Section 5
Barley

5.1 Barley Classification Procedures

Refer to Sections 1 and 2 of the Commodity Classification Manual as required.

The following classification procedure is to be used for the receival of all Malting and Feed Barley grades.

1. Ask the grower or carrier for the **Variety** of Barley to fill in the transaction. Varieties that can be accepted into the Malting Barley Grades are listed below. If the variety is not listed as a malt variety it can only be accepted into Feed Barley grades.

   MALTING BARLEY IS EXTREMELY SENSITIVE TO VARIETAL ADMIXTURES – ALTHOUGH THESE ARE ALL MALTING VARIETIES THEY CANNOT BE BINNED TOGETHER.

MALTING VARIETIES

VARIETY	CODE	VARIETY	CODE	VARIETY	CODE
Arapiles	ARAP	Franklin	FRAN	Schooner	SCHN
Baudin	BAUD	Gairdner	GAIR	Sloop	SLOP
Dhow	DHOW	Grimmett	GRIM	Sloop SA	SLOS
Flagship	FLAG	Lindwall	LIND	Sloop VIC	SLOV
Fitzroy	FITR	Lofty Nijo	LOFT	Tallon	TALL

FEED BARLEY VARIETIES

VARIETY	CODE	VARIETY	CODE	VARIETY	CODE
Barque	BARQ	Keel	KEEL	Skiff	SKFF
Buloke	BULO	Maltworthy	MWRT	Stirling	STIR
Capstan	CAPS	Maritime	MARI	Tantangara	TANG
Chebec	CHEB	Monarch	MONA	Two row	2ROW
Clipper	CLIP	Mundah	MUDN	Waranga	WARG
Dash	DASH	Not named / other	NTBA	Weeah	WEAH
Forrest	FORR	O'Connor	OCNR	Wyalong	WYAL
Fitzgerald	FITZ	Parwan	PARW	Yagan	YAGN
Galaxy	GALA	Picola	PICO	Yambla	YAMB
Galleon	GALL	Six row	6ROW		

2. Sample the load presented for delivery according to the Receival Sampling procedure detailed elsewhere in the CCM. Observe the load for the presence of **Nil Tolerance Contaminants**.

3. Form a representative **Grower Load Composite (GLC)** sample and ensure it is thoroughly mixed.

4. **Check for the presence of Nil Tolerance Contaminants at all stages of the following classification procedure.**

5. From the GLC sample take an 800 gram subsample to be tested for **Moisture** and **Protein** content using the Infratec wholegrain instrument as per the operating instructions elsewhere in the CCM. Ensure the machine is set to the correct calibration and record the results.

   If the moisture result meets specification continue with classification. If not refer to the moisture definition later in this section.

6. Fill the ½ litre measure using the barley pouring device as documented elsewhere in the CCM.

7. Determine the **Test Weight** using the ½ litre measure and balance method documented elsewhere in the CCM.

8. The **Retention** and **Screenings** assessment is based on two screens - **2.2mm** gap screen plus **2.5mm** top screen. Pour the ½ litre sample onto the top Agtator screen and press the start button.

9. Using the procedure in Section 2 of the CCM, place the grain remaining above the 2.5mm screen into the ½ litre measure and and determine the **% Retention** using the balance. Empty the ½ litre measure ready for the next test.

10. Place the contents that passed through the 2.2mm screen into the ½ litre measure and determine the **% Screenings** using the balance.

11. Inspect the bottom tray for presence of **Field Insects** or **Grain Insects**.

12. Inspect above and below the screens and the bottom tray for **Weed Seeds**. Record the weed seed types using the categories listed later in this chapter. This is mandatory when the load is to be downgraded.

13. Look for S**mall Foreign Seeds** in the bottom tray. To separate small foreign seeds (ryegrass, canola, turnip) from chaff and small barley, pass the sample through the mesh screen (colander) over a white tray. Slightly blowing on the fine screenings can help separate seeds from chaff. Some seeds may still need hand separating.

14. Examine the ½ litre sample for **Foreign Grains.** Count the number of foreign grains (wheat, triticale, rye and oats) in the sample. If the number of foreign grains is large refer to the foreign grain definition highlighted later in this section and follow the alternative method.

15. Count all **Snails** in the ½ litre sample.

16. Fill the 100-corn tray from the GLC as described elsewhere in the CCM. Spend up to 2 minutes with a Maggy Lamp and examine the tray for **Defective Grains** as listed below:

    - **Shot, Sprouted**
    - **Black Tipped / Field Fungi**
    - **Split / Cleaved / Hormone Damage**
    - **Skinned**
    - **Frosted Grains**
    - **Dry Green / Sappy**

    If necessary a further 3 minutes (total 5 minutes) be used to further examine any problem defects.

17. Confirm declared **Variety** and **Varietal Admixture**.

18. Examine a 20 gram sample from the GLC for **Broken or Cracked Grains.** If present **s**eparate all broken or cracked grains from the sample and weigh. Multiply the weight by 5 to determine the % by weight.

19. Examine a 1 litre sample for **Stones** according to the method described elsewhere in the CCM and the stone definition later in this section.

20. Test for any other parameters on the specification sheet, not already covered, as required.

21. Take an appropriate amount of sample from the GLC sample for samples as listed on the Receival Sample Summary Chart.

5.1.1 Quality Tests

1. At Manual Load Entry (MLE) sites record the results of the quality tests, along with the provisional and bin grade, in the quality section of the Transaction, according to the instructions in the Commodity Document Manual. Ensure that the quality test data entered is compatible with the classification, otherwise the transaction will be held in error when it is entered at the Business Centre, delaying payment to the grower until the information is corrected.

2. At Operational Management System (OMS) sites enter the test results and the variety code into the computer according to the instructions in the OMS User Guide.

   The computer can derive a list of the acceptable pay and bin grades, in order of rank. However it is important to remember that this is only an aid for the classifier and does not absolve the classifier from the responsibility of classifying the load.

   All mandatory tests shall be included on the transaction, as indicated with "**" below. If a test results in the grain being received into a grade lower than its varietal potential (eg Schooner downgraded from SC1 to SC3 or F1, or Galleon downgraded from F1 to F2), that test code and result must be included on the transaction.

   *refers to subsequent tests required by OMS on the transaction (grower receival transaction) dependent on variety.

5.1.2 Test Codes

TEST	Code	TEST	Code
Commodity - barley	BA	Shot Grain	SH
Variety	**VR****	Small Foreign Seeds	SS
Moisture	**MO****	Sprouted Grain	SP
Protein	**PR****	Varietal Admixture	VA
Screenings (below 2.2mm screen)	**SC****	Weather Staining	WS
Retention (above 2.5mm screen)	**RT****	Weed Seed Contaminants type 1	S1
Test weight	**TW****	Weed Seed Contaminants type 2	S2
Stones	SE	Weed Seed Contaminants type 3a	3A
Skinning	**SK***	Weed Seed Contaminants type 3b	3B
Cracked / Broken grains	CK	Weed Seed Contaminants type 3c	3C
Black tipping	DC	Weed Seed Contaminants type 4	S4
Field Fungi	FF	Weed Seed Contaminants type 5	S5
Foreign Grain	FG	Weed Seed Contaminants type 6	S6
Frost Affected Grain	FR	Weed Seed Contaminants type 7	S7
Green Barley	GB	Weed Seed Contaminants type 8	S8
Earth (pea size pieces)	EA	Black / Wild Oats, Wild Radish	BW
Sand (grains by count)	ES	RVA Units	RV
Snails - Round	SNR	Foreign Material	TF
Snails - Conical	SNC	Cleaved / Split / Hormone Damage	CB

Weed Seed Types to be included where the load has been downgraded due to weed seeds.

5.2 National Barley Receival Standards

The following definitions apply to all barley receivals for clients wishing to receive to the National Barley Standards for Malt and Feed grades.

5.2.1 Common Receival Criteria

5.2.1.1 Varietal Admixture

A Varietal Admixture is where a load has been contaminated by the presence of any other variety of barley.

A Variety can be identified by the overall shape, size, colour of the grain, length of hairs on the rachilla, the shape of the lemma base, the colour of the aleurone layer, and the kernel shape (twisted or straight). See the Variety Identification section later in this chapter.

It is important to be aware of the limits that apply to **six row and blue aleurone** varieties in the barley grades.

Check for variety and varietal admixture by examining at least 6 grains. This will indicate if varietal admixture limits are exceeded.

Results are described as % purity.

5.2.1.2 Test Weight

Test Weight is the weight of barley in a given volume. It is often interchanged with the term Density.

Test Weight is measured in kilograms per hectolitre.

5.2.1.3 Moisture

Moisture is the amount of water measured in a sample of Barley.

The accepted method of measuring moisture is using the wholegrain Infratec.

However, in SA, if the moisture is outside the accepted limits using the Infratec the following procedure can be followed:

In South Australia ONLY - If the moisture is greater than 13.5% on the Infratec, go to the Kett Moisture Meter (SA) and re-test the sample. If the Kett gives a result less than or equal to 12.5% the load can be accepted. Write both the Infratec and Kett results on the transaction. If the result exceeds 12.5% the load is to be declined.

Moisture is measured as % by weight.

5.2.1.4 Protein

Protein content of Barley is measured using the wholegrain Infratec instrument.

Protein is measured as a % by weight on a DRY basis (i.e. at 0% moisture).

5.2.1.5 Retention

Retention is the material retained above the 2.5mm Certified Agtator Screen.

Retention is measured as a % by weight.

5.2.1.6 Screenings

Screenings is material falling below the 2.2mm Certified Agtator Screen, into the catch pan.

Screenings is measured as a % by weight.

5.2.1.7 Germinative Energy - Late deliveries

This test applies to late deliveries ONLY (after the 1st March in SA or 1st April in VIC). A representative sample is required to be collected and forwarded to the laboratory for testing. **This test is not performed on site.**

Germinative Energy is measured as count per 100 grains.

5.2.1.8 Germinative Capacity - Late deliveries

This test applies to late deliveries ONLY (after the 1st March or 1st April in VIC). A representative sample is required to be collected and forwarded to the laboratory for testing. **This test is not performed on site.**

Germinative Capacity is measured as count per 100 grains.

5.2.1.9 RVA (Rapid Visco Analyser)

The RVA is an instrumental method used for determination of shot barley. RVA units will be distributed after taking into account prevailing harvest conditions.

RVA results override all visual assessments for Shot barley.

Once installed, the RVA units are to be used to classify each potential malting load.

RVA results are expressed as Stirring Number Units.

5.2.1.10 Shot or Sprouted Barley

Shot or Sprouted barley is generally caused by rain and humid conditions at harvest. If there is sufficient moisture mature barley may begin to germinate in the head of the plant. Shot and Sprouted barley cause the resultant processed malt to have uneven quality due to individual grains being at different stages of germination.

Barley grains exhibiting the following outward signs of having commenced germination are classed as Shot.

- Bursting of the grain at the germ end.
- The husk has a pinprick hole at the germ end and may have ‘tramlines’ where the husk has begun to lift on the back of the grain at the germ end. This can be more easily identified with a Maggy Lamp or hand lens.

Barley with roots, rootlets or a chit beginning to emerge is considered Sprouted.

Use the photographic standards for Shot and Sprouted grains to assist with the assessment of this defect in Barley grains.

If shot grains are detected the load can be classified no better than Feed No.1.

If sprouted grains are detected the load can be classified no better than Feed No.2.

Where an RVA test is available it will override a visual assessment for shot barley.

Measured as a count per 100 grains.

5.2.1.11 Black Tip and Field Fungi

Black Tipping is staining caused by excess moisture and / or humidity towards the end of the growing period and into harvest. This occurs at the germ end of the grain.

Only Black Tipping equal to or greater than 1mm is counted as defective grain.

Field Fungi is usually a mould called Cladisporium that gives the grain the appearance of black spotting. This may occur anywhere on the entire grain.

Mould may contaminate the Malthouse and causes beer to 'gush' from the bottle.

Use the photographic standards for Field Fungi and Black Tipped grains to assist with the assessment of this defect in Barley grains.

Measured as count per 100 grains.

5.2.1.12 Skinning

Skinning at harvest is normally caused by mechanical damage to the grain during harvesting. However, skinning may also be caused by over handling of grain in storage.

Skinning is defined as damage to the protective husk of the Barley, in the two thirds of the grain closest to the germ end.

Each grain exhibiting one of more of the following characteristics is counted as a skinned grain.

- Side or Back Skinning - One third or more of the husk is missing from the side or the back of the grain.
- Germ Exposed - The husk is removed from the germ end of the grain or the germ itself has been removed.
- Chipped - Approximately one third of the grain has been removed at the awn end of the grain.
- Pearled - The entire husk has been removed.
- Split Skirt - The husk is split along the centre or side edges, on the back of the grain, at the germ end.
- Split Backs - The husk is split along the length of the centre ridge of the back of the grain.
- Awn Skinning - Greater than a third of the husk from the awn end towards the centre of the grain has been removed.

Use the photographic standards for Skinned grains to assist with the assessment of this defect in Barley grains.

Measured as a count per 100 grains.

5.2.1.12.1Peeled Barley (Outturn Only)

Occasionally on outturn, there is a requirement from peeled grains to be counted. As defined above peeled grains are those that have the husk completely removed. Any grains with any husk remaining (no matter how small a piece) are not counted.

Measured as a % by weight in 100 grams.

5.2.1.13 Bored Insect Damaged Grain

Bored Insect Damaged Grain includes all grains that exhibit insect damage from field or stored product pests.

Measured as a count per ½ litre.

5.2.1.14 Split / Cleaved / Hormone Damaged Barley

Cleaved barley is caused by rainfall events or rapid changes in moisture when grain is at the dough stage. At this growth stage the grain may also be developing colour and is most susceptible to splitting. When grain begins to turn during hot dry periods, waxes begin to form on the outside of the grain and the husk begins to harden. The inside of the grain often begins to dry out but may still remain doughy. A sudden drop in temperature at this stage

causes the husk and skin to harden further. Rain that falls after this event can be absorbed by the plant, and some will enter the grain causing a split along the crease. Alternatively the grain can burst at the husk which causes a split down the back or sides of the grain.

NOTE: Splits must have penetrated through the husk and into the endosperm. See the photographic Standards for Cleaved Grains to assist with the assessment of this defect in Barley Grains.

Hormone affected Barley grains are to be classified under the Split / Cleaved heading. The grains affected are very distorted, twisted and lack a traditional Barley shape. A picture is included in the Grain Quality Ute Guide.

Use the same grade code and limits for hormone-affected barley as for Split / Cleaved.

Measured as a count per 100 grains.

5.2.1.15 Cracked or Broken Barley

Cracked or Broken barley is normally mechanical damage caused by harvesting or over handling of the grain during storage.

Cracked or Broken Barley is defined as grains with a quarter or more of the grain missing.

Measured as % weight per 100 grams.

5.2.1.16 Frost Affected Barley

Frost causes rapid moisture loss from the soil. This deprives the plant of moisture during grain formation.

Subsequently, Frosted Grains appear pinched and sunken in on the back, usually on the awn half of the grain. In severe cases the kernel under the husk will appear orange. This should not be confused with moisture stressed grains, which are usually shrunken along the full length of the grain.

Use the photographic standards for Frosted grains to assist with the assessment of this defect in Barley grains.

Measured as a count per 100 grains.

5.2.1.17 Dry Green Or Sappy Barley Grains

Dry Green and Sappy Barley Grains are normally seen early in harvest when crops may not be fully mature. They may also be seen where there is regrowth in already mature paddocks.

Dry Green and Sappy Barley Grains are those that have been harvested at an immature stage of development. They may be hard grains that are green in colour or they may be yellow grains that are still soft and have not ripened fully.

Measured as a count per 100 grains.

5.2.1.18 Heat Damaged or Bin Burnt

Heat Damaged or Bin Burnt grains are those that have become discoloured because of the development of storage fungi due to high moisture conditions, a gradual increase in temperature during storage or an incorrect artificial drying technique. Grains appear light to dark brown and may emit an odour.

Measured as count per ½ litre.

5.2.1.19 Foreign Grain

Foreign Grain in Barley applies to Wheat, Cultivated Oats, Rice, Triticale and Cereal Rye only.

(Pulses and oilseeds are considered as weed seeds).

Tolerances apply to whole seeds or their equivalent in pieces and refer to the maximum total of all seeds per half litre.

To assist with the Foreign Grain assessment (especially Feed Grades) use the following method:

- Convert the Test Weight back to grams / half litre.
- Divide by 10 to calculate the sample size for assessment.
- Count the foreign seeds (wheat, triticale, oats and rye) in the sample.
- Multiply this number by 10 to give you a count per half litre.

  Example

  Test Weight = 70 kg/hl , which is 350 grams/half litre

  Sample Size for assessment = 350 grams/10 = 35 grams

  Weigh out 35 grams. Count the number of foreign grains (say 25 for this example).

  Multiple 25 by 10 = 250, to give you count per half litre.

5.2.1.20 Wild Oats / Wild Radish

Wild Oats and Wild Radish results are measured as count per ½ Litre.

5.2.1.21 Barley with Blue Aluerone Layer (6 row)

Blue Aluerone Barley results are measurerd as a count per ½ Litre. There is NIL tolerance for all Malting Grades, with a tolerance allowed for Feed Grades

5.2.1.22 Weed Seeds

Weed Seeds are counted from above, between and below the screens (i.e. from the whole of the screened half litre sample).

Tolerances apply to whole seeds or their equivalent in pieces and refer to the maximum total of all seeds named in each type per half litre, Except Type 1 and 3(d). *For Types 1 and 3(d) the maximum applies on an individual seed basis per half litre.

TYPE 1* (maximum individual seeds per half litre)
Colocynth, Field Poppy, Horned Poppy, Jute, Long Head Poppy, Mexican Poppy, New Zealand Spinach, Saffron Thistle, Wild Poppy, Cut Leaf Mignonette Pods
TYPE 2 (maximum total seeds per half litre)
Castor Oil Plant, Coriander, Crow Garlic / Wild Garlic, Darling Pea, Opuim Poppy, Ragweed, Rattlepods, Starburr, St. John's Wort, Broomerape, Parthenium Weed
TYPE 3A (maximum total seeds per half litre)
Bathhurst Burr, Bulls head / Caltrop / Cats head, Cape Tulip, Cottonseed, Dodder, Noogoora Burr, Thornapple, Bellvine
TYPE 3B (maximum total seeds per half litre)
Vetch (Tare), Vetch (Commercial)
TYPE 3C (maximum total seeds per half litre)
Heliotrope (Blue), Heliotrope (Common)
TYPE 3D* (maximum individual seeds per half litre)
Double Gees / Spiny Emex / Three Corner Jack, Broad Beans
TYPE 4 (maximum total seeds per half litre)
Darnel (Drake Seed), Field Bindweed, Hexham Scent / Meliot (King Island)*, Hoary Cress, Mintweed, Nightshades, Paddy Melon, Skeleton Weed, Variegated Thistle
TYPE 5 (maximum total seeds per half litre)
Knapweed (Creeping / Russian), Paterson’s curse / Salvation Jane, Sesbania Pea
TYPE 6 (maximum total seeds per half litre)
Colombus Grass, Johnson Grass
TYPE 7 (maximum total seeds per half litre)
Chickpeas, Clover, Corn / Maize, Cowpea, Faba Beans, Field Peas, Lentils, Lupins, Medic Pods, Safflower, Soybean, Sunflower and any other large (pea sized) seeds or pods
TYPE 8 (maximum total seeds per half litre)
Bindweed (Australian & Black), Bedstraw, Brome grass, Forage Sorghum, Muskweed, Onion Weed, Phalaris glumes, Poverty Weed, Ryegrass on Stalk, Sheep weed, Turnip weed and any other weeds not specified in types 1 - 7 or small foreign seeds.
SMALL FOREIGN SEEDS (maximum total seeds per half litre)
Seeds not specified in types 1 - 8 below the 2.2mm Agtator screen.

A list of weed seeds and their codes is below.

* = Unmillable Material: U = Unlimited; S = Small Foreign Seeds

All Small Foreign Seeds in total not to exceed % by weight listed.

Some limits vary between South Australia, Victoria and other states.

COMMON NAME	*BOTANICAL NAME*	TYPE
Amsinckia	*Amsinckia spp*	S
Australian bindweed	*Convolvulus erubescens*	8
Australian carrot	*Daucus glochidiatus*	8
Australian phalaris	*Phalaris aquatica*	S
Ball clover	*Trifolium glomeratum*	S
Barley grass	*Hordeum leporinum*	8
Barnyard grass	*Echinochloa crus-galli*	8
Bathurst burr	*Xanthium spinosum*	3A
Beans (faba)	*Vicia faba*	7
Bedstraw (Threehorn)	*Galium tricornutum*	8
Bifora (monkey face or carrot weed)	*Bifora testiculata*	8
Billy buttons	*Calocephalus platyphalus*	8
Bindy-eye	*Calotis hispidula*	8
Bindweed (Australian)	*Convolvulus erubescens*	8
Bindweed (black)	*Polygonum convolvulus*	8
Bindweed (field)	*Convolvulus arvensis*	4
Black bindweed	*Polygonum convolvulus*	8
Black oats	*Avena fatua*	BW
Bladder soap wort	*Vaccaria hispanica*	S
Brome (great)	*Bromus diandrus*	8
Brome (soft)	*Bromus mollis*	8
Brome (sterile)	*Bromus sterilis*	8
Buchan weed	*Hirschfeldia incana*	8
Bulls head	*Tribulus terrestrio*	3A
Burr grass (spiny)	*Cenchrus tribuloides*	8
Burrweed (yellow)	*Amsinckia spp*	S
Caltrop	*Tribulus terrestris*	3A
Canary grass (lesser)	*Phalaris minor*	S
Canary grass (wild)	*Phalaris canariensis*	S
Canola	*Brassica rapa*	S
Cape tulip	*Homeria spp*	3A
Capeweed / Cape Dandelion	*Arctotheca calendula*	4
Carrot (Australian)	*Daucus glochidiatus*	8
Castor oil plant	*Ricinus communis*	2
Catchfly	*Silene spp.*	8
Cats head	*Tribulus terrestris*	3A
Celery (slender)	*Apium leptophyllum*	S
Cereal rye	*Secale cereale*	FG

COMMON NAME	***BOTANICAL NAME***	**TYPE**
Charlock	*Sinapis arvensis*	S
Chickpeas	*Cicer arietinum*	7
Clover (ball)	*Trifolium glomeratum*	S
Clover (pods)	*Trifolium spp*	7
Cockspur (Maltese)	*Centaurea melitensis*	S
Colocynth	*Citrullus colocynthis*	1
Colombus grass	*Sorghum almum*	6
Coriander	*Coriandrum sativum*	2
Corn	*Zea mays*	7
Corn gromwell	*Buglossoides arvensis*	8
Cottonseed	*Gossupium spp*	3A
Cowpea	*Vigna unguiculata*	7
Creeping knapweed	*Acroptilon repens*	5
Crow garlic	*Allium vineale*	2
Cutleaf mignonette (seeds)	*Reseda lutea*	S
Cutleaf mignonette (pods)	*Reseda lutea*	1
Darling pea	*Swainsona spp*	2
Darnel	*Lolium temulentum*	4
Dock	*Rumex spp*	S
Dodder	*Cuscuta spp*	3A
Double gees	*Emex australis*	3D
Drake	*Lolium temulentum*	4
Durum	*Triticum durum*	FG
Faba beans	*Vicia faba*	7
Fat hen	*Chenopodium album*	S
Fescue	*Festuca spp*	S
Field peas	*Pisum sativum*	7
Galvanised burr	*Sclerolaena birchii*	8
Garlic (crow) garlic (wild)	*Allium vineale*	2
Grain sorghum	*Sorghum bicolor*	8
Great Brome	*Bromus diandrus*	8
Gromwell (corn)	*Bugglosoides arvensis*	8
Hares ear	*Conringia orientalis*	S
Hedge mustard	*Sisymbrium officinale*	S
Heliotrope (blue)	*Heliotropium amplexicaule*	3C
Heliotrope (common)	*Heliotropium europaeum*	3C
Hexham scent (Melilotus)	*Melilotus indicus*	4
Hoary cress	*Cardaria draba*	4
Horehound	*Marrubium vulgare*	S
Horned poppy	*Glaucium flavum*	1

COMMON NAME	***BOTANICAL NAME***	**TYPE**
Indian weed	*Sigesbeckia orientalis*	8
Johnson grass	*Sorghum halepense*	6
Jute	*Corchorus olitorius*	1
Khaki weed	*Alternanthera pungens*	8
Knapweed (creeping)	*Acroptilon repens*	5
Knapweed (Russian)	*Acroptilon repens*	5
Knotweed	*Polygonum aviculare*	S
Lentils	*Lens culinaris*	7
Lesser canary grass	*Phalaris minor*	S
Lettuce	*Lactuca spp*	S
Linseed	*Linum usitatissimum*	8
Long headed poppy	*Papaver dubium*	1
Lucerne (pods)	*Medicago sativa*	7
Lucerne (seed)	*Medicago sativa*	S
Lupin	*Lupinus spp*	7
Maize	*Zea mays*	7
Mallow	*Malva spp*	8
Maltese cockspur	*Centaurea melitensis*	S
Medics (pods)	*Medicago spp*	7
Medics (seeds)	*Medicago sp*	S
Melilot (king island)	*Melilotus indicus*	4
Mexican poppy	*Argemone mexicana*	1
Mignonette (Cutleaf)	*Reseda lutea*	S
Milk thistle (pods)	*Sonchus oleraceus*	1
Milk thistle (seeds)	*Sonchus oleraceus*	S
Millet (Japanese)	*Echinochloa utilis*	8
Mintweed	*Salvia reflexa*	4
Muskweed	*Myagrum perfoliatum*	8
Mustard	*Sisymbrium spp*	S
Mustard (Indian hedge)	*Sisymbrium orientale*	S
New Zealand spinach	*Tetragonia tetragonoides*	1
Nightshades	*Solanum spp*	4
Noogoora burr	*Xanthium pungens*	3A
Oats (black)	*Avena fatua*	BW
Oats (common)	*Avena sativa*	FG
Oats (sand)	*Avena strigosa*	BW
Oats (wild)	*Avena fatua*	BW
Onion weed	*Asphodelus fistulosis*	8
Opium poppy	*Papaver somniferum*	2
Paddy melon	*Cucumis myocarpus*	4

COMMON NAME	*BOTANICAL NAME*	TYPE
Paradoxa grass (glumed)	*Phalaris paradoxa*	8
Paradoxa grass (seed)	*Phalaris paradoxa*	S
Parthenium weed	*Parthenium hysterophorus*	2
Paterson's curse	*Echium plantagineum*	5
Peas (field)	*Pisum sativum*	7
Peppercress	*Lepidium spp*	S
Phalaris (Australian)	*Phalaris aquatica*	S
Poached egg daisy	*Calocephalus platycephalus*	8
Poppy (field)	*Papaver rhoeas*	1
Poppy (horned)	*Glaucium flavum*	1
Poppy (Mexican)	*Argemone mexicana*	1
Poverty weed (yellow)	*Calocephalus sonderi*	8
Radish (wild) seed	*Raphanus raphanistrum*	S
Radish (wild) pod	*Raphanus raphanistrum*	BW
Ragweed	*Ambrosia spp*	2
Rapeseed	*Brassica rapa*	S
Rattlepods	*Crotalaria spp*	2
Rice	*Oryza sativa*	FG
Russian knapweed	*Acroptilon repens*	5
Rye (cereal)	*Secale cereale*	FG
Ryegrass	*Lolium spp*	S
Ryegrass on stalk	*Lolium spp.*	8
Safflower	*Carthamus tinctorius*	7
Saffron thistle	*Carthamus lanatus*	1
Sage (wild)	*Salvia verbenaca*	S
Saltbush	*Atriplex spp*	S
Salvation Jane	*Echium plantagineum*	5
Sand oats	*Avena strigosa*	8
Sesbania pea	*Sesbania cannabina*	5
Sheepweed	*Buglossoides arvensis*	8
Skeleton weed	*Chondrilla juncea*	4
Slender celery	*Apium leptophyllum*	S
Small burrgrass	*Tragus australianus*	8
Sorghum (grain)	*Sorghum bicolor*	8
Sorrel	*Rumex acetosella*	S
Sowthistle	*Sonchus spp*	S
Soybean	*Glycine max*	7
Spear grass	*Bromus diandrus*	8
Spear thistle	*Cirsium vulgare*	8
Spiny burr grass	*Cenchrus tribuloides*	8

COMMON NAME	***BOTANICAL NAME***	**TYPE**
Spiny emex	*Emex australis*	3D
Starburr	*Acanthospermum hispidum*	2
St. Johns wort	*Hypericum perforatum*	2
Sunflower	*Helianthus annuus*	7
Thistle milk (pods)	*Sonchus oleraceus*	1
Thistle milk (seeds)	*Sonchus oleraceus*	S
Thistle (saffron)	*Carthamus lanatus*	1
Thistle (spear)	*Cirsium vulgare*	8
Thistle (variegated)	*Silybum marianum*	4
Tick grass	*Tragus australianus*	8
Thornapple	*Datura spp*	3A
Three cornered jack	*Emex australis*	3D
Threehorn bedstraw	*Galium tricornutum*	8
Triticale	*Triticosecale spp*	FG
Turnip (Mediterranean)	*Brassica tournefortii*	S
Turnip (wild)	*Brassica rapa*	S
Turnip weed (ball)	*Rapistrum rugosum*	8
Urochloa grass	*Urochloa panicoides*	S
Variegated thistle	*Silybum marianum*	4
Verbena	*Verbena spp*	S
Vetch (commercial)	*Vicia spp*	3B
Vetch (wild tare)	*Vicia sativa*	3B
Wards weed	*Carrichtera annua*	8
Wheat	*Triticum aestivum*	FG
Wheatgrass	*Agropyron spp*	8
Wild canary grass	*Phalaris canariensis*	S
Wild garlic	*Allium vineale*	2
Wild oats	*Avena fatua*	BW
Wild poppy	*Papaver hybridum*	1
Wild radish (seed)	*Raphanus raphanistrum*	S
Wild radish (pod)	*Raphanus raphanistrum*	BW
Wild sage	*Salvia verbenace*	S
Wild turnip	*Brassica rapa*	S
Wireweed	*Polygonum aviculare*	S
Yellow burrweed	*Amsinckia spp*	S
Yellow poverty weed	*Calocephalus sonderi*	8

5.2.1.23 Smut

There is a **NIL** tolerance for smut. This includes all types of Smut – ball, covered and loose.

Loose Smut is the result of the fungus *Ustilago tritici* developing in heads during the growing phase. This is the smut that is most likely to be found in barley.

Grains infected with Ball Smut (commonly known as Stinking Smut or Bunt) are those that have become invaded by 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.

5.2.1.24 Ergot

Ergots are purplish black fungal bodies that contaminate cereal and ryegrass kernels when they are infected by the fungus *Claviceps purpurea*

Cereal Ergot:	There is a NIL tolerance for Cereal Ergot.
Ryegrass Ergot:	The tolerance applies to the maximum length (in centimetres) of ergot pieces in a ½ litre sample.

5.2.1.25 Earth and Sand

This category of contaminant refers to the admixture by any soil type, with the tolerance being for grains of sand or pea size pieces of earth.

Earth and sand are measured by grains per ½ litre.

5.2.1.26 Stones (SA Only)

If stones are suspected in the load, a 1litre sample is taken from the GLC. The stones are picked out and assessed using the stone gauge.

Stones are allocated points based on the holes in the gauge.

The stone gauge has three different sized holes each with a different points rating.

- Stones that will fit through the smallest hole will incur 1 point per stone.
- Stones that fit through the medium sized hole but not the small hole will incur three points per stone.
- Stones that fit through the large hole but not the medium sized hole will incur five points per stone.
- Stones that will not fit through the large hole will result in the rejection of the load.
- There is a maximum length of stone as measured using the maximum slot length at the top of the gauge.

All points incurred from the count of the stones in a litre sample will be added together and the total compared against the allowable limits.

Stones are measured as points per Litre

5.2.1.27 Field Insects

Field Insects include: Grasshoppers, Woodbugs, Ladybirds, Millipedes and any other field insects that are not damaging to stored grain.

Tolerance: Two whole bodies.

Field Insects are measured as a count per ½ litre.

5.2.1.28 Sitona Weevil

Sitona weevils are classified separately to field insects as they have different tolerances.

Sitona weevils are often found in freshly harvested grains they do not breed or feed in stored grain.

Results are measured as a count per ½ Litre.

5.2.1.29 Pea Weevil

When peas are detected in a load after sampling, it will be necessary to confirm that they are free of live pea weevil and / or larvae; this means that the peas will need to be broken open. If peas are not found in the probed sample but are obvious on the surface of the load, several peas are to be collected at random in a safe manner and checked for infestation.

This is to be carried out using the "pea crusher" supplied. Up to 10 peas are placed into the cylinder and the piston rammed home to break open the peas. The peas are then inspected for pea weevil infestation. As pea weevil will most likely be in the larval stage, care should be exercised when breaking open the peas as the grub can easily be lost in the debris.

There is a NIL tolerance for Pea Weevil.

5.2.1.30 Live Grain Insects

THERE IS A NIL TOLERANCE FOR ALL LIVE GRAIN INSECTS IN ALL GRADES.

Grain insects are those, which attack or inhabit stored grain. A listing of the common grain insect species is given below.

For a guide to Insect identification consult the “Insects of Stored Grain” pocket book or wall chart available in all sampling offices. If you are unsure of the identification of any insect detected in the sample then the load should be declined until it can be identified. Contact your Business Centre or Head Office for assistance.

COMMON NAME	***SCIENTIFIC NAME***
Angoumois grain moth	*Sitogroga cerealella*
Confused flour beetle	*Tribolium confusum*
Flat grain beetle	*Cryptolestes spp*
Fungus beetle	*Corticaria punctulata*
Granary weevil	*Sitophilus granarius*
Hairy fungus beetle	*Typhaea stercorea*
Indian meal moth	*Plodia interpunctella*
Lesser grain borer	*Rhyzopertha dominica*
Maize weevil	*Sitophilus zeamais*
Mites	*Acarina*
Psocids / book lice	*Psocoptera*
Rice weevil	*Sitophilus oryzae*
Rust-red flour beetle	*Tribolium castaneum*
Saw toothed grain beetle	*Oryzaephilus surinamensis*
Tropical warehouse moth	*Ephestia cautella*

5.2.1.31 Dead Grain Insects

There are tolerances for dead grain insects.

These are measured as a count per ½ litre.

5.2.1.32 Snails

Snails refer to whole bodies or substantially whole (more than half) Snail shells irrespective of size. Examples include the White Snail (*Cernvella virgata*), White Italian Snail (*Theba pisana*), Pointed Snail (*Cochlicella acuta*), Small Pointed Snail (*Cochlicella barara*) and Cernuella neglecta.

Snails are measured as count per ½ litre.

5.2.1.33 Odours, Tainting Agents, Sour and Musty or Mouldy grains

There is a **NIL** tolerance for any contaminant that imparts an objectionable taint or smell to the load such as, but not limited to, Eucalyptus, Wild Garlic, Hexham Scent (also known as Melilotus, is only acceptable if no tainting odour is present), Coriander or animal faeces. Tainting agents also refer to objectionable odour as a result of insect infestation or rotting snail, bird or rodent bodies.

Includes odour due to improper storage causing mould.

5.2.1.34 Foreign Material

Foreign Material refers any matter in a sample that is not barley.

The specifications include provision for any foreign material that is not already categorised in the standards. This is measured on a ½ litre sample for all barley grades.

Foreign Material is measured as % by weight.

5.2.1.35 Objectionable Matter

There is a **NIL** tolerance for any objectionable matter including any sticks, glass, metals, concrete or any other commercially unacceptable contaminant, smell or taste

5.2.1.36 Mouldy and Sweated grains

There is a **NIL** tolerance for any grain affected by post–harvest mould. It cannot be received.

5.2.1.37 Chemical Residues

There is a **NIL** tolerance for chemicals not approved for stored grain. This includes all chemicals that are not registered for use on stored Barley in this State, or chemicals registered for use on stored Barley but which have been applied at a rate in excess of the legal rate, specified on the label by the manufacturer. Grain treated with, or contaminated with Bioresmethrin, Carbaryl, Organochlorine compounds, or Dryacide will not be accepted.

If a Grower indicates that the load has been treated with a chemical either shortly before harvesting or prior to delivery, the classifier should contact the Quality and Technical Services Department to determine whether the chemical and the treatment rate are acceptable for receival at your site.

5.2.1.38 Pickling Compounds and Red Dyed Grains

There is a **NIL** tolerance for Pickling compounds and red dyed grains. Including Fenaminosulf, triadimenol, carboxin, flutriafol, bitertanol and any other fungicide added to the grain as a seed treatment. Also included are any marker dyes commonly used during crop spraying operations that have stained the grain.

5.2.1.39 Barley not of the current season

To be accepted into malting classification, loads of approved malting varieties must be of the current season.

5.2.1.39 Nil Tolerance Contaminants

Loads of Barley containing any contaminants that have a **NIL** tolerance are unacceptable

They require a sample to be collected regardless of variety (sample not required for moisture and live grain insects).

Separate the NIL tolerance contaminants in the sample. Send to the Laboratory and keep a specimen at your site. If only one specimen of the contaminant is found in the sample, this is to be forwarded to the Ceretech laboratory. These loads must also be issued with a Notice of Decline.

5.3 Barley Varietal Identification

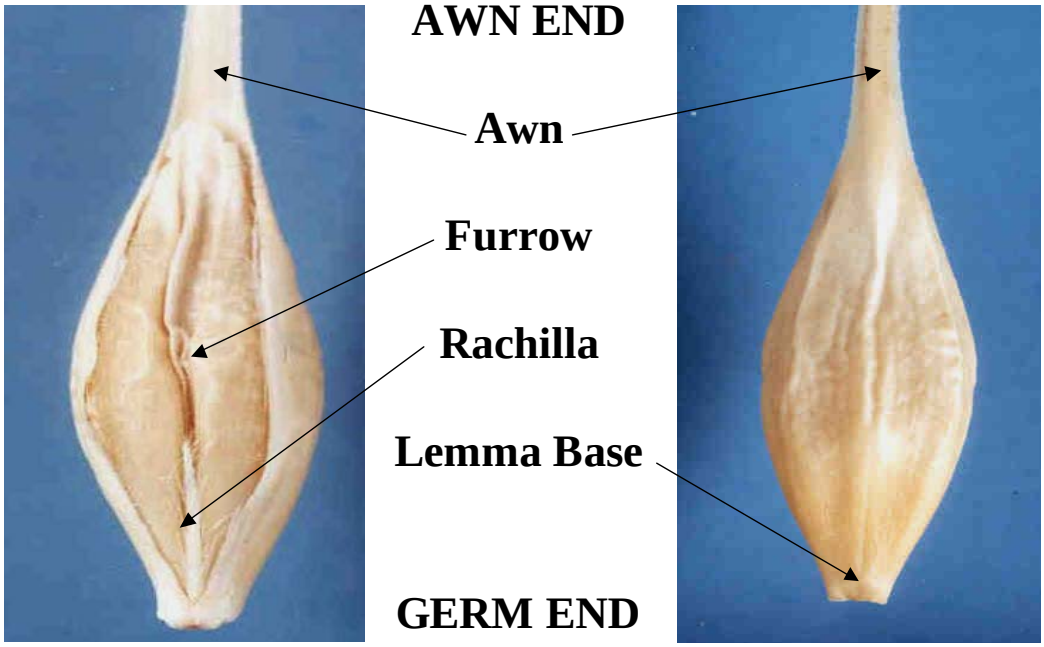
In malting barley, a mixture of varieties is undesirable, unless varieties have similar malting performance.

During the malting process the grain is germinated. Each variety has a different rate of germination. Compatible varieties such as Sloop, Sloop SA and Sloop VIC take up water and germinate at a similar rate to produce even malt. With incompatible varieties, the rate of water uptake is different resulting in uneven malt. Some grain may be over-malted or some grain may be under-malted. The malting process cannot be stopped for some of the mixture while the rest catches up.

It is necessary that classifiers are able to identify barley varieties. Barley identification is mainly based on the following characteristics.

5.3.1 Morphological Features

5.3.1.1 Diagram of Grain Features



5.3.1.2 Kernel Shape (Twisted Grain)

This is a feature readily visible to the unaided eye.

SIX ROW BARLEY - has three rows on each side of the central stem called the rachis. The central rows can grow without problem, but the other four rows have to twist to fit in the cramped space. Therefore, on average, two-thirds of the grain will be twisted. Examples of six-row barley include Cape and Beecher.

TWO ROW BARLEY - the outer two rows on each side do not grow and only the even inner rows on each side develop, giving a sample with no twisted grains.

5.3.1.3 Aleurone Layer Colour

The aleurone layer is directly under the husk of the grain and is easily seen on skinned grains or when the husk has been peeled off. All current two-row varieties in Australia have a white aleurone layer. Some varieties overseas have a purple or black aleurone layer. Cape and Corvette are old Australian varieties with blue aleurone layers.

5.3.1.4 Rachilla Hair Length (Long V Short (Fuzzy))

IT IS IMPORTANT TO NOTE THAT THE RACHILLA HAIRS ARE THE MOST DISTINGUISHING FEATURE AND NOT THE RACHILLA ITSELF.

This feature generally needs the aid of jewellers eye loop with 5x or 10x magnification for recognition.

The rachilla is part of the barley flower, which remains on the grain. It does not seem to serve any purpose. It lies along the crease or hollow in the front of the grain, attached to the base or germ end and extending about one-third to one-half the grain length. It is generally thin and covered by one of two types of hair. Either it is densely coated with short fuzzy hairs or it has long glistening silky hairs. While the fuzzy haired type is always lushly covered, the longhaired type can either be well covered or else have only a few hairs on it with the almost smooth rachilla easily seen.

As an aid to examining the rachilla hair type, it is useful to lift the rachilla out of the furrow of the grain. This can be done by tilting back the base of the germ end of the grain with the thumbnail. The rachilla can then be observed against a dark coloured surface so that the hairs are more easily seen. If the hairs are visible to the naked eye they are almost certainly of the long type.

5.3.1.5 Lemma Base Shape (Creased V Depressed)

This feature generally needs the aid of jewellers eye loop with 5x or 10x magnification for easier recognition.

The lemma is the skin on the back of the grain, which continues up, into the awn. This is the opposite to the side of the grain to the crease and the rachilla. At the base of the lemma, the grain of some varieties will have a crease running across it, whilst other varieties will not have a crease.

5.3.2 Specific Variety Characteristics

In examining all barley features it is worth looking at more than one grain. Often the rachilla can be knocked out during the harvesting and sometimes the base of the lemma is broken off as well.

The features previously described enable varieties to be separated into a number of groups. Further separation into separate varieties can be more difficult and is usually not necessary at the silo.

5.3.2.1 Short Hair Rachilla and Depressed Lemma Base

Barque: Similar to Galleon but slightly larger, plumper and brighter. Tends to retain awns.

Capstan: Exhibits short-medium length rachilla with short hair and depressed lemma base.

Chebec: Similar to Schooner but an all round creamier colour. Ribs running down centre of back and edges more pronounced than Schooner. Smaller percentage of wrinkles evident.

Forrest: Generally larger in size than Schooner. Easily distinguished by purple - brown stripes prominent on ribs down the centre and edges of the back of the grain (however not all grains exhibit this effect). Grains have a medium length rachilla with short hairs.

Gairdner: Long grains but thinner than Schooner and Sloop. Grains have a long stiff rachilla almost half the length of the grain. Usually grown in higher rainfall areas.

There may also be 3 distinct veins visible on the back of the grain.

Galleon: Usually longer and thinner than Schooner and has a brighter creamier colour. Tends to retain more awn especially if reaped in cooler conditions. When viewed side on, some grains display a slight downwards hook to the germ end.

Schooner: Medium to average size. Mellow colour tending to greyish underneath. Wrinkles evident mostly on top. May have greyish colour lemma nerves. Short-medium rachilla length with short hairs.

Sloop: Slightly plumper than Schooner, off white to yellow in colour and more angular than Schooner.
Sloop SA Tends to be more like Chebec than Schooner. There is very little awn retention.
Sloop VIC

5.3.2.2 Short Rachilla Hair and Creased Lemma Base

Weeah: Distinct crease evident at the lemma base. Medium to large grain. Can be chaffy with grains attached in groups to the rachis. Has a medium length rachilla.

5.3.2.3 Long Rachilla Hair and Depressed Lemma Base

Arapiles: Plump, medium size creamy coloured grain. Shape can be quite distinctive. Rachilla hairs are long and bushy. Grown in Wimmera and Central Districts of Victoria.

Baudin: Bred as replacement for Gairdner. Has a slightly larger grain size than Gairdner.

Clipper: Small to medium sized grains. Mainly white in colour. Medium-long rachilla length with long silky hairs that are dense at the rachilla base. Grains have some wrinkling.

Dhow: Tends to be plumper than Gairdner and has a soft, loose husk. Dhow has short - medium length rachilla.

Franklin: Predominantly small grain size – is typically classified using smaller screen size. Off white to yellow colour. Almost half of the length of grain is heavily wrinkled both top and bottom. Rachilla lies close in crease. Grown only in areas with higher rainfall.

Keel: Plump grains with low screenings.

Lofty Nijo: Plump grains with bushy rachilla.

Maritime: Short-medium rachilla length with long hairs.

Skiff: Small to medium size grain and under normal conditions is quite plump. Caramel like colour and generally shows considerable husk and backbone in load. Has a bushy rachilla and is very wrinkled.

Tallon: Similar in most respects to Franklin, especially the wrinkles, but generally lighter in colour.

Yagan: Large long angular grains, white to yellow in colour. Rachilla hair long and bushy.

5.3.2.4 Six Row Varieties

Beecher: Long thin grain, white colour with long rachilla hair. Approximately two thirds of the grains are twisted.

Cape: Grain exhibits a blue coloured aleurone, short rachilla hair and creased lemma base. Two thirds of the grains are twisted.

5.3.2.5 Summary Of Major Grain Characteristics

VARIETY	RACHILLA HAIR		LEMMA BASE	
	LONG	SHORT	DEPRESSED	CREASED
Arapiles	*		*	
Barque		*	*	
Baudin	*		*	
Beecher (Six Row)	*		*	
Cape (Six Row – Blue)		*		*
Capstan		*	*	
Chebec		*	*	
Clipper	*		*	
Dhow	*		*	
Forrest		*	*	
Franklin	*		*	
Galleon		*	*	
Gairdner		*	*	
Keel	*		*	
Lofty Nijo	*		*	
Maritime	*		*	
Schooner		*	*	
Skiff	*		*	
Sloop		*	*	
Sloop SA		*	*	
Sloop VIC		*	*	
Tallon	*		*	
Weeah		*		*
Yagan	*		*	

5.4 Outturn Test Methods

For Barley Outturn, National Barley Receival Standards apply in most cases. However, there are some tests that are exceptions. The alternative tests are based on International malting barley-marketing protocols established by the 'Institute of Brewing' (IOB) and the 'European Brewing Convention' (EBC). In these cases the methods to be used are outlined below in greater detail.

5.4.1 Steinecker Method - Retention and Screenings

The Steinecker Method for Post Harvest Retention and Screenings is outlined elsewhere in the CCM.

This method uses alternative style screens and shakers to those used for receival.

Results are expressed as % Retention by weight and % Screenings by weight.

5.4.2 Germination

This test is used to measure the ability of the grain to germinate and be turned into malt. It is only applicable to malting barley grades.

1. Place two labelled Petri Dishes on a bench.
2. Place 2 filter papers into the base of each Petri dish.
3. Count 100 grains using the 100 corn tray and place grains onto the filter papers in each Petri dish. Each sample is tested in duplicate.
4. Measure 4mls of water and pour on to filter papers.
5. Place the lid on the dish and put them in a dry spot out of direct sunlight.
6. Count the number of grains that have either a rootlet or a chit after 72 hours from the time the water is added to the grain in the dish.
7. Record the results in the relevant documentation. Results are expressed as % by count in 100 grains.

5.4.3 Foreign Grain

Foreign Grain is measured differently for Outturn than for receival.

1. Accurately weigh out 100 grams of sample on the digital balance and remove all foreign grain from the sample.
2. Weigh the total amount of foreign grain and express the result as % by weight.

5.4.4 Foreign Matter

Foreign Matter is measured differently during outturn than receival. During receival it only measures foreign matter that has not already been classified. On outturn Foreign Matter is the total of everything in the sample that is not barley.

1. Accurately weigh out 100 grams of sample on the digital balance.
2. All material that is not whole or cracked grain of the desired commodity is regarded as Foreign Matter. Remove all of this material including weed seeds, foreign grain, chaff, snails, stones etc. from the sample. A screen may be used to separate foreign matter from the barley grains.

3. Weigh the total amount of foreign material and express the result as % by weight.

5.4.5 1000 Corn Weight

1000 Corn Weight is a parameter that applies only to outturn. It is not measured for receival.

1. Take a pinch of grain as close as possible to 100 grains and place it in the 100 corn tray.
2. Fill the tray as instructed in Section 2 of the CCM.
3. With the aid of the lid, pour the 100 grains into a zeroed or level balance.
4. Repeat this process another 4 times (total 5 x 100 grains) then multiply by 2.
5. For some shipments it is necessary to convert 1000 corn weight to dry basis. Use the following formulae to calculate 1000 Corn Weight Dry basis:

$$\frac{\text{1000 corn weight (grams) X (100-Moisture)}}{100}$$

6. Results are expressed in grams.

5.5 Barley Receival Charts

You may want to add the current Barley Receival Charts to this section. Refer to the Intranet for the latest revision of the Reference Charts.