definitions
- Varietal Master List
- Methods & Procedures

Other sections of the GTA Standards Manual should also be perused for general guidance on activities associated with implementation of these Standards.

As stated previously, the following Standards are applicable at the time of publishing of this Manual. Variations and new Grades may exist and industry is encouraged to keep updated with changes via reviewing the GTA website and other relevant industry information sources.

Commodity: CEREAL RYE Standard Reference No. CSG-60 Effective: 1 August 2014 Season: 2014/15		
PARAMETER	SPECIFICATION	COMMENT / VARIATION
Description	n/a	Approved varieties only
Moisture Max (%)	12.0	
Test Weight Min (kg/hl)	70.0	
Unmillable Material above the screen Max (% by weight)	3.0	Includes whiteheads, chaff, backbone, Wild Radish pods, Milk Thistle pods or other seedpods not otherwise listed. Excludes contaminants where tolerances already exist
Unmillable Material below the screen (Screenings) Max (% by weight)	5.0	All matter passing through a 1.6mm x 19.0mm slotted screen – 40 shakes in the direction of the slots
Falling Number Min (sec)	200	Falling Number result over-rides the visual assessment for Sprouted grains
DEFECTIVE GRAINS Max (% by count, 300 grain sample, unless otherwise stated)		
Damaged Grains Max	2.0	Includes both whole or part kernels of Sprouted, Weather Damaged, Frost Damaged, Field Fungi, Germ Damaged, Insect Damaged, Dry Green or Sappy
Bin Burnt, Heat Damaged, Storage Mould (count per half litre)	1	
Pink Stained (entire load)	Nil	<i>Fusarium species</i> causing pink staining
FOREIGN SEED CONTAMINANTS Max (count of seeds in total per half litre unless otherwise stated)		
Type 1 (Individual seed basis)	8	Colocynthis, Jute, Long Headed Poppy, Mexican Poppy, Field Poppy, Horned Poppy, Wild Poppy, New Zealand Spinach, Parthenium Weed (Qld only)
Type 2 (entire load)	Nil	Castor Oil Plant, Coriander, Crow Garlic/Wild Garlic, Cutleaf Mignonette seeds or pods, Darling Pea, Opium Poppy, Peanuts seeds and pods, Ragweed, Rattlepods, Starburr, St. John's Wort
Type 3 (a)	2	Bathurst Burr, Bellvine, Branched Broomrape, Bulls Head/Catrop/Cats Head, Cape Tulip, Cottonseed, Dodder, Noogoora Burr, Thornapple/False Castor Oil
Type 3 (b)	5	Vetch (Blue/Tare), Vetch (Commercial), Saffron Thistle
Type 3 (c)	8	Heliotrope (Blue) and Heliotrope (Common)
Type 4	20	Bindweed (Field), Damel, Hexham Scent/King Island Melilot (Hexham Scent is only acceptable if no tainting odour is present), Hoary Cress, Mintweed, Nightshades, Paddy Melon, Variegated Thistle
Type 5	40	Knapweed (Creeping/Russian), Patterson's Curse/Salvation Jane, Sesbania pea
Type 6	5	Melilotus, Skeleton weed
Type 7 (a)	10	Broad Beans, Chickpeas, Corn (Maize), Cowpea, Faba Beans, Johnson Grass or Columbus Grass, Lentils, Lupin, Peas (Field), Safflower, Soybean, Sunflower and any other seeds or pods greater than 5mm in diameter
Type 7 (b)	150	Barley, Bindweed (Australian), Bindweed (Black), Wheat, Durum, Oats (Sand), Oats (Common), Rice, Sorghum (Forage), Sorghum (Grain), Triticale, Turnip Weed and any other weed seeds not specified in Types 1-7(a), Variations or SFS that remain above the screen following the Screenings process.
Small Foreign Seeds (% by weight)	1.2	All foreign seeds not specified in Types 1-7(b) that fall below the 1.6mm screen during the Screenings process
Variations	1 20	Double Gees/Spiny Emex/Three Corner Jack Other Pulses, Other Oilseeds, Wild Oats and Other Cereal Grains not listed
OTHER CONTAMINANTS Max (count per half litre, unless otherwise stated)		
Smuts (entire load)	Nil	Includes Ball Smut, Gall Smut and other Smut species
Ergot – Cereal (entire load)	Nil	Whole or pieces of Cereal Ergots
Ergot – Ryegrass (length in cm)	2.0	Length of all pieces present aligned end on end
Stored Grain insects & Pea Weevils – Live (entire load)	Nil	All life stages
Insects – Large	3	Dead or alive
Insects – Small	10	Dead or alive
Snails	1	Dead or alive
Earth	3	Pieces of Earth, maximum 5mm in diameter
Sand	50	Individual grains of sand
Stones (g per 2.5L)	4.0	Maximum total weight of all Stones retained above the 1.6mm screen per 2.5L
Other Foreign Material (% by weight)	0.1	Material not otherwise stated in this Standard
Objectionable Material (entire load)	Nil	Sticks, glass, concrete, or any other commercially unacceptable contaminant, smell or taste
Pickling Compounds (entire load)	Nil	Pickled grain or artificial colouring
Odour (entire load)	Nil	Grain which has any commercially objectionable foreign odour due to tainting agents or improper storage causing mould, souring or musty odours
Chemicals Not Approved for Cereal Rye (entire load)	Nil	Residues of any chemical compound not approved for Cereal Rye, used in contravention of the labelled instructions or chemicals in excess of the MRL

Commodity: TRITICALE		Standard Reference No. CSG-50
Effective: 1 August 2014		Season: 2014/15
PARAMETER	SPECIFICATION	COMMENT / VARIATION
Description	n/a	Approved varieties only
Moisture Max (%)	12.5	
Test Weight Min (kg/hl)	65.0	
Unmillable Material below the screen Max (% by weight)	10.0	All matter passing through a 2.0mm slotted screen – 40 shakes in the direction of the slots
Unmillable Material above the screen Max (% by weight)	5.0	Includes whiteheads, chaff, backbone, Wild Radish pods, Milk Thistle pods or other seedpods not otherwise listed. Excludes contaminants where tolerances already exist
DEFECTIVE GRAIN Max (% by count, 300 grain sample, unless otherwise stated)		
Sprouted	2.0	Split germ or visible signs of rootlet growth
Insect Damaged	2.0	
Stained, of which:	15.0	Includes Weather Stained, Field Fungi
Pink Stained	5.0	Various fungal species that cause pink staining
Bin Burnt, Heat Damaged or Storage Mould (count per half litre)	1	
Dry Green or Sappy	2.0	
Frost Damaged	2.0	
FOREIGN SEED CONTAMINANTS Max (count of seeds in total per half litre unless otherwise stated)		
Type 1 (Individual seed basis)	8	Colocynth, Double Gee/Spiny Emex/Three Cornered Jack, Jute, Long Headed Poppy, Mexican Poppy, Field Poppy, Horned Poppy, Wild Poppy, New Zealand Spinach, Parthenium Weed (Qld only)
Type 2 (entire load)	Nil	Castor Oil Plant, Coriander, Crow Garlic/Wild Garlic, Darling Pea, Opium Poppy, Peanut seeds and pods, Ragweed, Rattlepods, Starburr, St. John's Wort
Type 3 (a)	2	Bathurst Burr, Bellvine, Branched Broomrape, Bulls Head/Caltrop/Cats Head, Cape Tulip, Cottonseed, Dodder, Noogoora Burr, Thornapple/False Castor Oil
Type 3 (b)	4	Vetch (Blue/Tare), Vetch (Commercial)
Type 3 (c)	8	Heliotrope (Blue), Heliotrope (Common)
Type 4	20	Bindweed (Field), Cutleaf Mignonette seeds or pods, Damel, Hexham Scent (Hexham Scent is only acceptable if no tainting odour is present) or King Island Melilot, Hoary Cress, Mintweed, Nightshades, Paddy Melon, Skeleton Weed, Variegated Thistle
Type 5	40	Knapweed (Creeping/Russian), Patterson's Curse/Salvation Jane, Sesbania pea
Type 6	50	Saffron Thistle, Johnson Grass, Columbus Grass
Type 7 (a)	10	Broad Beans, Chickpeas, Corn (Maize), Cowpea, Faba Beans, Lentils, Lupin, Peas (Field), Safflower, Soybean, Sunflower and any other seeds or pods greater than 5mm in diameter
Type 7 (b)	150	Barley, Bindweed (Australian), Bindweed (Black), Wheat, Durum, Oats (Black), Oats (Sand), Oats (Wild), Oats (Common), Rice, Rye (Cereal), Sorghum (Forage), Sorghum (Grain), Turnip Weed and any other weed seeds not specified in Types 1-7(a) or SFS
Small Foreign Seeds (% by weight)	1.2	All foreign seeds not specified in Types 1-7(b) that fall below the 2.0mm screen during the Screenings process
OTHER CONTAMINANTS Max (count per half litre, unless otherwise stated)		
Smuts (entire load)	Nil	Includes Ball Smut, Gall Smut and other Smut species
Ergot – Cereal (entire load)	Nil	Whole or pieces of Cereal Ergots
Ergot – Ryegrass (length in cm)	2.0	Length of all pieces present aligned end on end
Stored Grain Insects & Pea Weevils – Live (entire load)	Nil	All life stages
Insects – Large	3	Dead or alive
Insects – Small	10	Dead or alive
Snails	1	Dead or alive
Earth	3	Pieces of Earth, maximum 5mm in diameter
Sand	50	Individual grains of sand
Stones (g per 2.5L)	4.0	Maximum total weight of all Stones retained above the 2.0mm screen per 2.5L
Other Foreign Material (% by weight)	0.1	Material not otherwise stated in this Standard
Objectionable Material (entire load)	Nil	Sticks, glass, concrete, or any other commercially unacceptable contaminant, smell or taste
Pickling Compounds (entire load)	Nil	Pickled grain or artificial colouring
Odour (entire load)	Nil	Grain which has any commercially objectionable foreign odour due to tainting agents or improper storage causing mould, souring or musty odours
Chemicals Not Approved for Triticale (entire load)	Nil	Residues of any chemical compound not approved for Triticale, used in contravention of the labelled instructions or chemicals in excess of the MRL

SECTION 4 VARIETAL CLASSIFICATION

Cereal Rye

For Cereal Rye there is no minimum variety specification and a load may be delivered with a varietal mix at any level.

Any variety is eligible for delivery into the Cereal Rye grade.

Triticale

For Triticale, there is no minimum variety specification and a load may be delivered with a varietal mix at any level.

Any variety is eligible for delivery into the Triticale grade.



SECTION 5 METHODS & PROCEDURES

5.1 Introduction

The following section details methods and procedures to be used for the assessment of various quality parameters as outlined in this Manual.

The methods outlined are either Reference Methods or Field Assessment Methods. Field Assessment Methods are included as a guide to industry where Reference Methods may not be able to be implemented. Note that Field Assessment Methods must equate to the Reference Method for the applicable test method.

In all instances of disputes, test results produced by trade-certified equipment take precedence over non-trade certified equipment and methods. Where the dispute involves only non trade-certified equipment or test methods, the reference method takes precedence over the field assessment method.

Depending on the test to be conducted, variations may exist due to equipment used.

Procedures outlined are a guide for industry. Industry is free to develop their own Operational Procedures for each test and activity based on their own circumstances. At all times industry use of apparatus outlined in this Standard must comply with the manufacturers' recommendations for occupational health and safety and training.



5.2 Sampling

5.2.1 Definitions

This is the standard procedure used to draw a sample of the commodity from a bulk unit tendered for delivery to enable tests to be conducted on the commodity for the purposes of determining its quality.

- A **primary sample** is an individual probed sample taken from the lot presented for sampling
- A **composite sample** is the combined primary samples taken from the lot to be sampled, and is representative of the entire lot
- A **sub sample** is the sample taken from the mixed composite sample for the purposes of conducting quality tests, and is representative of the entire lot

5.2.2 Scope

Cereal Rye and Triticale is traded on the basis of quality tests conducted on lots of Cereal Rye and Triticale presented for sale or delivery to end users. Obtaining representative samples is critical to ensuring test results reflect the true quality of these lots.

This procedure is applicable to all cereal grains, pulses and oilseeds.

5.2.3 Apparatus

- Manual sampling probe (double tube compartment probe, one inside the other, equipped with spiralled ports that open sequentially from bottom to top).
- Vacuum or pneumatic probe (an alternative to the manual sampling probe and consisting of a hand held or remotely controlled probe which retrieves grain through the use of a vacuum or other air movement system).
- Mixing bucket (including other associated equipment such as mini-auger suitable for mixing sample, optional).
- Sample dividing apparatus (optional).

5.2.4 Reagents

Not Applicable.

5.2.5 Procedure

Sample Collection guidelines for collecting a representative sample

- The surface of the grain should be fully exposed prior to sampling to allow for effective visual inspection. At this point, the load should be scanned for any defects or contaminants.
- The probe to be used should be of a sufficient length in order to obtain a sample from as close as possible to the bottom of truck.
- A primary sample must be drawn for assessment by thrusting the sampling probe as vertically and as deep as possible into the load.

- At least one probe must be taken from the front, middle and rear of each bulk unit.
- If more than one unit is delivered, samples must be drawn from each bulk unit as described above.
- If the bulk units are of visibly different quality, or if required at the Receival Agents discretion, different samples and grade classification may be undertaken for each separate bulk unit.
- If the declared varietal composition or paddock where the grain was grown is different for each unit tendered for delivery, or more than one variety is commingled in each delivery unit, then a separate assessment of each unit must be conducted.
- Each primary (probed) sample must consist of at least one litre of grain.
- A composite sample from each load tendered for delivery shall consist of the following minimum quantities and number of probes:

Load Size	Sample Size (minimum)
10 tonnes or less	3 litres
Over 10 tonnes up to 20 tonnes	4 litres
Over 20 tonnes up to 30 tonnes	5 litres
Over 30 tonnes up to 40 tonnes	6 litres
Over 40 tonnes up to 50 tonnes	7 litres
Over 50 tonnes up to 60 tonnes	8 litres
Over 60 tonnes up to 70 tonnes	9 litres
Over 70 tonnes up to 80 tonnes	10 litres

Note – in the above table the sample size reflects the number of probe samples. For example, 4 litres equates to 4 probe samples.

Sample Mixing

- The primary samples in each probe must be collected together and thoroughly mixed in a suitable container using a mechanical device where appropriate, to form the composite sample.
- Sub samples should be drawn from the composite sample either by hand or through the use of a suitable sample dividing apparatus.

Sample Analysis

- The sub sample should then be analysed for all of the quality parameters specified in these Standards or in the Receival Agent's agreement with the buyer concerned if different from these Standards.
- Results should be entered on the Receival Agents sample receipt.

5.2.6 References

Sampling of Wheat and other Grains - AACC Method 64-70A

5.3 Moisture Assessment of Cereals – Fan Forced Oven Reference Method

5.3.1 Definitions

This is the fan forced reference method specified in National Measurement Institute legislation to be used to determine the moisture content of grain samples as loss in weight when subjected to heating.

5.3.2 Scope

This is applicable to all cereals when being tested for moisture content under laboratory conditions.

5.3.3 Apparatus

- Laboratory Mill
- Forced Draft Oven capable of being maintained at 130°C +/- 1°C
- Aluminium moisture dishes, 50 – 55 by 15 – 20mm with tight fitting covers
- Desiccator
- Electronic balance capable of weighing up to 100g to 4 decimal places

5.3.4 Reagents

Not applicable

5.3.5 Procedure

- Grind a 30-40g whole grain sample in a suitable mill (Perten 3303, Tecator, Cemotec or similar). Sample to be “as is”.
- Mix thoroughly and transfer 2 to 3g portions to each of 2 or more tared moisture dishes
- Cover and weight the dishes immediately
- Subtract tare weights and record weight of sample
- Clean mill between samples
- Uncover the dishes and place them in pre heated oven (130°C) and place covers under the dishes. Evenly distribute the dishes within the oven
- Close oven door and allow temperature to stabilise and then heat for exactly 60 minutes
- Remove the dishes, quickly replace the lids and place in the desiccator
- Weigh the dishes after they reach room temperature

- Determine loss in weight as moisture as per the following equation:

$$\% \text{ Moisture} = \frac{W_{tp} - (W_{dry} - W_{dish})}{W_{tp}} \times 100$$

Where

W_{tp} is the weight of the test portion before oven drying

W_{dry} is the weight of the dish, lid and test portion after oven drying

W_{dish} is the weight of the empty oven moisture dish and lid

Report result to the nearest 0.1%.

If duplicates differ by more than 0.2%, repeat the determination, otherwise, report the average of the duplicates.

5.3.6 References

- Moisture – Air Oven Methods – AACC Method 44-15A
- NMI M 8 Pattern Approval Specifications for Protein Measuring Instruments for Grain
- NMI V10 Uniform Test Procedures for the Verification, Certification and In Service Inspection of Protein Instruments for Grain

5.4 Moisture Assessment of Cereals – Brabender Oven Reference Method

5.4.1 Definitions

This is the Brabender Oven reference method used to determine the moisture content of grain samples as loss in weight when subjected to heating.

5.4.2 Scope

This is applicable to all cereals when being tested for moisture content.

5.4.3 Apparatus

- Mill - A low moisture loss mill must be used as significant levels of heat can be generated. The mill of choice is the Falling Number 3303 mill (a Wiley - using a 20 mesh screen). The Falling Number Mill 3303 is used with the setting – Wheat – 0.
- Electronic balance – accuracy = 0.001g (or better)
- Aluminium dishes - these dishes must be kept clean and weigh $11.500 \pm 0.005\text{g}$
- Vial with well sealing screw to lid. Currently a small yellow top polyethylene container with polypropylene lid is used. Samples must be prepared and used within 24hrs.

5.4.4 Reagents

Not Applicable

5.4.5 Procedure

- Grind approx 50g of sample in accordance with relevant mill manual. Mix sample well and replace into original sample vial tightly sealing the lid. Sample must be prepared and used on the same day or prepared on the evening before.
- Make sure the dishes are clean and are resting on a clean surface (wipe with tissue). Tare the first dish and also subsequent dishes used but note the weight before taring if weight varies from 11.500 or tare varies by $\pm 0.010\text{g}$ from tare. Recheck weight of dish to ensure within $11.500 \pm 0.005\text{g}$. Dishes must also be checked before and after the season to ensure they are correct.
- Weigh out accurately $10.000 \pm 0.001\text{g}$ of the ground sample into an Aluminium dish. Then shake dish to obtain an even layer of sample.
- Take the weighed samples and place into the oven which has been previously switched on and heated to 130°C . Place the dishes in the oven noting the number of the dish and its position number (1 through 9). There are ten positions in the oven (the tenth place is taken up by an empty dish for calibration purposes).
- When the oven has been loaded note the time or set a countdown timer to 60 mins once the required temperature is reached. Usually for 130°C the oven takes 10 - 15 minutes to reach the required temperature.
- When one hour has elapsed, standardise the instrument by selecting the empty dish and placing 9g in weights in the small platform between the 3 prongs on the balance and adjust the scale to 10.0 with the standard swinging freely. Moisture can then be read off for each sample in turn.

- Read the samples in the dishes consecutively recording results in the relevant worksheet.

NOTE:

- When switching the oven on make sure that the Brabender oven is level (use bubble level).
- All results are a direct reading of % w/w water.
- The minimum heating time must be adhered to (1 hour) but heating over the hour will not affect the results (up to 2 hours).
- If only a few grams of sample are available see the manufacturers hand book for the technique to be adopted.
- The weight of Aluminium dishes is to be checked at 6 monthly intervals to ensure they are within 11.500 +/-0.005g. If they are underweight they are to be discarded and replacements purchased. Do not add weight to the dish i.e. solder etc as this will breakdown over time or fall off. If they are overweight they may be cleaned with warm water and neutral detergent. Under no circumstances use abrasive or corrosive chemicals as this will lead to the dish being underweight.

5.4.6 References

- Moisture – Air Oven Methods – AACC Method 44-15A
- NMI M 8 Pattern Approval Specifications for Protein Measuring Instruments for Grain
- NMI V10 Uniform Test Procedures for the Verification, Certification and In Service Inspection of Protein Instruments for Grain

5.5 Moisture Assessment of Cereals – NIR

5.5.1 Definitions

This describes the NIR method for determination of moisture in cereal grains.

5.5.2 Scope

This procedure is applicable to all cereal grains.

5.5.3 Reagents

Not applicable.

5.5.4 Apparatus

NIR instrument approved for use for trade purposes under the conditions currently being developed by the National Measurement Institute.

5.5.5 Method

Sample to be “as is”.

Individual manufacturer instructions and procedures should be followed for operation and maintenance of NIR instruments used to determine grain moisture.

Report result to the nearest 0.1%.

5.5.6 References

- NMI M 8 Pattern Approval Specifications for Protein Measuring Instruments for Grain
- NMI V10 Uniform Test Procedures for the Verification, Certification and In Service Inspection of Protein Instruments for Grain

5.6 Test Weight Assessment - Schopper Chondrometer Reference Method

5.6.1 Definitions

The Schopper Chondrometer is used for the measurement of Grain Density (Density is also known as “Bushel Weight”, “Test Weight” or “Hectolitre Weight”).

5.6.2 Scope

This method is applicable to all cereal grains.

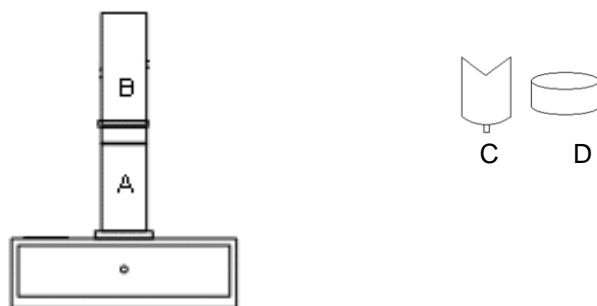
5.6.3 Apparatus

- 1L Schopper Calibrated Chondrometer
- 2 decimal place balance
- Plastic bowl

5.6.4 Reagents

Not applicable

5.6.5 Procedure



- Secure bottom half of cylinder A to base plate on the chondrometer box.
- Ensure the sliding divider C is in the slot on cylinder A.
- Place weight D on top of sliding divider.
- Secure top half of cylinder B to the bottom half A.
- Ensure the slider is closed and pour grain in the cylinder at a constant rate until full to the top.
- Pull the sliding divider out and the weight will move down, drawing the grain down with it (you will hear it moving down).
- Once the weight D is at the bottom, replace the sliding divider back in the slot.
- Carefully tip the cylinder upside down and tip out all the grain remaining above the divider. Make sure to catch the weight D as it drops down.

- Place a plastic container on the electric balance and tare to read zero.
- Remove the blade from the chondrometer and tip the measured litre of grain into the plastic container and weigh.
- The weight is in grams and needs to be multiplied by 0.1 (divided by 10) to obtain a density in kg/hl.
- Always undertake analysis in duplicate and average results.
- Report the result to one (1) decimal place.

5.6.6 References

Test Weight Per Bushel - AACC Method 55-10

National Measurement Institute General Certificate of Approval No 4/10/0

5.7 Test Weight Assessment – Franklin Mark 11 Chondrometer Reference Method

5.7.1 Definitions

This is the Franklin Mark 11 Chondrometer reference method to determine the density of cereal grains (otherwise known as the Test Weight) expressed as kilograms per hectolitre.

5.7.2 Scope

This method is applicable to all cereal grains.

5.7.3 Apparatus

- Franklin Mark II Drop Weight Trade Certified chondrometer
- Pre filling Cup

5.7.4 Reagents

Not applicable.

5.7.5 Procedure

- Assemble the instrument together and place the calibration weight onto the top of the measuring cylinder.
- Place the measuring cylinder with weight on the hook at the end of the measuring beam.
- Calibrate the instrument by moving the sliding weight to the position corresponding to 40kg/hl on the measuring beam. The beam should balance equidistantly between the top and bottom of the square space at the other end of the beam.
- If the beam is not balanced, turn the calibration screw at the other end of the beam until the correct setting is achieved.
- Remove the calibration weight. The instrument is then calibrated.
- Insert the cutter bar into the bottom measuring cylinder, and place the drop weight on top of the cutter bar.
- Fit the top filling cylinder onto the measuring cylinder.
- Fill the pre filling cup with grain. Sample to be “as is”.
- Steadily pour the grain from the pre filling cup with one hand into the top filling cylinder until it is full whilst holding both cylinders together.
- Withdraw the cutter bar in a single swift motion.
- Re-insert the cutter in the slit and push it through the grain with a single firm stroke.
- Remove the top filling cylinder from the measuring cylinder and discard the grain remaining above the cutter, while holding the cutter in place.
- Remove the cutter and suspend the measuring container from the measuring beam of the chondrometer.



- Adjust the sliding weight on the beam until the instrument is balanced.
- Read the test weight of the graduated balance beam at the point indicated by the sliding weight and record the result in kilograms per hectolitre.
- Report the result to one (1) decimal place.

5.7.6 References

Test Weight Per Bushel - AACC Method 55-10

ISO7971-2

National Measurement Institute General Certificate of Approval No 4/10/0



5.8 Test Weight Assessment – Kern 222 Chondrometer Reference Method

5.8.1 Definition

This is the Kern 222 Trade Certified Chondrometer reference method to determine the density of cereal grains (otherwise known as the test weight) expressed as kilograms per hectolitre.

5.8.2 Scope

This method is applicable to all cereal grains.

5.8.3 Apparatus

- Kern 222 Trade Certified Chondrometer with valid Regulation 13 certificate.
- Electronic balance 0.01g resolution.

5.8.4 Reagents

Not applicable

5.8.5 Procedure

- Assemble the measuring container with the grain cutter inserted in the slit. Place the brass piston on top of the cutter blade. Connect the filling hopper securely on the top of the measuring container.
- Fill the pre-filling cup with grain. Grain sample to be “as is”.
- Empty the pre-filling cup out onto a large sample tray and manually remove any foreign material e.g. whiteheads, straw, barley, lupins, sticks stones etc.
- Pour the remaining grain from the sample tray back into the pre-filling cup. Ensure that the pre filler cup is filled up to or above the internal filling line/groove.
- Steadily pour the grain from the pre-filling cup into the filling hopper until the filling hopper is full.
- Grasp the measuring container firmly with one hand and with the other hand withdraw the cutter in a single swift motion.
- Re-insert the grain cutter in the slit and push it through the grain with a single firm stroke.
- Remove the filling hopper from the measuring container and discard the grain remaining above the cutter, while holding the cutter in place.
- Remove the cutter and return the base bucket to an upright position and then withdraw the cutter.
- Place the Steel Bowl onto the balance and press the T (Tare) button, ensure Zeros are displayed.
- Pour the grain from the bucket into the steel bowl.

- The weight in grams will appear on the display of the balance. This figure is referred to as the weight in grams per litre.
- All numerical results are to be written down to two decimal places.

5.8.6 References

ISO Method 7971-2

National Measurement Institute General Certificate of Approval No 4/10/0



5.9 Unmillable Material Assessment – Reference Method

5.9.1 Definition

This is the reference method used to determine the percentage by weight of Unmillable Material above the Screen and Unmillable Material below the Screen (Screenings), including Small Foreign Seeds.

5.9.2 Scope

This method is applicable to Cereal Rye and Triticale.

5.9.3 Apparatus

Agtator Shaking Device

Screens with the following specifications:

Triticale - Screen 2.00mm with the following specifications:

- 300mm diameter discs x 0.9mm stainless steel, perforated with 12.7mm x 2.00mm slots, hit and miss on ends with 4.77mm end bar and 2.0mm side bar.
- Slot width as assessed by an Engineers Pin Gauge is to be 2.00 mm \pm 0.01 mm. Pin Gauge, being 2.01mm and 1.99, needs to have a valid Regulation 13 certificate.
- Compliance testing shall be undertaken by randomly selecting 74 slots and measuring using the above Gauge. 0 to 25 slots is an acceptable failure rate. Refer to separate procedure.

Cereal Rye - Screen 1.6mm with the following specifications:

- 300mm diameter discs x 0.9mm stainless steel, perforated with 19.0mm x 1.6mm slots, hit and miss on ends with 4.77mm end bar and 1.6mm side bar.
- Slot width as assessed by an Engineers Pin Gauge is to be 1.6 mm \pm 0.01 mm. Pin Gauge, being 1.59mm and 1.61, needs to have a valid Regulation 13 certificate.
- Compliance testing shall be undertaken by randomly selecting 74 slots and measuring using the above Gauge. 0 to 25 slots is an acceptable failure rate. Refer to separate procedure.

Analytical balance accurate to at least 0.01g

5.9.4 Reagents

Not applicable.

5.9.5 Procedure

- Obtain a certified half litre sample of grain. Sample to be “as is”.
- Place the screen on top of the Agtator platform with the slots aligned toward the front of the Agtator. Ensure the screen is clean, smooth, dry and free of grain residues in the slots.

- Ensure the Agtator is set to perform 40 to and fro movements over a period of approximately 68 seconds.
- Pour the half litre of grain in one movement onto the screen surface. No additional movement or spreading of the sample over the screen is to occur.
- Turn on the Agtator and allow it to run until the 40 movements have been completed.
- Gently remove the screen and pan from the Agtator and detach the screen from the pan.
- Calculate Screenings percentage - Weigh the contents of the pan on an appropriate top pan balance and calculate the percentage as follows:

$$\text{Screenings by wt (\%)} = \frac{\text{Screenings Weight}}{\text{Total Weight}} \times 100$$

- Calculate Small Foreign Seeds percentage - Separate any Small Foreign Seeds (SFS) as listed in the Definitions Section of these Standards from the Screenings fraction and weigh these separately.

$$\text{SFS by wt (\%)} = \frac{\text{SFS Weight}}{\text{Total Weight}} \times 100$$

- Calculate Unmillable Material Above the Screen percentage - Separate any Unmillable Material Above the Screen (whiteheads with grains removed, chaff, backbone, Wild Radish pods, Milk Thistle pods, other Foreign Seed Pods not otherwise listed whether whole or in pieces and other light material) and weigh separately.

$$\text{Unmillable Material Above the Screen (\%)} = \frac{\text{Unmillable Weight}}{\text{Total Weight}} \times 100$$

- Report all results to the nearest 0.1%.

5.9.6 References

No go gauge with Regulation 13 certificate.

5.10 Falling Number Assessment – Reference Method

5.10.1 Definitions

This is the reference method for determination of Falling Number and is based on the unique ability of alpha amylase to liquefy a starch gel. Strength of the enzyme is measured by Falling Number defined as the time in seconds required to stir plus the time it takes to allow the stirrer to fall a measured distance through a hot aqueous gel undergoing liquefaction.

5.10.2 Scope

This method is applicable to cereal rye.

5.10.3 Apparatus

Perten Falling Number apparatus, including standardised precision viscometer tubes with close tolerances, inside diameter $\pm 0.02\text{mm}$ outside diameter $\pm 0.3\text{mm}$ length $\pm 0.3\text{mm}$.

Thermometer, calibrated in 0.1°C , and certified to $\pm 0.3^\circ\text{C}$.

Sample Mill. Must produce meal with particle size distribution as follows; $<500\mu\text{m}$, 0-10%; >210 but $<500\mu\text{m}$, 25-40%; $<210\mu\text{m}$, 75-50%. The recommended instrument is the Perten 3100 Mill with 0.8mm sieve.

Automatic Pipette should be capable of delivering $25 \pm 0.3\text{ml}$.

Analytical balance accurate to at least 0.01g

5.10.4 Reagents

Distilled water

5.10.5 Method

- Start the Falling Number instrument by following the manufacturer's instructions. Ensure the bath is filled with distilled water and the instrument has reached full operating temperature before being used.
- Grind a minimum 250g sample of whole grain using the designated mill. Sample to be "as is".
- Weigh 7.00 ± 0.05 g of meal into a dry falling number tube.
- Add 25 ml of distilled water from the automatic dispenser. Insert a rubber stopper into the top of the tube and shake tube in an upright position 20-30 times (up and down) or more if necessary) until mixed. Make sure all flour is suspended by upending. Alternatively the unit may shake the tubes.
- Use the viscometer stirrer to scrape down the slurry coating the upper part of the tube, and scrape all slurry from the stopper.
- Place the tube and the viscometer stirrer into the water bath within 30 to 60 seconds after mixing. Start the Falling Number apparatus immediately afterward.
- At the conclusion of the test, record the time in seconds.

- Remove the tube and appropriately clean the stirrer, tube and stopper using cold water and brush. Distilled water may assist removal of all traces of the starch gel material. Clean the mill of all residues retained from the sample.
- Report the Falling Number value to the nearest second.

5.10.6 References

Falling Number Determination – AACC Method 56-81B



5.11 Defective Grains Assessment – Reference Method

5.11.1 Definitions

This describes the method of assessment of deliveries of Cereal Rye and Triticale for the various types of defective grains described in these Standards. These are defined as the following:

Cereal Rye -

Count per 300 grains	Count per half litre	Count per entire load
Damaged Grains	Bin Burnt, Heat Damaged, Storage Mould	Pink Stained
Dry Green or Sappy		Smut
Field Fungi		
Frost Damaged		
Germ Damaged		
Insect Damaged		
Sprouted#		
Weather Damaged		

Where Sprouted grain is detected, it is recommended that a Falling Number test be conducted. The Falling Number result over-rides any visual analysis.

Triticale –

Count per 300 grains	Count per half litre	Count per entire load
Dry Green or Sappy	Bin Burnt, Heat Damaged, Storage Mould	Smut
Field Fungi		
Frost Damaged		
Insect Damaged		
Pink Stained		
Sprouted		
Stained		
Weather Stained		

5.11.2 Scope

This method is applicable for all deliveries of Cereal Rye and Triticale.

5.11.3 Apparatus

Cereal Rye and Triticale Screens with the specifications as listed in 5.9.

Visual Recognition Standards, with the following photographic standards being recognised by GTA:

- Grain Quality Visual Recognition Standards – Australian Grains Centre, Co-operative Bulk Handling Ltd, October 2004
- Visual Recognition Standards Guide for Grain Commodity Sampling and Assessment – Issued August 2014, GTA

A mechanism capable of holding/gathering 300 grains

5.11.4 Reagents

Not applicable



5.11.5 Method

- Sample to be “as is”.
- For Defective grains with tolerances per 300 grains, assessment is made on the half litre sample on grain remaining above the screen after the Unmillable Material assessment has been conducted.
- For nil tolerance defects, the tolerance (rejection of the load) can apply if the defect is detected at any stage of the delivery or testing process, including in the truckload before sampling, in the probe sample, in the half litre sample or during discharge into the receival hopper after assessment.
- Following sieving, the grain remaining on the top screen should be examined under conditions of good lighting for a period of at least 30 seconds but no more than 60 seconds. If defective grains are found, the level of defect shall be determined using:
 - A 300 grain tray, if available
 - By counting 300 grains
 - A suitable mechanism for obtaining 300 grains
- Instruments of magnification may be used to assist the determination of the level of visually defective grains present in the sample.
- If defective grains which have a tolerance based on % in a 300 grain sample are detected, a small sub sample should be drawn from across the top of the screen, and a representative 300 grain sub-sample obtained.
- For those defects with a tolerance based on the number of grains in a half litre sample (Heat Damaged, Bin Burnt or Storage Mould), the entire half litre sample is to be assessed. Count the number of grains for the defect in question.
- Where a Damaged or Stained category exists, add the separate tolerances for each defect falling within the definition of that category.
- Each grain should be examined to determine if it is classified as defective. An individual kernel may only have one defect, being the defect type with the tightest tolerance in the standard.
- The defective grains percentage can be assessed with the assistance of the GTA Approved photographic standards (Visual Recognition Standards Guide) or Approved objective measurement instruments where appropriate.
- Report results as follows:

Percentage by count in 300 grains – nearest 0.1%
Count per half litre – nearest whole number

5.11.6 References

Grain Quality Visual Recognition Standards – Australian Grains Centre, Co-operative Bulk Handling Ltd, October 2004.

Visual Recognition Standards Guide for Grain Commodity Sampling and Assessment – Issued August 2014, GTA

5.12 Contaminants Assessment – Reference Method

5.12.1 Definitions

This describes the method of assessment of deliveries of Cereal Rye and Triticale for the various types of Contaminants described in these Standards. The various contaminant types and their assessment methods are described in this method as follows:

Count per half litre	Length in cm per half litre	% by weight in half litre	Count per entire load	Weight in grams per 2.5 litres
All Weed Seeds except Type 2 & includes Foreign Seed Pods where specified	Ryegrass Ergot	Other Foreign Material	Cereal Ergot	Stones (total above the 1.6mm# or 2.0mm^ screen)
Earth		Small Foreign Seeds	Chemicals Not Approved for Cereal Rye and Triticale or in Excess of the MRL	
Insects Large – Live or Dead		Unmillable Material Above the Screen*	Objectionable Material	
Insects Small – Live or Dead			Odour	
Sand			Pickling Compounds or Artificial Colouring	
Snails			Smut	
			Stored Grain Insects and Pea Weevil - Live	
			Type 2 weed seeds	

* May or may not include a contaminant

Cereal Rye only

^ Triticale only

5.12.2 Scope

This method is applicable for all deliveries of Cereal Rye and Triticale.

5.12.3 Apparatus

Cereal Rye and Triticale Screens with the specifications as listed in 5.9

Analytical balance accurate to at least 0.01g

Visual Recognition Standards with the following photographic standards being recognised by GTA:

- Grain Quality Visual Recognition Standards – Australian Grains Centre, Co-operative Bulk Handling Ltd, October 2004
- Visual Recognition Standards Guide for Grain Commodity Sampling and Assessment – Issued August 2014, GTA

- Seed Impurities of Grain Identification Guide, 3rd Edition, GTA
- Insects of Stored Grain, A Pocket Reference, 2nd Edition, CSIRO

Mesh Screen (optional)

Ruler

5.12.4 Reagents

Not applicable.

5.12.5 Method

- Sample to be “as is”.
- For contaminants with tolerances above zero, assessment is made on the half litre sample on grain above and below the applicable screen after the Unmillable Material assessment has been conducted.
- For nil tolerance contaminants, the tolerance (rejection of the load) may apply if the contaminant is detected at any stage of the delivery or testing process, including in the truckload before sampling, in the probe sample, in the half litre sample or during discharge into the receival hopper after assessment.
- Following sieving, the grain remaining on the top and in the bottom screen should be examined under conditions of good lighting. There is no time restriction for this assessment. If contaminants are found, they shall be removed by hand and assessed in accordance with the tolerance prescribed in these Standards.
- If any Stones are found above the 1.6mm screen (Cereal Rye) or 2.0mm screen (Triticale) in the initial half litre sample, then a further four half litre samples should be taken. If the total weight of all Stones found in the combined 2.5L sample for an individual commodity is above 4.0g, the sample is to be rejected.
- Seed contaminants are to be assessed using the appropriate visual assessment method and in accordance with the tolerance prescribed in these Standards. Note that for Type 1 weed seeds, tolerances apply to individual seeds whereas for all other Types listed, tolerances are the total of all seeds in each Type.
- Small Foreign Seeds (SFS) are assessed in the bottom tray (catchpan). These may need to be physically removed from all non-SFS material in the bottom tray. Alternatively, to assist in separating SFS from non-SFS material in the bottom tray, a mesh screen may be used. Place the sample in the mesh screen over a white tray and gently shake. SFS tend to remain on top of the mesh screen. Physical hand separation of SFS may still be required using this method.
- Note that any seed pods detected must not be opened. Whole pods or part thereof are classified as Unmillable Material Above the Screen unless tolerances are specified in Foreign Seeds.
- Where depicted, other contaminants should be assessed using the GTA Approved photographic standards. Where reference material is not available, other contaminants should be assessed by reference to the Definitions of those parameters.

- For assessment of Pickling Compounds, Chemicals not Approved for Cereal Rye and Triticale, or Chemicals in Excess of the MRL, it is recommended all deliveries are accompanied by a signed declaration referring to its chemical status. Where the receiving agent believes that the visual appearance and/or odour of grain suggests that it has been treated with a non approved chemical, it is recommended the grain is not received until the representative “as received” sample has been tested by an approved independent laboratory and the presence or absence of non approved chemicals ascertained.
- Report results as follows:
 - Count per half litre – nearest whole number
 - Length in cm per half litre – nearest 0.1cm
 - Percentage by wt in half litre – nearest 0.1%
 - Weight in grams in 2.5 litres – nearest 0.1g

5.12.6 References

Grain Quality Visual Recognition Standards – Australian Grains Centre, Co-operative Bulk Handling Ltd, October 2004

Visual Recognition Standards Guide for Grain Commodity Sampling and Assessment – Issued August 2014, GTA

Seed Impurities of Grain Identification Guide, 3rd Edition, GTA

Insects of Stored Grain, A Pocket Reference, 2nd Edition, CSIRO

Ute Guide Series, GRDC

5.13 Varietal Declaration Procedure

5.13.1 Definitions

This is the recommended procedure for determining the variety of the load presented for delivery.

5.13.2 Scope

This procedure is applicable to all Cereal Rye and Triticale deliveries.

5.13.3 Apparatus

Not applicable.

5.13.4 Reagents

Not applicable.

5.13.5 Method

- For the purposes of the Receival Standards and delivery of grain, classification is dependent on the point of delivery. This means that the highest grade classification available to a variety depends on the region in which it is delivered and the segregation being available at the point of delivery.
- Driver declares the variety(s) in the load tendered for delivery. It is recommended that the grower sign a Declaration Form and provide this to the driver for provision to the Receival Agent. This Declaration Form should at a minimum contain the grower details and the variety(s) of the load.
- Note that depending on the varietal declaration and the procedures of the Receival Agent, a sample of the load may be taken and sent to a laboratory for assessment of the variety within the sample. In this instance sample is to be “as is”.
- Report the variety as per the following procedure using the applicable code as defined by the Receival Agent.

Load is Declared as One Variety Only

- Where the load is declared as being of the one variety only, review the applicable maximum grade classification of that variety as per the Varietal Master List.
- Based on the quality results, Grade the load and record the declared variety.

Load is Declared as Multiple Varieties of the Same Grade Classification Status

- Based on the quality results, Grade the load and record the variety with the greatest percentage in the load.
- Where the load is declared as being of more than the one Cereal Rye variety, the load may still be classified as the Cereal Rye grade.
- Where the load is declared as being of more than the one Triticale variety, the load may still be classified as the Triticale grade.

Load is Declared as Multiple Varieties of Different Grade Classification Status

- Based on the quality results, Grade the load and record the variety with the greatest percentage in the load.

5.13.6 References

Varietal Master List

Declaration Form, if applicable



5.14 Screen Slot Size Compliance Procedure

5.14.1 Definitions

This is the recommended procedure for determining whether the screen slot size complies with the Standard and relevant legislation.

5.14.2 Scope

This procedure is applicable to all Cereal Rye and Triticale deliveries and screens used for assessment purposes.

5.14.3 Apparatus

Engineers Pin Gauge (GO/NO GO GAUGE), 1.99mm and 2.01mm, with a valid Regulation 13 certificate – Triticale

Engineers Pin Gauge (GO/NO GO GAUGE), 1.61mm and 1.63mm, with a valid Regulation 13 certificate – Cereal Rye

Checking template (if available)

Calibration Sticker

5.14.4 Reagents

Not applicable.

5.14.5 Method

- Compliance testing shall be undertaken by randomly selecting 74 slots and measuring using the above Gauge.
- Place screen or disc with the smooth surface up so that it sits horizontally.
- Examine the screen for any damage to the slots. If there is any damage affecting the accuracy of the slots or the screen immediately reject the screen.
- Ensure the screen is labelled with the correct slot/hole size, the commodity that is normally tested on the screen (wheat) and the screen identification number.
- For screen accuracy, place relevant checking template (testing 74 slots) centred as much as possible (use the handle as a guide) on top of screen and rotate so that all the holes line up. For discs place the disc on top of relevant checking template, rotate disc until all the holes line up then clamp with bulldog clips.
- Select the appropriate GO/NO GO GAUGE for the screen/disk to be tested.
- Hold the GO/NO GO GAUGE in the middle.
- Place an end of the GO/NO GO GAUGE on the middle of a slot which lines up with a slot on the template so that is perpendicular to the slot.
- Release the GO/NO GO GAUGE. Gauges are not to be pushed through slots.

- If the GREEN (GO) end does not go through then the slot fails. Record this event and move on to the next slot.
- If the GREEN (GO) end does go through then the slot size is greater than the nominated size of the GREEN end. Proceed to test the slot with the RED (NO GO) end as follows:
 - If the RED (NO GO) end does not go through then the slot size is less than the nominated size of the RED end and greater than the nominated size of the Green End, hence the slot is within the accepted range and passes.
 - If the RED (NO GO) end does go through then the slot fails. Record this event and move on to the next slot.
- Proceed to test all 74 slots, recording each failure.
- 0 to 25 slots is an acceptable failure rate.
- If the screen meets the tolerances:
 - Record results on the equipment record
 - Affix the relevant calibration sticker to the side of the sieve (not the catch pan)

5.14.6 References

Not applicable.



SECTION 6 REFERENCE MATERIALS

At the time of publishing this Manual, the following photographic Reference Material referred to in this Manual is considered by GTA to be suitable as an aid to classification of Cereal Rye and Triticale.

Industry should be aware that all such material is controlled by the author of that material and appropriate copies of that material can be obtained from the author.

The method of printing, copying, storing, using or otherwise obtaining such Reference Material may impact on the appearance of its content. This may impact on the classification of Cereal Rye and Triticale. Industry should note the method of publication of the material by the author and other relevant information such as version number to ensure they have the appropriate version.

Name of Material	Material Type	Author	Version Number	Applicable Dates
Defective Grains				
Visual Recognition Standards Guide for Grain Commodity Sampling and Assessment	Hardcopy booklet	GTA	n/a	Issued August 2014
Grain Quality Visual Recognition Standards	Hardcopy single sheets per defect type	Australian Grains Centre, Co-operative Bulk Handling Ltd	October 2004	n/a
Contaminants				
Grain Quality Winter Grain Crops: The Ute Guide	Hardcopy booklet	GRDC	n/a	n/a
Weeds: The Ute Guide	Hardcopy booklet	GRDC	Various editions	n/a
Insects of Stored Grain, A Pocket Reference	Hardcopy booklet	CSIRO	2 nd Edition	2007
Seed Impurities of Grain Identification Guide	Hardcopy booklet	GTA	3 rd Edition	n/a

