Animal &
Plant Health
Agency

Instructions to Licensed and Official Crop Inspectors in England and Wales

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This publication is available at www.gov.uk/government/publications

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Contents

These instructions replace all previous versions and are intended to assist licensed crop inspectors in their official duties and as a reference guide for official crop inspectors. It is available on the Seed Marketing pages of GOV.UK.

The first part of the booklet is an introduction to aspects of crop inspection common to all species. It is followed by sections giving detailed guidance for each crop group. Variety descriptions and guidance on how to use morphological characters to identify species, varieties and varietal impurities are issued by Animal and Plant Health Agency's technical contractor. Inspectors must be familiar with these Instructions, bearing in mind subsequent alterations by new Statutory Instruments, Seed Certification Information Letters and General Licences. For detailed guidance on seed certification in England and Wales please refer to the appropriate seed regulations.

Animal and Plant Health Agency (Plant Varieties and Seeds) is the Certifying Authority for England and for Wales on behalf of the National Assembly for Wales. NIAB is Animal and Plant Health Agency's technical contractor for the operation of seed certification.

Animal and Plant Health Agency

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There are separate Certifying Authorities for Scotland and Northern Ireland.

Marketing of seed of the main agricultural crops is controlled by:

- **European Community Directives on the Marketing of Seed**
- **The Plant Varieties and Seeds Act 1964**
- **The Seed Marketing Regulations**

Note

The above regulations have all subsequently been amended by Statutory Instrument and you are advised to check details on GOV.UK.

1. Introduction

1.1 SEED REGULATIONS

- Define the categories (including HVS) of seed (Pre-basic, Basic, CS, C1, C2 and C3) which may be marketed.
- Give the standards which must be achieved in the seed crop.
- Give the standards which seed must achieve before it can be marketed.
- Provide for official certification of most categories of seed.

The Seed Marketing Regulations require three building blocks before certification can take place: the crop, seed and variety stages. The crop stage is entry of a seed lot for multiplication, entry of a seed crop, followed by inspection to assess if it meets the conditions specified in the regulations and issuing of a report. The seed stage is sampling and testing of seed to assess if it meets the standards specified in the regulations and issuing of a report. The variety stage requires that before it can be marketed, seed must be of a variety which is on the UK National List or Common Catalogue.

The regulations allow early multiplication of varieties which are undergoing National List testing in the EU, completing the crop and seed stages but not the variety stage.

Licensed crop inspectors are licensed under The Seed Marketing Regulations. The duties of a licensed crop inspector are described in these regulations and in the crop inspector licence.

Data Protection Act 1998 – Fair Processing Notice

The purpose of this Fair Processing Notice is to inform you of the use that will be made of your personal data, as required by the Data Protection Act 1998. Animal and Plant Health Agency, as part of Defra, is the data controller in respect of any personal data that you provide when you complete seed certification forms.

Applicants should note that Animal and Plant Health Agency, or Animal and Plant Health Agency's technical contractor NIAB acting on Animal and Plant Health Agency's behalf, will use your personal data supplied on the seed certification forms primarily for the purposes of: determining eligibility of your application for seed certification; for monitoring purposes; and for statistical purposes.

Legislation

The Plant Varieties and Seeds Act 1964

The England Seed Marketing Regulations 2011

Council Directives

66/401/EEC Marketing of Fodder Plant Seed

66/402/EEC Marketing of Cereal Seed

2002/54/EC Marketing of Beet Seed

2002/55/EC Marketing of Vegetable Seed

2002/57/EC Marketing of Oil and Fibre Plant Seed

Under the legislation listed above, the data provided to Animal and Plant Health Agency/NIAB is used to compile statistics about certified seed. The information which Animal and Plant Health Agency publishes in Seed Statistics relates only to the hectares of seed crops entered for certification and the tonnage harvested by variety. Personal data enabling persons to be identified is not included in the statistics.

Personal data is released to the Animal and Plant Health Agency GM team under a voluntary consent by seed importers under an agreement PVS has with the GM team to monitor the presence of adventitious GM organisms in seed imports.

Seed Certification data for British Society of Plant Breeders (BSPB) sub-licence holders is released under a legal agreement between BSPB and Defra for the purposes of royalty collection. The BSPB is the representative body for the UK plant breeding industry and the Plant Varieties and Seeds Act 1964 established the framework for collecting seed royalties on protected varieties.

Certification Data is released to a third parties in the following two areas

1. The Directives /Regulations require that we collect details of exports of seed over 2kg from countries outside the EU to England and Wales. This information is collected for the European Commission. We forward this data to the Animal and Plant Health Agency GM team, but only if the companies supplying the data sign a form consenting to this data transfer.

2. Certification data relating to varieties certified is released to the British Society of Plant Breeders (BSPB) to enable them to collect royalties. Data is released under a specific

legal agreement signed with BSPB and for those companies for which BSPB acts as licensee.

Animal and Plant Health Agency may also be required to release information, including personal data and commercial information, on request under the Environmental Information Regulations 2004 or the Freedom of Information Act 2000. However, Animal and Plant Health Agency will not permit any unwarranted breach of confidentiality nor will we act in contravention of our obligations under the Data Protection Act 1998.

Animal and Plant Health Agency or its appointed agents may use the name, address and other details on your application form to contact you in connection with occasional customer surveys or research aimed at improving the services that Animal and Plant Health Agency and its contractors provides.

Defra's Information Charter (which also covers Animal and Plant Health Agency) - Public Service Guarantee on Data Handling, which gives details of your rights in respect of the handling of your personal data, is on the Defra GOV.UK website. A document explaining the Guarantee is also on this website.

If you believe that any of the information we hold concerning you is incorrect or out of date, please provide us with the accurate information in writing together with supporting evidence (if appropriate). You should address your correspondence to Seed Marketing Team, Animal and Plant Health Agency, Eastbrook, Shaftesbury Road, Cambridge, CB2 8DR. Telephone 0208 0265993.

1.2 LICENSED INSPECTION OF PRE-BASIC AND BASIC CROPS

The European Commission has introduced legislation allowing licensed inspectors to inspect pre-basic and basic seed crops of all species except potatoes. This 'temporary experiment' is implemented by Commission Decision 2012/340/EU and a general licence under the Seed Marketing Regulations. Specific conditions apply for licensing of inspectors, control plots of sown seed, official check inspection, monitoring of seed quality, identification of seed produced under the experiment.

The experiment will give seed companies the option of using licensed crop inspector as an alternative to officials.

The experiment runs from 1 January 2013 to 31 December 2019.

1.3 REQUIREMENTS FOR CROP INSPECTION

All seed crops must be registered with the Certifying Authority. Multiplication generations of seed are officially controlled, with breeder's seed producing pre-basic seed, pre-basic

seed producing basic seed or more pre-basic seed and basic seed producing certified seed. For some species, the regulations allow two or three generations of certified seed. There is some flexibility for downgrading of crops and seed through the generations, provided all other relevant requirements are met, although breeder's seed can only produce pre-basic and basic seed.

For some species, the regulations provide for local varieties where there is no breeder's or pre-basic seed, and instead basic seed lots are nominated for further basic seed production.

The regulations specify that certain crops must be inspected by officials of the Certifying Authority or its technical contractor. These are:

- Crops entered to produce pre-basic and/or basic seed.
- Crops entered to produce any category of a species covered by the vegetable seeds regulations.
- Crops entered to produce any category of a variety in early multiplication (that is, undergoing National List testing but not yet on the National List or Common Catalogue).

All other crops can be inspected and approved by licensed crop inspectors.

All seed crops must have at least one inspection but for some species two or three inspections are required. If a crop does not meet the category and level entered, the inspector must record this in the decision box on the CERT 3 Crop Inspection Report form. The applicant may take remedial action and ask for the crop to be re-inspected. On completion of a crop inspection, licensed inspectors should return the CERT 3 Crop Inspection Report to the applicant. Official inspection reports are returned immediately to NIAB and copied to the applicant. Only the inspector mailing the report can amend it.

For a seed crop to be inspected and approved by a licensed crop inspector, there must be an official control plot of the sown seed lot. Control plots are grown from representative samples of all multiplication seed lots to authenticate the variety and assess varietal purity. When varietal impurities are detected in excess of the standard for the category and level of the next generation, a plot report is issued and sent to every applicant who has entered crops sown with the seed lot. The report is also issued to the company that certified the seed lot.

The report gives the percent varietal impurities found in the control plot and describes them in terms of how they differ from the variety. It is a guide to the type and level of impurities likely to be found in the field. If the sample and control plot are representative of the seed lot, the impurities recorded in the control plot would also be expected to occur in the seed crop.

However, there are a number of reasons why the percentage of impurities found in the crop will differ from that found in the control plot.

Crops sown with seed lots subject to a plot report may also be inspected by officials. Information from the official inspections may be used to determine the approval of all crops sown with the seed lot and may override the results of licensed inspections.

1.4 CROP INSPECTOR LICENCES

Crop inspector licences are issued after a candidate completes appropriate training and passes an examination relating to the species. There are four licence types organised by crop group.

Species	**Licence Classification**	**Training Examination**	**Mandatory Retest**
Cereals	A	New inspectors Part I - January Part II – June	June - every five years
Field Beans and Peas	J	June	Every five years
Sugar beet, Fodder and Oilseeds	K	October	Every five years
Grasses and Herbage Legumes	L	May	Every five years

Inspectors successful in the Part I cereals examination in January may, subject to certain conditions, inspect crops before the Part II examination in June, but they must pass the Part II examination in order to be issued with a licence.

Inspectors are required to have appropriate training and re-take the examination every five years or as required by Animal and Plant Health Agency. Licensed inspectors should be aware that a proportion of crops are check inspected by officials of the Certifying Authority.

1.5 PURPOSE OF CROP INSPECTION

The objective of a crop inspection is to confirm the pedigree and identity of the crop and assess its suitability for seed production using the criteria in the seed regulations. The actions included in a crop inspection are to:

- Confirm crop entry details, including the crop location, size and previous cropping.

- Authenticate each seed lot sown by checking official certification labels and recording at least one serial number for each seed lot.
- Confirm the identity of the variety as far as is possible in the field.
- Detect and record any varietal impurities.
- Detect and record any species impurities.
- Check compliance with any isolation requirements.
- Assess and record the general condition of the crop including:
    - Whether the crop is in a suitable condition for inspection.
    - Any pesticide spray damage.
    - Detect the presence of any weed species, diseases and lodging where this is required as part of the inspection procedure.

A varietal impurity is a plant of the same species where one or more of its morphological characters is outside the range of characters normally associated with that variety and is clearly distinct from the variety.

1.6 BIOSECURITY

Inspectors should be aware of the risks of inadvertently spreading plant and animal diseases between crops and farm holdings on footwear, clothing or vehicles. Contact and close proximity with farm animals should be avoided. Where the risk is significant inspectors are recommended to spray footwear, over trousers and vehicle wheels etc. with disinfectant between holdings.

For crops where a disease is known to be a problem, care should be taken to minimise the risk to other crops of the same species, for example by changing clothes, cleaning footwear and clothing, or by inspecting the diseased crop last.

1.7 EQUIPMENT AND REFERENCE MATERIAL

All inspectors should have the following equipment and reference material available to them when carrying out a crop inspection:

- A CERT 3 Crop Inspection Report, appropriate to the species to be inspected, with details of the crop and grower.
- A description for the variety to be inspected.

- A copy of these instructions which include seed crop standards, reject and population tables and any special instructions concerning field inspections.
- A plot report if one has been issued.
- Guidance for the identification of crop species, varieties, varietal impurities, weeds and diseases.
- For cross-pollinating species, clean overalls between crops of different varieties will reduce the risk of introducing undesirable pollen.
- Pen and/or pencil.
- Calculator.
- Cane or stick marked to measure 1m. Where it is necessary to measure the drill width between rows, it is helpful to mark 30cm of the stick in divisions of 1cm.
- Where a crop has been sown broadcast, a square of 0.5 x 0.5m or a folding ruler.
- Hand lens with 10 times and/or 20 times magnification to look at detailed plant characters.
- Clothing and footwear suitable for the weather conditions.
- Inspectors need to be fit and physically able to carry out a crop inspection. If access to a crop or conditions are such that there is undue risk to the inspector's personal safety, the crop should be left and inspected when the risk is removed. This may include crops recently sprayed with pesticides. If the crop cannot be inspected safely it should be rejected.

2. Inspection

2.1 CONFIRMING CROP DETAILS WITH THE GROWER

The inspector will have a CERT 3 Crop Inspection Report form for the appropriate crop species with the following details entered on it:

- Applicant's name.
- Crop identity number.
- Grower's name and telephone numbers.

- Address of crop.
- Species.
- Variety.
- Category and level the crop is entered to produce.
- Area of crop.
- Reference number(s) of the seed lot(s) sown.
- Previous cropping details.
- Field IACS number and possibly the field name or grid reference.

The first stage in the crop inspection is to check with the grower that these details, except the crop identity number, are correct. This can be done shortly before the crop itself is inspected. The crop identity number is confidential to the applicant and if it needs to be checked this should always be done through the applicant. Both the applicant and NIAB should be informed of any changes in crop details.

It is particularly important to confirm that all seed lots stated on the CERT 3 Crop Inspection Report by the applicant have been sown in the correct field. On locating the label for each sown seed lot, either at the farm or in the field, the inspector should check the variety and seed lot reference number against the details provided by the applicant. The inspector should record at least one serial number for each seed lot sown. Any discrepancies between the details given by the applicant and the label should be noted on the CERT 3 Crop Inspection Report.

If the inspector has significant doubt about the authenticity of the sown seed, location of the crop, or there are any changes in crop details which could affect the eligibility of the crop, the inspector should proceed with caution or delay inspection until details have been confirmed with the applicant (licensed inspectors) or with Animal and Plant Health Agency's technical contractor (official inspectors).

Should the inspector decide to inspect the crop, it must be recorded as 'failed' on the CERT 3 Crop Inspection Report until the discrepancies have been resolved.

Invoices or delivery notes may be acceptable as alternative authentication of the sown seed lot. However they are not as clear or safe as the inspector seeing labels at the time of inspection. A copy of the invoice or delivery note should be attached to the CERT 3 Crop Inspection Report by licensed inspectors.

2.2 NUMBER AND TIMING OF INSPECTIONS

Inspections should be timed at the crop growth stage when impurities, in particular varietal impurities, will be most easily seen. This, and the required number of inspections, varies according to the species and is covered in the section for each crop group.

2.3 TIME TAKEN TO COMPLETE A CROP INSPECTION

The time taken to inspect a crop depends mainly on:

- Number of inspectors.
- Experience and confidence of the inspector.
- The severity of problems with varietal purity, isolation, etc.
- Weather, weeds and field conditions.
- Size of crop.
- Density of crop.

2.4 ISOLATION

Minimum isolation distances are given in the section for each crop group. For species not having a minimum isolation distance, the seed crop (specifically the area to be used for seed production) must be clearly defined both at the time of inspection and at harvest by a physical barrier or a fallow strip.

When only part of the crop is to be taken for seed, either the whole crop is inspected and the decision recorded on the CERT 3 Crop Inspection Report, or the area for seed production is clearly defined and inspected. In such cases, a sketch map showing the area inspected is good practice to avoid errors through misunderstanding. If this results in a change to the crop area, it should be reported to the applicant and to NIAB.

2.5 PREVIOUS CROPPING (SEE ANNEX)

The previous cropping of the field shall not be incompatible with the production of seeds of the species and variety of crop. The field shall be sufficiently free from plants which are volunteers from previous cropping.

2.6 GENERAL CROP ASSESSMENT

On reaching the field, the inspector starts the inspection by walking round the outside of the crop. The objectives are to determine whether:

- The limits of the crop are clearly defined. It is good practice to have a physical barrier or 2m gap between the seed crop and any other crop likely to cause contamination of the harvested seed.
- The minimum isolation distance is observed from sources of cross-pollination. The inspector should record on the CERT 3 Crop Inspection Report whether the isolation is satisfactory or not.
- The crop area approximates to the area given by the applicant and entered for seed production.
- The variety in the field conforms to the official description for the variety stated on the seed label. For some species varietal identity can be confirmed with reasonable certainty, but for many it is only possible to state that there is no reason to believe that the crop is not of the variety stated.
- There are any areas that are unrepresentative of the crop as a whole, for example patches of weeds, other crop species or sown with another variety.
- An inspection is possible. For example, all or a significant part of the crop may be so stunted, weedy or poorly grown that an inspection cannot be carried out and the crop must be rejected or reduced in size.

A sketch map of the crop and surrounding area should be included and is especially helpful, for those crops where the second inspection is carried out by different inspectors or where the applicant may decide to carry out remedial action.

2.7 DETAILED CROP ASSESSMENT

Crops are too large for detailed assessment of the whole area. Instead, a number of sample areas known as quadrats are examined across the crop. Assessment of varietal and species impurities, and of diseases in some species recorded in these quadrats act as the basis for the decision on crop approval. Quadrats should be spread through the whole crop, usually across the direction of drilling. The size and number of quadrats depends on the species and crop area and is covered in the section for each crop group.

For most species, assessment of quadrats includes counts of the plants or fertile tillers in a metre row or measured square, depending on whether the crop is drilled in rows or broadcast. The counts are used to estimate the plant or tiller population per hectare, allowing assessments of impurities to be compared with reject numbers for the whole crop.

Drill width is measured at this stage, either by measuring the distance between the centres of two adjacent rows, and repeating this several times, or by counting the number of rows in 1m.

In species where it is difficult to count individual plants, for example grasses, varietal and species purity are assessed on an area basis, by recording the number of impurities in a given area.

Quadrats are paced out, 20m at right angles to the direction of drilling using the metre cane or tramlines as a guide. Varietal and species impurities are then detected while walking slowly back through the paced out quadrat, using the cane to maintain a width of 1m. Some inspectors prefer also to walk slowly back through the quadrat in the opposite direction.

This forms the basis of the inspector's decision to:

- approve the crop for the category level entered,
- approve it for lower category levels,
- reject it for all categories of seed production.

Any impurities seen are recorded on the CERT 3 Crop Inspection Report, with a brief description and the number of plants (or tillers or stems) detected for each different impurity. If no impurities are found in a quadrat the CERT 3 should be marked with a slash or a 0, but should not be left blank.

2.8 CALCULATING THE CROP POPULATION AND REJECT NUMBERS

(Please ensure you use current tables)

For those species where varietal and species purity are assessed by comparing the number of impurities found against reject numbers for the population, it is necessary to calculate the plant or tiller population per hectare or the population examined during the inspection. This forms the basis of the inspector's decision to approve the crop for the category and level entered, approve it for lower categories and levels, or to reject it for all categories of seed production.

For cereals except rye, populations are estimated as fertile tillers per hectare.

For linseed/flax populations are estimated as stems per hectare.

For all other species except grasses, herbage legumes, rye and hemp, populations are estimated as plants per hectare or the population examined during the inspection is calculated.

For grasses, herbage legumes, rye, brown mustard, fodder radish and hemp, assessment is by an area standard, with no requirement to calculate the population per hectare.

There are two methods to calculate the crop population, depending on whether the crop is drilled in rows or broadcast, or for some other reason the rows are not discernible.

1. Calculation of crop population drilled in rows:

- Count the fertile tillers, stems or plants in each 1m row and enter the results on the CERT 3.
- Calculate the mean number of tillers, stems or plants per metre by adding the counts and dividing by the number of counts. In most cases, this means dividing by five or ten.
- Divide the mean number of tillers, stems or plants per metre by the drill width in cm to give the population per hectare in millions.
- Use the 0.05 probability level reject tables or for those species where reject tables are based on a probability level of 0.05 please ensure you have a copy of the correct tables and NOT those based on a probability level of 0.01, to find reject numbers at the calculated population for the relevant standards and enter them on the CERT 3.

Examples

	Example 1	**Example 2**
Total tillers or plants in 10 counts	965	62
Divide by 10 to get the mean	96.5	6.2
Drill width in cm	15.2	15.2
Population in millions/ha	6.349	0.408
Rounded population in millions/ha	6.3	0.4 (400,000)

2. Calculation of population per hectare for broadcast or cross drilled crops etc.:

Where the crop is not in clearly defined rows, tillers, stems or plants are counted in a sample area rather than in 1m lengths along a row. The sample area is usually 0.5 x 0.5m, marked out using a metal square, or a folding ruler.

- Record the size of the sample area in the drill width box on the CERT 3.
- Count tillers, stems or plants in each of five or ten sample areas.

- For 0.5 x 0.5m sample areas, multiply by four to give the population per square metre and enter in the appropriate box on the CERT 3.
- Calculate the total number of tillers or plants in five or ten sample areas.
- Divide by five or ten to give the mean population per square metre.
- Multiply by 10,000 to give the population per hectare.

Example

Total tillers or plants in 10 sample areas	496
Divide by 10 to get the mean	49.6
Multiply by 10,000 to give population in millions/ha 0.496 or 496,000	

3. Calculation of the population examined for broadcast or cross drilled crops etc.:

The population examined equals the mean count per m^2 x number of quadrats x 20.

Example

Mean count per m^2	25
Number of quadrats	10
x20 (sq metres)	20
Population examined	5,000

4. Calculation of the population examined for crops drilled in rows:

- Count the plants in each 1m row and enter the results on the CERT 3.
- Calculate the mean number of plants per metre by adding the counts and dividing by the number of counts. In most cases, this means dividing by five or ten.
- Divide the mean number of plants per metre by the drill width in cm and multiply by 100, to give the mean number of plants per square metre.
- Multiply the mean number of plants per square metre by the number of quadrats and the size of quadrats.
- The population examined equals (mean count per m divided by drill width in cm) x 100 x number of quadrats x 20.

Example

Total number of plants in 10 counts	400
Divide by 10 to get the mean	40
Divide by drill width in cm	16
Multiply by 100	250
x10 quadrats examined	2,500
x20 (sq metres)	50,000

The population is used with the appropriate reject tables (included in the sections for each crop group) to derive the reject numbers for the crop. The results of assessments of varietal and species purity are compared with the reject numbers to decide if the crop meets the standards for the category and level entered and for lower categories and levels if appropriate. The reject number is the point at which a crop should be rejected, making allowance for statistical variation and error in the assessment method. Reject tables are calculated at a probability level of 0.05 i.e. there is a five in 100 risk of rejecting a crop that is better than the standard if the number of impurities is equal to the reject number.

2.9 COMPLETING THE INSPECTION

The final stage of the inspection is completion of the CERT 3 Crop Inspection Report and making the approval decision. If the crop meets the standards, the inspector approves it by **ticking** the appropriate box for the category and level entered and the boxes for all lower categories and levels for which the crop is eligible and meets the standards.

If the crop fails the standard for the category and level entered, for any reason, the inspector puts an 'X' against this category and level. The inspector then makes a decision about all lower categories and levels, marking the boxes with a **tick** or **X** as appropriate. A note should be made in the comments box giving all reasons for failure. This is especially important if the inspector considers that a problem could be rectified.

It is not acceptable to approve a crop or leave the decision boxes blank in anticipation of a problem being rectified. Where a crop has been rejected at the first inspection, a second inspection may override the first provided the reason for the original rejection has been rectified and no new problems were found.

The CERT 3 Crop Inspection Report must be completed in every detail, signed and dated, with the inspector's name and licence number before leaving the field. The inspector's decision and signature verifies that the inspection has been carried out in accordance with

seed regulations and these instructions, based on the crop condition and findings at the time of the inspection.

For species requiring more than one inspection, completion of the decision boxes on the CERT 3 Crop Inspection Report does not confer crop approval until the final inspection has been completed. For approval, the standards must be met at each inspection stage. Licensed crop inspectors should agree with the applicant whether the Crop Inspection Report is retained by the inspector until all inspections are complete. For Pre-basic and Basic seed crops, and other crops requiring official inspection, NIAB will copy the report of each inspection to the applicant.

If two or more inspectors inspect a crop, it is recommended that blank CERT 3 forms are used and the results combined onto the original CERT 3 at the end of the inspection. All inspectors taking part in the inspection should sign the report form. There may be instances where the crop has met the required standards but could be improved by roguing of species impurities or weeds such as wild oats. The crop inspector can show this by a recommendation in the comments box using clear notes and a sketch map to show contaminated areas.

3. Cereals

The species in this section are all covered by the Seed Marketing Regulations and the Classification 'A' crop inspectors' licence.

3.1 CATEGORIES AND LEVELS

Wheat*, barley and oats (except hybrids)	Pre-basic Basic, HVS and min. std C1, HVS and min. std C2, HVS and min. std	Pre-basic BH and BL C1H and CIL C2H and C2L
Triticale	Pre-basic Basic C1 C2	Pre-basic Basic C1 C2
Rye and hybrid barley	Pre-basic Basic Certified Seed	Pre-basic Basic Certified Seed

* Throughout this section, 'wheat' includes durum and spelt wheat.

3.2 NUMBER AND TIMING OF INSPECTIONS

All cereal crops can be approved on a single inspection although two inspections are recommended. Ideally cereal crops should be inspected not earlier than one week after full ear emergence. Rye flowers earlier than any other cereal, mostly during early May, making late May and early June the likely time for inspection.

3.3 ISOLATION

Isolation requirements for crops of wheat, barley and oats need to be clearly defined. The requirements for hybrid barley are listed below.

The minimum distances from sources of undesirable foreign pollination for triticale, and conventional rye varieties are listed in the following table. For non-hybrids and components of hybrids, this means from crops of another variety. For hybrids, this means from all crops of the same species except for another crop producing CS of the same variety or a crop of the male parent.

Crop	Category	Minimum distance (m)
Triticale	Pre-basic and Basic C1 and C2	50 20
Rye	Pre-basic and Basic CS	300 250
Hybrid rye	Pre-basic and Basic, using male sterility Pre-basic and Basic, not using male sterility CS	1,000 600 500
Hybrid barley	Pre-basic and Basic of female component CS	100 50

These minimum isolation distances do not apply if there is sufficient protection from undesirable pollination. Please contact NIAB before using this exception.

3.4 GENERAL CROP ASSESSMENT

In addition to guidance given in the introduction, it is recommended that:

- Ears are selected at random and examined in detail, using the varietal description to confirm the variety.

- A count is made of wild oats in the crop including any near the field edge which might be harvested. The final calculation of wild oats per hectare cannot be made until the inspection has been completed.

- For those cereal species where there is a risk of cross pollination, it is good practice to note adjacent crops of the same species and draw a map.

3.5 DETAILED CROP ASSESSMENT

Assessment of varietal purity in all cereal crops, except for rye and hybrid barley, is based on estimates of population and varietal impurities on quadrats of 1 x 20m. Specific procedures for rye and hybrid barley are covered at the end of this section. The following applies to all other cereals:

- Measure the drill width.
- Select the starting point for a quadrat and measure out a 1m row or sample area.
- Within the metre selected:
  - Count the number of fertile ears.
  - Examine each fertile ear and record the number of varietal impurities.
- Pace out the entire 1 x 20m quadrat:
  - Count varietal impurities.
  - Count species impurities.

Varietal impurities are counted by number of ears. Ears counted in the 1m rows are also checked for less obvious characters such as rachilla hair type and ventral furrow hair in barley and internal hair in wheat. Any impurities found in the 1m row should be added to the metre sample column and included in the quadrat count with a brief description. Ears in the metre sample are within the quadrat and are therefore recorded on both parts of the CERT 3C Crop Inspection Report.

For crops where the population is estimated using sample areas, examination of at least one ear from each plant in the sample area is done as for crops with clear rows.

In crops of 3 ha or less, assessment is carried out on minimum of five quadrats.

In crops greater than 3 ha, assessment is carried out on minimum of ten quadrats.

3.6 VARIETAL PURITY STANDARDS

Category	Wheat, Barley, Oats (%)	Triticale (%)
BH	99.95	-
PB/BL/BS	99.9	99.7
C1H	99.9	-
C1L/C1	99.7	99.0
C2H	99.7	-
C2L/C2	99.0	98.0
(For hybrids and Rye see para. 3.15)		

3.7 WILD OATS

The maximum number of wild oat plants per hectare is:

Category	Wheat (all species)	Barley	Oats	Triticale	Rye
Pre-basic and Basic	7	7	0	7	7
C1 HVS	7	7	0	-	-
C1 minimum standard	50	20	0	50	-
C2 HVS	7	7	0	-	-
C2 minimum standard	50	20	0	50	-
CS	-	20*	-	-	50

*** Hybrids only**

Wild oats are assessed in the whole crop and should be counted throughout the inspection. The number of wild oat plants in the whole crop divided by the crop area gives the number of plants per hectare. This is entered on the CERT 3C Crop Inspection Report and compared against the appropriate standard. In fields with very large numbers of wild oats, a rough estimate is acceptable.

3.8 SPECIES PURITY: HVS ONLY

The field standard for species purity of crops entered to produce HVS of all categories is 99.99%. There is no field standard for minimum standard or for triticale, rye or hybrid barley.

There are seed standards for all species, so it is good practice to note in the comments box any other cereals seen in the crop which might affect the purity of the harvested seed.

3.9 LOOSE SMUT: WHEAT AND BARLEY ONLY

The standards for loose smut in wheat and barley are 99.9% for Basic HVS, 99.8% for C1 and C2 HVS, and 99.5% for all categories at minimum standard. The regulations apply the standard in the seed crop, supported by information from control plots. Loose smut is rarely severe, but is frequently found at a low level and can become damaging within a few generations if conditions are suitable. Infected ears should be noted if found during the inspection and a detailed assessment made if necessary.

3.10 LODGING

For HVS crops of all categories, the crop must not be more than one third lodged at the time of inspection. For crops of minimum standard, the crop is rejected only if lodging makes a satisfactory inspection impossible.

3.11 COMPLETING THE CERT 3C CROP INSPECTION REPORT

The CERT 3C Crop Inspection Report is completed after finishing the crop assessment:

- Calculate totals for each type of varietal impurity recorded and enter on the report.
- Calculate total varietal impurities.
- Calculate totals for other species recorded in the quadrat.
- Complete the boxes for lodging, isolation and wild oats.
- Calculate the number of wild oats per hectare.
- Calculate the population by one of the methods described in the introduction.

- Use the appropriate reject table to calculate reject numbers for the category and level entered and all lower categories and levels. Complete the boxes for reject numbers.
- Compare the results of the inspection against the reject numbers and standards, and complete the decision boxes.
- Sign and date the report.

3.12 SERIOUS FIELD PROBLEMS

Varietal impurities which are very similar to the variety may only be distinguishable when looking at individual ears in the metre sample or sample area. A normal inspection is inappropriate when the inspector finds significant varietal impurities in the metre samples but cannot see the same type of impurity in the quadrat as a whole. In this case the inspector's decision is based on the metre sample findings.

Varietal purity is calculated as a percentage of the number of impurities found in the metre samples and divided by the number of ears recorded in the population head counts X 100. The percent varietal purity is compared directly with the varietal purity standard and a decision made accordingly. Further advice should be obtained from NIAB.

In C2 crops with very severe varietal impurities, a decision to reject can be based on detailed assessment of two quadrats. This allows a decision to be made without counting large numbers of impurities in the normal five or ten quadrats. Before doing this, the inspector should be confident that the whole crop is contaminated and that the two quadrats are representative.

The two head counts are added together, halved to get the mean, and the population calculated in the usual way. The '2 quadrats' column in the reject tables gives the reject number for C2 minimum standard. If the number of varietal impurities clearly exceeds the reject number then the crop should be rejected. If the reject number is not met or only just met, the inspection should continue until the required number of quadrats is completed.

3.13 FURTHER INSPECTIONS

For crops not meeting the category and level entered, the applicant may organise remedial action and request a further inspection. Unless the inspector becomes aware of a new problem, it is only necessary to re-inspect for the original problem, provided the crop met all other standards at the first inspection.

3.14 RYE: ASSESSMENT OF VARIETAL PURITY

Varietal purity standards for rye are based on numbers of plants not true to type in a given area. Therefore, counts of metre rows or sample areas to estimate the population are unnecessary. However, a detailed examination of plants in a metre row assists in confirming the variety.

There is a considerable degree of variation in rye varieties for height, hairiness of the neck, pigmentation and glaucosity.

In hybrid rye, the Basic seed sown to produce certified seed is a technical mixture of about 95% male sterile female parent and 5% male parent. The male parent, which may be several genetically different lines, carries a gene to restore fertility in the certified seed. The female parent is usually uniform compared to the tall ragged growth of the male parent.

The technical mixture is grown in the centre of the field, framed by a strip of pure male parent to fertilise the seed crop and act as a barrier to undesirable pollen. This frame of male parent is removed after pollination and before harvest. It must be possible to distinguish the technical mixture from the strip of male parent surrounding the crop.

In hybrid rye, varietal purity is assessed in the female component of the technical mixture. The taller and more ragged male parent is ignored. Descriptions of hybrid varieties describe the hybrid itself, the female parent and the male parent.

Varietal purity standards and reject levels for rye:

Category	Standard	5 Quadrats	10 Quadrats
Pre-basic and Basic	1 impurity in $30m^2$	4	7
CS	1 impurity in $10m^2$	10	20

3.15 HYBRID BARLEY CROP INSPECTIONS

The following information relates to hybrid barley varieties which are based on cytoplasmic male sterility (CMS). This involves crossing a female parent (male sterile) and a male parent (fertile) which restores fertility to the certified seed of the F1 hybrid.

TERMINOLOGY

At any time the following terminology may be used to describe the different components:

Female Parent (syn: with 'female line'): this is the male sterile parent that should not produce any fertile pollen and requires pollen from a fertile plant to produce seed. The female parent can also be referred to as the CMS female or male sterile.

There are two types of fertile parents and both have the ability to self-pollinate -

a) **Maintainer:** this is the fertile parent that is used in Basic seed production to produce the CMS female seed.

b) **Male Restorer (syn: with 'male line'):** This is the fertile male parent that is blended with the female parent to create the 'technical mixture' used to produce the final certified hybrid.

The method for the production of certified seed is similar to that of hybrid rye, with the sown basic seed consisting of a mixture of mostly female parent and some male restorer. The harvested certified seed of the F1 hybrid will therefore contain some seed resulting from the self-pollination of the male restorer.

This presence is acceptable provided the certified seed meets a varietal purity standard in post control of 85%. The hybrid is an F1 final generation seed and intended for the production of grain. The reserve portion of certified seed may be requested by NIAB for post control assessment of varietal purity.

CROP INSPECTION

Pre-Basic and Basic Crop Inspection

Categories entered to produce Pre-Basic and Basic seed require different inspection procedures to conventional barley varieties.

- There is no Higher Voluntary Standard.
- Crops are grown in alternating separate strips of the female parent (sterile) and the fertile maintainer.
- A full inspection is carried out on each component.
- Each component is inspected as a separate entity.
- The female parent must be isolated by a minimum of 100 metres from foreign sources of undesirable pollen, other than the maintainer.
- A definitive description is needed for each parent.
- The sterile female parent is usually grown in wider strips than those of the maintainer line. An optional maintainer strip may be planted around the outside to act as a buffer and provide additional pollen.
- The two components (female and maintainer) are alike morphologically, although minor differences may be evident.

- Timing of the inspection is critical as it is essential that the crops are inspected during anthesis.
- A varietal purity standard of 99.9% is applied to the maintainer and restorer lines.
- A varietal purity standard of 99.8% is applied to the female parent.
- Fertile ears in the female strip are considered as impurities and the BS crop must achieve a 99.7% male sterility standard.

Certified Crop Inspection

A 'technical mixture' is drilled as a blend of approximately 93% of the female line and 7% of the male restorer line. The identity of both parents is checked during the general crop assessment, but as the assessment of varietal purity is more complex, the crop inspection is carried out on smaller $10m^2$ quadrats. The timing of the first inspection is critical and should take place during anthesis. Inspection of crops to produce certified seed of hybrid barley differs from conventional varieties, the following points should be noted:

- The crop must be isolated by a minimum of 50 metres from foreign sources of undesirable pollen.
- The ratio of female ears to male ears is assessed in metre rows and the percentage of male ears within the metre row noted. If the crop inspector is concerned about variation in male restorer percentage, additional metre rows should be assessed.
- The metre row should then be checked for any other impurities (the same as a conventional crop inspection).
- Depending on the area of the crop five or ten quadrats are assessed.
- Each parental line is assessed for varietal purity and must meet the following standards:
    - 99.7% for the restorer and female parent
    - 99.5% where the female parent is a hybrid (3-way hybrids)
- Fertile ears in the female parent are considered impurities and the CS crop must achieve a 99.5% male sterility standard.
- In order to assess seed set, a second inspection is required.

Each quadrat is assessed for varietal purity. Intermediums, two row barley and other barley types are examples of impurities. After the required number of quadrats has been completed calculate:

- **Percentage of Male Restorer Ears**: Total number of male ears divided by the total number of ears in the metre counts and multiplied by 100. Male restorer ears should make up 5-10% of the plants present.

- **Population (ears/ha):** The crop population is calculated in the same way as a conventional crop by dividing the mean head count by the drill width.

Timing of the second inspection to establish seed set in the female is not critical. The easiest way is to make an assessment is on approximately 50 randomly sampled female ears across the field when the grain has filled sufficiently to distinguish ‘set’ grain from any gaps (‘unset’) on the ear.

There is no minimum percentage for seed set or maximum percentage for male restorer in hybrid crops but inspectors should be aware of the large impact these variables have on the purity of CS seed lots. High male restorer percentages combined with low percentage seed set will result in a higher proportion of male restorers ending up in the final generation seed.

3.16 CEREAL REJECT TABLES FOR 10 QUADRATS AND 2 QUADRATS (SEE 3.20 FOR TRITICALE 10 QUADRATS)

At a probability level of 0.05								
Species Purity - All Categories at HVS Level		**Varietal Purity**					**Reject number of 2 quadrats to be applied to first 2 quadrats for varietal purity**	
		BH	**PB, BL, C1H**	**C1L, C2H**	**C2L**	**WHB CMS Female (BS)**		
Standard	**99.99%**	**99.95%**	**99.90%**	**99.70%**	**99.00%**	**99.80%**		**99.00%**
Population (Ears/Hectare)		**Reject numbers for 10 quadrats**					**2 quadrats**	
1,500,000	7	23	40	107	330	74	Reject number for 2 quadrats For varietal purity in C2 crops only	74
1,800,000	8	26	47	126	392	87		87
2,100,000	9	30	54	146	455	100		100
2,400,000	10	33	61	165	517	113		113
2,700,000	10	37	67	184	579	126		126
3,000,000	11	40	74	203	642	139		139
3,300,000	12	44	81	222	704	152		152
3,600,000	13	47	87	241	765	165		165
3,900,000	14	51	94	260	827	178		178
4,200,000	14	54	100	279	889	191		191
4,500,000	15	57	107	298	951	203		203
4,800,000	16	61	113	317	1,012	216		216
5,100,000	17	64	120	336	1,074	229		229
5,400,000	17	67	126	355	1,135	241		241
5,700,000	18	71	133	374	1,197	254		254
6,000,000	19	74	139	392	1,258	267		267
6,300,000	20	77	146	411	1,320	279		279
6,600,000	20	81	152	430	1,381	292		292
6,900,000	21	84	159	449	1,442	305		305
7,200,000	22	87	165	467	1,504	317		317

At a probability level of 0.05								
Species Purity - All Categories at HVS Level		**Varietal Purity**					**Reject number of 2 quadrats to be applied to first 2 quadrats for varietal purity**	
		BH	**PB, BL, C1H**	**C1L, C2H**	**C2L**	**WHB CMS Female (BS)**		
Standard	**99.99%**	**99.95%**	**99.90%**	**99.70%**	**99.00%**	**99.80%**		**99.00%**
Population (Ears/Hectare)		**Reject numbers for 10 quadrats**					**2 quadrats**	
7,500,000	23	91	171	486	1,565	330	Reject number for 2 quadrats For varietal purity in C2 crops only	330
7,800,000	23	94	178	505	1,626	342		342
8,100,000	24	97	183	524	1,687	355		355
8,400,000	25	100	191	542	1,749	367		367
8,700,000	26	104	197	561	1,810	380		380
9,000,000	26	107	203	579	1,871	392		392
9,300,000	27	110	210	598	1,932	405		405
9,600,000	28	113	216	617	1,993	418		418
9,900,000	28	117	222	635	2,054	430		430
10,200,000	29	120	229	654	2,116	442		442
10,500,000	30	123	235	673	2,177	455		455
10,800,000	31	126	241	691	2,238	467		467
11,100,000	31	130	248	710	2,299	480		480
11,400,000	32	133	254	728	2,360	492		492
11,700,000	33	136	260	747	2,421	505		505
12,000,000	33	139	267	765	2,482	517		517
12,300,000	34	143	273	784	2,543	530		530
12,600,000	35	146	281	802	2,604	542		542
12,900,000	35	149	286	821	2,665	555		555
13,200,000	36	152	292	840	2,726	567		567

3.17 CEREAL REJECT TABLES FOR 5 QUADRATS AND 2 QUADRATS (SEE 3.21 FOR TRITICALE 5 QUADRATS)

At a probability level of 0.05 – *sample too small, assess more quadrats								
Species Purity - All Categories at HVS Level		**Varietal Purity**					**Reject number of 2 quadrats to be applied to first 2 quadrats for varietal purity**	
		BH	**PB, BL, C1H**	**C1L, C2H**	**C2L**	**WHB CMS Female (BS)**		
Standard	**99.99%**	**99.95%**	**99.90%**	**99.70%**	**99.00%**	**99.80%**		**99.00%**
Population (Ears/Hectare)		**Reject numbers for 5 quadrats**					**2 quadrats**	
1,500,000	*_	13	23	57	171	40	Reject number for 2 quadrats For varietal purity in C2 crops only	74
1,800,000	*_	15	26	67	203	47		87
2,100,000	6	17	30	77	235	54		100
2,400,000	6	19	33	87	267	61		113
2,700,000	7	21	37	97	298	67		126
3,000,000	7	23	40	107	330	74		139
3,300,000	8	24	44	117	361	81		152
3,600,000	8	26	47	126	392	87		165
3,900,000	8	28	51	136	424	94		178
4,200,000	9	30	54	146	455	100		191
4,500,000	9	32	57	155	486	107		203
4,800,000	10	33	61	165	517	113		216
5,100,000	10	35	64	175	548	120		229
5,400,000	10	37	67	184	579	126		241
5,700,000	11	39	71	194	611	133		254
6,000,000	11	40	74	203	642	139		267
6,300,000	12	42	77	213	673	146		279
6,600,000	12	44	81	222	704	152		292
6,900,000	12	45	84	232	734	159		305
7,200,000	13	47	87	241	765	165		317

At a probability level of 0.05 – *sample too small, assess more quadrats								
Species Purity - All Categories at HVS Level		**Varietal Purity**					**Reject number of 2 quadrats to be applied to first 2 quadrats for varietal purity**	
		BH	**PB, BL, C1H**	**C1L, C2H**	**C2L**	**WHB CMS Female (BS)**		
Standard	**99.99%**	**99.95%**	**99.90%**	**99.70%**	**99.00%**	**99.80%**		**99.00%**
Population (Ears/Hectare)		**Reject numbers for 5 quadrats**					**2 quadrats**	
7,500,000	13	49	91	251	796	171	Reject number for 2 quadrats For varietal purity in C2 crops only	330
7,800,000	14	51	94	260	827	178		342
8,100,000	14	52	97	270	858	184		355
8,400,000	14	54	100	279	889	191		367
8,700,000	15	56	104	289	920	197		380
9,000,000	15	57	107	298	951	203		392
9,300,000	16	59	110	308	981	210		405
9,600,000	16	61	113	317	1,012	216		418
9,900,000	16	62	117	327	1,043	222		430
10,200,000	17	64	120	336	1,074	229		442
10,500,000	17	66	123	345	1,105	235		455
10,800,000	17	67	126	355	1,135	241		467
11,100,000	18	69	130	364	1,166	248		480
11,400,000	18	71	133	374	1,197	254		492
11,700,000	19	72	136	383	1,228	260		505
12,000,000	19	74	139	392	1,258	267		517
12,300,000	19	76	143	402	1,289	273		530
12,600,000	20	77	146	411	1,320	279		542
12,900,000	20	79	149	421	1,350	286		555
13,200,000	20	81	152	430	1,381	292		567

3.18 HYBRID BARLEY REJECT TABLES FOR 10 QUADRAT INSPECTIONS OF CS CROPS (REDUCED 10m^2 QUADRAT)

At a probability level of 0.05			
Standard	**CS - Varietal Purity of the Female Parent & Restorer**	**CS - Varietal Purity of the Female Parent (3-Way Hybrid)**	**CS - Male Sterility of Female Parent**
	99.7%	**99.5%**	**99.5%**
Population (Ears/Hectare)	**Reject Number for 10 Quadrats**		
1,500,000	57	91	91
1,800,000	67	107	107
2,100,000	77	123	123
2,400,000	87	139	139
2,700,000	97	155	155
3,000,000	107	171	171
3,300,000	117	187	187
3,600,000	126	203	203
3,900,000	136	219	219
4,200,000	146	235	235
4,500,000	155	251	251
4,800,000	165	267	267
5,100,000	175	283	283
5,400,000	184	298	298
5,700,000	194	314	314
6,000,000	203	330	330
6,300,000	213	345	345
6,600,000	222	361	361
6,900,000	232	377	377
7,200,000	241	392	392
7,500,000	251	408	408
7,800,000	260	424	424
8,100,000	270	439	439
8,400,000	279	455	455

At a probability level of 0.05			
Standard	**CS - Varietal Purity of the Female Parent & Restorer**	**CS - Varietal Purity of the Female Parent (3-Way Hybrid)**	**CS - Male Sterility of Female Parent**
	99.7%	**99.5%**	**99.5%**
Population (Ears/Hectare)	**Reject Number for 10 Quadrats**		
8,700,000	289	471	471
9,000,000	298	486	486
9,300,000	308	502	502
9,600,000	317	517	517
9,900,000	327	533	533
10,200,000	336	548	548
10,500,000	345	564	564
10,800,000	355	579	579
11,100,000	364	595	595
11,400,000	374	611	611
11,700,000	383	626	626
12,000,000	392	642	642
12,300,000	402	657	657
12,600,000	411	673	673
12,900,000	421	688	688
13,200,000	430	704	704

3.19 HYBRID BARLEY REJECT TABLES FOR FIVE QUADRAT INSPECTIONS OF CS CROPS (REDUCED 10m^2 QUADRAT)

At a probability level of 0.05			
Standard	**CS - Varietal Purity of the Female Parent & Restorer**	**CS - Varietal Purity of the Female Parent (3-Way Hybrid)**	**CS - Male Sterility of Female Parent**
	99.7%	**99.5%**	**99.5%**
Population (Ears/Hectare)	**Reject Number for 5 Quadrats**		
1,500,000	32	49	49
1,800,000	37	57	57
2,100,000	42	66	66
2,400,000	47	74	74
2,700,000	52	82	82
3,000,000	57	91	91
3,300,000	62	99	99
3,600,000	67	107	107
3,900,000	72	115	115
4,200,000	77	123	123
4,500,000	82	131	131
4,800,000	87	139	139
5,100,000	92	147	147
5,400,000	97	155	155
5,700,000	102	163	163
6,000,000	107	171	171
6,300,000	112	179	179
6,600,000	117	187	187
6,900,000	122	195	195
7,200,000	126	203	203
7,500,000	131	211	211
7,800,000	136	219	219
8,100,000	141	227	227
8,400,000	146	235	235

At a probability level of 0.05			
Standard	**CS - Varietal Purity of the Female Parent & Restorer**	**CS - Varietal Purity of the Female Parent (3-Way Hybrid)**	**CS - Male Sterility of Female Parent**
	99.7%	**99.5%**	**99.5%**
Population (Ears/Hectare)	**Reject Number for 5 Quadrats**		
8,700,000	151	243	243
9,000,000	155	251	251
9,300,000	160	259	259
9,600,000	165	267	267
9,900,000	170	275	275
10,200,000	175	283	283
10,500,000	179	290	290
10,800,000	184	298	298
11,100,000	189	306	306
11,400,000	194	314	314
11,700,000	199	322	322
12,000,000	203	330	330
12,300,000	208	338	338
12,600,000	213	345	345
12,900,000	218	353	353
13,200,000	222	361	361

3.20 TRITICALE REJECT TABLES - 10 QUADRATS AND 2 QUADRATS

		Varietal purity standard		Reject number table for 2 quadrats to be applied to first 2 quadrats for varietal purity in first and second generation Certified crops only	
	Pre basic and Basic seed	Certified seed of the first generation	Certified seed of the second generation		
Standard	**99.7%**	**99.0%**	**98.0%**	**C1**	**C2**
Population (Ears/Hectare)	**Reject numbers for 10 quadrats**			**99.0%**	**98.0%**
1,500,000	107	330	642	74	139
1,800,000	126	392	765	87	165
2,100,000	146	455	889	100	191
2,400,000	165	517	1,012	113	216
2,700,000	184	579	1,135	126	241
3,000,000	203	642	1,258	139	267
3,300,000	222	704	1,381	152	292
3,600,000	241	765	1,504	165	317
3,900,000	260	827	1,626	178	342
4,200,000	279	889	1,749	191	367
4,500,000	298	951	1,871	203	392
4,800,000	317	1,012	1,993	216	418
5,100,000	336	1,074	2,116	229	442
5,400,000	355	1,135	2,238	241	467
5,700,000	374	1,197	2,360	254	492
6,000,000	392	1,258	2,482	267	517
6,300,000	411	1,320	2,604	279	542
6,600,000	430	1,381	2,726	292	567
6,900,000	449	1,442	2,848	305	592
7,200,000	467	1,504	2,970	317	617
7,500,000	486	1,565	3,091	330	642
7,800,000	505	1,626	3,213	342	666
8,100,000	524	1,687	3,335	355	691
8,400,000	542	1,749	3,457	367	716
8,700,000	561	1,810	3,578	380	741

		Varietal purity standard		Reject number table for 2 quadrats to be applied to first 2 quadrats for varietal purity in first and second generation Certified crops only	
	Pre basic and Basic seed	**Certified seed of the first generation**	**Certified seed of the second generation**		
Standard	**99.7%**	**99.0%**	**98.0%**	**C1**	**C2**
Population (Ears/Hectare)	**Reject numbers for 10 quadrats**			**99.0%**	**98.0%**
9,000,000	579	1,871	3,700	392	765
9,300,000	598	1,932	3,822	405	790
9,600,000	617	1.993	3,943	418	815
9,900,000	635	2,054	4,065	430	840
10,200,000	654	2,116	4,186	442	864
10,500,000	673	2,177	4,308	455	889
10,800,000	691	2,238	4,429	467	914
11,100,000	710	2,299	4,551	480	938
11,400,000	728	2,360	4,672	492	963
11,700,000	747	2,421	4,794	505	988
12,000,000	765	2,482	4,915	517	1,012
12,300,000	784	2,543	5,037	530	1,037
12,600,000	802	2,604	5,158	542	1,061
12,900,000	821	2,665	5,279	555	1,086
13,200,000	840	2,726	5,401	567	1,111

3.21 TRITICALE REJECT TABLE - 5 QUADRATS

	Varietal purity standard		
	PB & BS	**C1**	**C2**
Standard	**99.7%**	**99.0%**	**98.0%**
Population (Ears/Hectare)	**Reject numbers for 5 quadrats**		
1,500,000	57	171	330
1,800,000	67	203	392
2,100,000	77	235	455
2,400.000	87	267	517
2,700,000	97	298	579
3,000,000	107	330	642
3,300.000	117	361	704
3,600.000	126	392	765
3,900,000	136	424	827
4,200.000	146	455	889
4,500,000	155	486	951
4,800,000	165	517	1,012
5,100.000	175	548	1,074
5,400,000	184	579	1,135
5,700,000	194	611	1,197
6,000,000	203	642	1,258
6,300,000	213	673	1,320
6,600,000	222	704	1,381
6,900,000	232	734	1,442
7,200,000	241	765	1,504
7,500,000	251	796	1,565
7,800,000	260	827	1,626
8,100,000	270	858	1,687
8,400,000	279	889	1,749
8,700,000	289	920	1,810
9,000,000	298	951	1,871
9,300,000	308	981	1,932
9,600,000	317	1,012	1,993
9,900,000	327	1,043	2,054
10,200,000	336	1,074	2,116
10,500,000	345	1,105	2,177
10,800,000	355	1,135	2,238
11,100,000	364	1,166	2,299
11,400,000	374	1,197	2.360
11,700,000	383	1,228	2,421
12,000,000	392	1,258	2,482
12,300,000	402	1,289	2,543
12,600,000	411	1,320	2,604
12,900,000	421	1,350	2,665
13,200,000	430	1,381	2,726

4. Sugar beet and fodder beet

Sugar beet and fodder beet are covered by the Seed Marketing Regulations and by the Classification 'K' crop inspectors' licence. The CERT 3B Crop Inspection Report form is used for sugar beet and the CERT 3M form for fodder beet. For the purposes of this guidance, mangels are considered to be a type of fodder beet.

4.1 CATEGORIES

There are three categories of sugar beet and fodder beet for seed production; Pre-basic (PB), Basic (BS) and Certified (CS). Sugar beet is normally BR →BS→CS

4.2 NUMBER AND TIMING OF INSPECTIONS

Sugar beet and fodder beet seed crops have two inspections. The first inspection during the vegetative stage and the second inspection during flowering, usually in late June or early July.

4.3 ISOLATION

Sugar beet and fodder beet are open pollinating, producing large amounts of wind dispersed pollen. In addition, almost all sugar beet varieties and some fodder beet varieties are hybrids and consequently there are requirements for isolation from sources of undesirable pollen. The minimum isolation distances are:

		Distance (m)
1.	For the production of Pre-basic and Basic seed:	
	sources of the genus Beta	1,000
2.	For the production of CS sugar beet:	
	a) from any pollen sources of the genus Beta not included below	1,000
	b) the intended pollinator or one of the intended pollinators being diploid, from tetraploid sugar beet pollen sources	600
	c) the intended pollinator being exclusively tetraploid from diploid beet pollen sources	600
	d) from sugar beet pollen sources, the ploidy of which is unknown	600
	e) the intended pollinator or one of the intended pollinators being diploid,	

	from diploid sugar beet pollen sources	300
f)	the intended pollinator being exclusively tetraploid, from tetraploid sugar beet pollen sources	300
g)	between two sugar beet seed production fields in which male sterility is not used	300

		Distance (m)
3.	For the production of CS fodder beet:	
a)	from any pollen sources of the genus *Beta* not included below	1,000
b)	the intended pollinator or one of the pollinators being diploid, from tetraploid fodder beet pollen sources	600
c)	the intended pollinator being exclusively tetraploid, from diploid fodder beet pollen sources	600
d)	from fodder beet pollen sources, the ploidy of which is unknown	600
e)	the intended pollinator or one of the pollinators being diploid, from diploid fodder beet pollen sources	300
f)	the intended pollinator being exclusively tetraploid, from tetraploid fodder beet pollen sources	300
g)	between two fodder beet seed production fields in which male sterility is not used	300

The ploidy of the components will be given on the variety description or on variety information available from NIAB.

Sources of undesirable pollen include bolting sugar beet and fodder beet, weed beet, sea beet and spinach beet. It is difficult to check isolation thoroughly. Small or dispersed areas towards the extremes of the required isolation may not be a problem and may be ignored at the inspector's discretion.

The isolation distances do not apply if adjacent crops have the same pollinator. The distances may be reduced if there is sufficient protection from undesirable pollination, for example if the seed crop or source of undesirable pollen is in a polytunnel.

The main check for isolation is at the second inspection during flowering.

4.4 GENERAL CROP ASSESSMENT

Guidance for the general crop assessment and headland walk is given in the introduction. Given the importance of isolation, it is good practice to make a sketch map of the crop and surrounding area particularly if remedial action and re-inspection are likely.

4.5 DETAILED CROP ASSESSMENT

The CERT 3S (sugar beet) or CERT 3M (fodder beet) Crop inspection report form is completed after finishing the crop assessment.

First inspection: Sugar beet

- Calculate the population recording any off types seen and calculate the varietal purity level and the percentage varietal purity.
- Record any inter-row plants found during the first inspection and note any differences between them and the main crop.
- Record the distance from other crops of *Beta* spp. and check for other sources of beet pollen present within the isolation distance
- Complete the isolation box.
- Compare the results of the inspection against the standards and complete the decision boxes.
- Sign and date the report. The crop is not approved until it has met the standards at the time of the second inspection.

Second inspection

- Record any off types seen and calculate the varietal purity level and the percentage varietal purity.
- Record any inter-row plants found during the inspection and note any differences between them and the main drilled crop.
- Record the germity and sterility of male sterile lines, if appropriate for the variety.
- Record the fertility and germity of pollinator lines, if appropriate for the variety.
- For crops where there are separate pollinator and MS blocks, check varietal purity and uniformity for the expected flower characters.

- Note any weeds, pests and diseases which might affect the quality of harvested seed.
- Compare the results of the inspection against the standards and complete the decision boxes.
- Sign and date the report.

First inspection: Fodder beet

- Calculate the population recording any off types seen and calculate the varietal purity level and the percentage varietal purity.
- Record the distance from other crops of *Beta* spp. and check for other sources of beet pollen present within the isolation distance.
- Complete the isolation box.
- Compare the results of the inspection against the standards and complete the decision boxes.
- Sign and date the report. The crop is not approved until it has met the standards at the time of the second inspection.

Second inspection

- Record any off types seen and calculate the varietal purity level and the percentage varietal purity.
- Record any inter-row plants found during the first inspection and note any differences between them and the main drilled crop.
- Record the germity and sterility of male sterile lines, if appropriate for the variety.
- Record the fertility and germity of pollinator lines, if appropriate for the variety.
- For crops where there are separate pollinator and MS blocks, check varietal purity and uniformity for the expected flower characters.
- Note any weeds, pests and diseases which might affect the quality of harvested seed.
- Compare the results of the inspection against the standards and complete the decision boxes.
- Sign and date the report.

5. Field beans and field peas

Field beans *(Vicia faba)* and field peas *(Pisum sativum)* are covered by the Seed Marketing Regulations and the Classification 'J' crop inspectors' licence.

5.1 CATEGORIES

Field beans and field peas have four categories of seed production, Pre-basic (PB), Basic (BS), C1 and C2.

5.2 NUMBER AND TIMING OF INSPECTIONS

Field beans and field peas require two inspections. The first inspection is done before flowering, to assess the population which is easier when plants are small; to assess leaf characters in peas, and to check isolation in beans. In autumn sown crops this will normally be in February/March and in spring sown crops late April to early May.

For crops entered to produce Pre-basic and Basic seed, the first inspection is done by a licensed crop inspector. The information provided by the licensed inspector is used by officials when inspecting the crop during flowering. Applicants should send the completed CERT 3P report from the first inspection to NIAB, with a sketch map, by the following dates:

Autumn sown crops 30 April; Spring sown field beans 15 May; Spring sown field peas 30 May.

NIAB will organise an official inspection during flowering to determine crop approval.

5.3 ISOLATION

There are no isolation requirements for field peas, since they are self-pollinating, but it must be possible to recognise the boundaries of the crop. A 2m gap or a physical barrier is good practice to prevent contamination of the seed from a neighbouring crop.

Seed crops of field beans must be isolated from bean crops of a different variety or other crops with significant bean volunteers for example, by the following distances:

For production of	Crops of 2 ha or less (m)	Crops > 2 ha (m)
Pre-basic and Basic	200	100
C1	200	100
C2	100	50

Isolation must be maintained throughout the flowering period of the crop. The minimum isolation distances may be reduced if there is sufficient protection from undesirable pollination. Please contact NIAB before using this exception.

5.4 GENERAL CROP ASSESSMENT

Guidance for the general crop assessment and headland walk is given in the introduction. Given the isolation requirements for field beans, it is important to always include a sketch map of the field and surrounding crops on the CERT 3P at the first inspection.

5.5 DETAILED CROP ASSESSMENT

Counts of plants or stems in metre rows or sample areas are made to estimate the population. If plants are counted to assess the population, all other records must also be based on plants. Similarly stems must be used consistently.

The assessment of population is done at the first inspection only.

At each inspection, varietal impurities are counted in quadrats 1m wide by 20m long across the direction of drilling.

In crops of 3 ha or less, assessment is of a minimum of five quadrats.

In crops greater than 3 ha, assessment is of a minimum of ten quadrats.

It is recommended that any infection with *Ascochyta* is recorded in field beans and any infection with *Pseudomonas syringae* pv. *pisi* recorded in field peas. There are no standards for infection with these diseases in the field but the information may be useful to the crop applicant.

5.6 VARIETAL PURITY STANDARDS

Varietal purity standards in crops to produce Pre-basic/Basic and Certified seed are:

Species	**Pre-basic/Basic (%)**	**C1 (%)**	**C2 (%)**
Field peas	99.7	99.0	98.0
Field beans	99.7	99.0	98.0

5.7 COMPLETING THE CERT 3P CROP INSPECTION REPORT

The CERT 3P Crop Inspection Report is completed after finishing the crop assessment:

Calculate totals for each type of varietal impurity recorded and enter on the report.

- Calculate total varietal impurities.
- For field beans, calculate total number of stems infected with *Ascochyta.* Percent infection can be calculated as the Total number of infected stems divided by population examined x 100.
- Complete the boxes for isolation.
- Calculate the population by one of the methods described in the introduction.
- Use the appropriate reject table to calculate reject numbers for the category and level entered and all lower categories and levels. Complete the boxes for reject numbers
- Compare the results of the inspection against the reject numbers and standards, and complete the decision boxes.
- Sign and date the report.

5.8 FURTHER INSPECTIONS

For crops not meeting the category and level entered, the applicant may organise remedial action and request a third inspection. Unless the inspector becomes aware of a new problem, it is only necessary to re-inspect the original problem, provided the crop met all the other standards at the second inspection.

5.9 FIELD BEAN AND FIELD PEA REJECT TABLES

At a probability level of 0.0

Population stems or plants/ha in 1000s	Total no. of plants examined	Varietal purity		
		PB/BS 99.7%	C1 99.0%	C2 98.0%
10	200	-	6	9
20	400	-	9	14
30	600	-	11	19
40	800	6	14	24
50	1,000	7	16	29
60	1,200	8	19	33
70	1,400	9	21	38
80	1,600	10	24	43
90	1,800	11	26	47
100	2,000	11	29	52
110	2,200	12	31	56
120	2,400	13	33	61
130	2,600	14	36	65
140	2,800	14	38	70
150	3,000	15	40	74
160	3,200	16	43	78
170	3,400	17	45	83
180	3,600	17	47	87
190	3,800	18	49	92
200	4,000	19	52	96
225	4,500	21	57	107
250	5,000	23	63	118
275	5,500	24	68	129
300	6,000	26	74	139
325	6,500	28	80	150
350	7,000	30	85	161
375	7,500	32	91	171
400	8,000	33	96	182
425	8,500	35	101	193
450	9,000	37	107	203
475	9,500	39	112	214
500	10,000	40	118	225
525	10,500	42	123	235
550	11,000	44	129	246
575	11,500	45	134	256
600	12,000	47	139	267
625	12,500	49	145	277
650	13,000	51	150	288
675	13,500	52	155	298
700	14,000	54	161	309
725	14,500	56	166	319

Population stems or plants/ha in 1000s	Total no. of plants examined	Varietal purity		
		PB/BS 99.7%	C1 99.0%	C2 98.0%
750	15,000	57	171	330
775	15,500	59	177	340
800	16,000	61	182	351
825	16,500	62	187	361
850	17,000	64	193	372
875	17,500	66	198	382
900	18,000	67	203	392
925	18,500	69	209	403
950	19,000	71	214	413
975	19,500	72	219	424
1,000	20,000	74	225	434
1,050	21,000	77	235	455
1,100	22,000	81	246	476
1,150	23,000	84	256	497
1,200	24,000	87	267	517
1,250	25,000	91	277	538
1,300	26,000	94	288	559
1,350	27,000	97	298	579
1,400	28,000	100	309	600
1,450	29,000	104	319	621
1,500	30,000	107	330	642
1,550	31,000	110	340	662
1,600	32,000	113	351	683
1,650	33,000	117	361	704
1,700	34,000	120	372	724
1,750	35,000	123	382	745
1,800	36,000	126	392	765
1,850	37,000	130	403	786
1,900	38,000	133	413	807
1,950	39,000	136	424	827

NB: In 1,000s/ha - Sample too small, assess more quadrat.

Population stems or plants/ha in 1000s	Total no. of plants examined	Varietal purity		
		PB/BS 99.7%	C1 99.0%	C2 98.0%
2,000	40,000	139	434	848
2,100	42,000	146	455	889
2,200	44,000	152	476	930
2,300	46,000	159	497	971
2,400	48,000	165	517	1,012
2,500	50,000	171	538	1,053
2,600	52,000	178	559	1,094
2,700	54,000	184	579	1,135
2,800	56,000	191	600	1,176
2,900	58,000	197	621	1,217
3,000	60,000	203	642	1,258
3,100	62,000	210	662	1,299
3,200	64,000	216	683	1,340
3,300	66,000	222	704	1,381
3.400	68,000	229	724	1,422
3,500	70,000	235	745	1,463
3,600	72,000	241	765	1,504
3,700	74,000	248	786	1,545
3,800	76,000	254	807	1,585
3,900	78,000	260	827	1,626
4,000	80,000	267	848	1,667
4,100	82,000	273	868	1,708
4,200	84,000	279	889	1,749
4,300	86,000	286	910	1,789
4,400	88,000	292	930	1,830
4,500	90,000	298	951	1,871
4,600	92,000	305	971	1,912
4,700	94,000	311	992	1,953
4,800	96,000	317	1,012	1,993
4,900	98,000	323	1,033	2,034
5,000	100,000	330	1,053	2,075

6. Oilseed rape and other cruciferous crops

The crops covered in this section, listed below, are all cruciferous with a common approach to crop inspection. They are covered by the Seed Marketing Regulations and the classification 'K' crop inspectors licence.

Common name	Botanical name	Regulations
Oilseed rape (swede rape)	*Brassica napus*	Oil and Fibre plant
Fodder rape	*Brassica napus*	Oil and Fibre plant
Fodder swede and hybrid fodder swede	*Brassica napus var. napobrassica*	Fodder plant
Turnip rape	*Brassica rapa var. sylvestris*	Oil and Fibre plant
Turnip	*Brassica rapa. var. rapa*	Vegetable
Fodder kale	*Brassica oleracea convar. acephala var. medullosa*	Fodder plant
Brown mustard	*Brassica juncea*	Oil and Fibre plant
White mustard	*Sinapis alba*	Oil and Fibre plant
Fodder radish	*Raphanus sativus*	Fodder plant

6.1 CATEGORIES

The crops covered in this section have three categories of seed production: Pre-basic (PB), Basic (BS) and Certified (CS).

6.2 NUMBER AND TIMING OF INSPECTIONS

Species	Number	Timing
Oilseed rape (except hybrids), fodder rape, turnip rape, fodder kale, brown mustard, white mustard, fodder radish	2	1: Vegetative stage. About November and December for autumn sown crops, depending on establishment and weather. Depends on sowing date for spring crops, but note that growth may be very rapid. 2: During flowering.
Hybrid oilseed rape Hybrid fodder swede	3	1: Vegetative stage. About November and December for autumn sown crops, depending on establishment and weather. For spring crops, depends on sowing date, but note that growth may be very rapid. 2: During flowering. 3: After flowering to check destruction of the pollinator.
Fodder swede and turnip	2	1: October or November when bulb development has taken place. 2: During flowering

6.3 ISOLATION

Cruciferous crops are open pollinating and consequently have requirements for isolation from sources of undesirable pollen. The first inspection at the vegetative stage allows isolation risks to be identified before flowering and remedial action taken. The flowering inspection is the stage when the actual cross-pollination risk is assessed.

The isolation distances are:

Crop Type	PB/BS (m)	CS (m)	Legislation
Oilseed rape (except hybrids)	200	100	O & F
Fodder rape, turnip rape, brown mustard, white mustard	400	200	O & F
Hybrid oilseed rape	500	300	O & F
Turnip from *Brassica rapa*	1000	600	Veg
Turnip from other group II species	500	300	Veg
Kale, fodder swede and hybrid fodder swede crops	400	200	Fod
Fodder radish: crops greater than 2 ha	100	50	Fod
Fodder radish: crops 2 ha or less	200	100	Fod

For the following species these best practice isolation distances are recommended:

Crop Type	PB/BS (m)	CS (m)
Oilseed rape (except hybrids)	400	200
Hybrid fodder swede	400	200

The isolation distances apply to sources of undesirable pollen. Crops which are not flowering at the same time as the seed crop and adjacent crops of the same variety are not a source of undesirable pollen. In this context, a commercial crop of a hybrid is effectively a different variety from a crop producing certified seed of the same hybrid. Gardens with vegetable brassicas running to flower may also pose a cross-pollination risk. The minimum isolation distances may be reduced if there is sufficient protection from undesirable pollination, for example if the seed crop or source of undesirable pollen is in a polytunnel. Cruciferous crops are divided into groups according to their cross-pollination relationships. Seed crops should be isolated by the required distance from species where the table shows a cross-pollination risk. There is no cross-pollination between groups.

Group	Species	Common name	Cross pollination risk
Group I	*Brassica oleracea*	Fodder kale, Brussels sprouts, Cabbage, Cauliflower, Sprouting broccoli, Wild cabbage	Cross-pollinate within **Group I** but not with Groups II and III
Group II	*Brassica chinensis* *Brassica napus* *Brassica rapa* *Brassica juncea* *Brassica nigra*	Chinese cabbage Oilseed rape, Fodder rape, Fodder swede Turnip rape, Turnip fodder rape, Turnip Brown mustard Black mustard	Cross-pollinate within **species** and occasionally between species in Group II but not with Groups I and III
Group III	*Sinapis alba* *Raphanus sativus*	White mustard, Fodder radish, Garden radish	Cross-pollinate within **species** but not with other species in the Group or in Groups I and II

6.4 GENERAL CROP ASSESSMENT

Guidance for the general crop assessment and headland walk is given in the introduction. Given the importance of isolation at the second inspection, it is important to always include a sketch map of the field and surrounding crops on the CERT 3M at the first inspection.

6.5 DETAILED CROP ASSESSMENT

At the first inspection at the vegetative stage, the general uniformity of the crop is assessed and whether the crop conforms, as far as it is possible to judge, to the description for the variety stated on the label. It may not be possible positively to identify varieties in the field.

Flower characteristics are assessed during the second inspection. Again, it is difficult positively to identify varieties. The crop should be assessed for localised areas of contamination with other varieties.

Except for fodder radish and brown mustard, counts of plants in metre rows or sample areas are made to estimate the population. In all species, varietal impurities are counted in the quadrat assessment 1m wide by 20m long across the direction of drilling. Ten quadrats distributed across the field are assessed at each inspection.

In crops of 3ha or less, assessment is of a minimum of five quadrats. In crops greater than 3ha, assessment is of a minimum of ten quadrats.

6.6 VARIETAL PURITY STANDARDS

Varietal purity standards in crops to produce Pre-Basic/Basic and Certified seed are:

Species	Pre-basis/Basic (%)	Certified (%)
Oilseed rape (swede rape and turnip rape) except hybrids	99.9	99.7
Hybrid oil seed rape produced using male sterility: Female component	99.0	99.0
Hybrid Swede: Male Component	99.9	99.9
Fodder rape, white mustard	99.7	99.0
Turnip, fodder kale, swede	99.7	98.0
Fodder radish and brown mustard	1 impure plant/30 m2	1 impure plant/10 m2

For fodder radish and brown mustard, the reject levels are given in the following table.

For all other species, use the reject tables at the end of this section.

Category	Reject level: Impure plants in 10 quadrats
Pre-basic and Basic	7
CS	20

6.7 HYBRID OILSEED RAPE AND HYBRID SWEDE

Hybrid crops of the species listed above and entered to produce certified seed, require different inspection procedures to crops of conventional varieties. The crops are grown in alternating strips of the male-sterile female parent and male fertile pollinator. The two components are often clearly different morphologically. The strips of the male sterile female parent are usually wider than those of the pollinator and should be clearly defined between male and female component.

For crop inspection, each type of strip is treated as an individual crop with it's own CERT 3M crop inspection report. The reports should be clearly labelled, for example in red, as the male or female component.

Hybrid oilseed rape

Three inspections are required:

1. At vegetative stage
2. At flowering stages

} as for conventional varieties

3. To check that the strips of pollinator plants have been destroyed (usually by mowing or rotovating).

Hybrid Swede

Three inspections are required:

1. Oct/Nov to check bulb formation

2. At flowering stage

3. To check that the strips of pollinator plants have been destroyed (usually by mowing or rotovating).

The first inspection checks the identity and varietal purity of the parent lines and identifies any isolation risks.

Isolation:

Crop	Pre-basic/Basic (m)	Certified (m)
Hybrid oilseed rape	500	300
Hybrid swede	400	200

Within the field, there should be a clearly defined division between each alternating strip of the male and female components.

Varietal purity standards

At the flowering inspection, in addition to repeating the checks made at the first inspection, the female parent is assessed for male sterility by examining flowers for the absence of fertile anthers.

In crops to produce Pre-basic/Basic and Certified seed, the following varietal purity standards apply:

Species	Pre-basic/Basic (%)	Certified (%)
Hybrid oilseed rape using Male sterility		
Female component	99.0	99.0
Male component	99.9	99.9
Hybrid swede using Male sterility		
Female component	99.7	98.0
Male component	99.7	98.0

When inspecting seed crops of hybrid varieties during flowering, it is essential that foreign pollen is not introduced into the male sterile crop. It is advisable to change overalls between each variety inspected.

6.8 COMPLETING THE CERT 3M CROP INSPECTION REPORT

The CERT 3M Crop Inspection Report is completed after finishing the crop assessment:

- Calculate totals for each type of varietal impurity recorded and enter on the report.
- Calculate total varietal impurities.
- Complete the isolation box.
- All species except fodder radish and brown mustard:
- Calculate the population by one of the methods described in the introduction.
- Use the appropriate reject table to calculate reject numbers for the category and level entered and all lower categories and levels. Complete the boxes for reject numbers.
- Compare the results of the inspection against the reject numbers and standards, and complete the decision boxes.
- For fodder radish and brown mustard, calculate the total number of impurities and compare with the maximum number allowed. Complete the decision boxes.
- Sign and date the report.

6.9 CRUCIFEROUS CROP REJECT TABLES

Crop type and Category	Varietal purity Standard			
	Pre-basic & Basic oilseed rape	**CS oilseed rape, PB/BS fodder rape, swede, white mustard, turnip, fodder kale**	**CS fodder rape, white mustard**	**CS turnip, fodder kale, swede**
Standard	**99.9%**	**99.7%**	**99.0%**	**98.0%**
Total no plants inspected in sample	**Reject numbers**			
100	-	-	4	6
200	-	2	6	9
300		3	7	11
400	3	3	9	14
500	3	4	10	16
600	3	4	11	19
700	3	5	13	21
800	3	6	14	24
900	4	7	15	26
1,000	4	7	16	29
1,200	4	8	19	33
1,400	5	9	21	38
1,600	5	10	24	43
1,800	5	11	26	47
2,000	6	11	29	52
2,200	6	12	31	56
2,400	6	13	33	61
2,600	6	14	36	65
2,800	7	14	38	70
3,000	7	15	40	74
3,200	7	16	43	78
3,400	8	17	45	83
3,600	8	17	47	87
3,800	8	18	49	92
4,000	9	19	52	96
4,500	9	21	57	107
5,000	10	23	63	118

Crop type and Category	Varietal purity Standard			
	Pre-basic & Basic oilseed rape	CS oilseed rape, PB/BS fodder rape, swede, white mustard, turnip, fodder kale	CS fodder rape, white mustard	CS turnip, fodder kale, swede
Standard	**99.9%**	**99.7%**	**99.0%**	**98.0%**
Total no plants inspected in sample	**Reject numbers**			
5,500	11	24	68	129
6,000	11	26	74	139
6,500	12	28	80	150
7,000	13	30	85	161
7,500	13	32	91	171
8,000	14	33	96	182
8,500	15	35	101	193
9,000	15	37	107	203
9,500	16	39	112	214
10,000	16	40	118	225
10,500	17	42	123	235
11,000	18	44	129	246
11,500	18	45	134	256
12,000	19	47	139	267
12,500	20	49	145	277
13,000	20	51	150	288
13,500	21	52	155	298
14,000	21	54	161	309
14,500	22	56	166	319
15,000	23	57	171	330
15,500	23	59	177	340
16,000	24	61	182	351
16,500	24	62	187	361
17,000	25	64	193	372
17,500	26	66	198	382
18,000	26	67	203	392
18,500	27	69	209	403
19,000	27	71	214	413
19,500	28	72	219	424
20,000	29	74	225	434
21,000	30	77	235	455

Crop type and Category	Varietal purity Standard			
	Pre-basic & Basic oilseed rape	**CS oilseed rape, PB/BS fodder rape, swede, white mustard, turnip, fodder kale**	**CS fodder rape, white mustard**	**CS turnip, fodder kale, swede**
Standard	**99.9%**	**99.7%**	**99.0%**	**98.0%**
Total no plants inspected in sample	**Reject numbers**			
22,000 23,000 24,000	31 32 33	81 84 87	246 256 267	476 497 517
25,000 26,000 27,000	34 36 37	91 94 97	277 288 298	538 559 579
28,000 29,000 30,000	38 39 40	100 104 107	309 319 330	600 621 642
31,000 32,000 34,000	41 43 45	110 113 120	340 351 372	662 683 724
36,000 38,000 40,000	47 49 52	126 133 139	392 413 434	765 807 848
42,000 44,000 46,000	54 56 58	146 152 159	455 476 497	889 930 971
48,000 50,000	61 63	165 171	517 538	1,012 1,053

For hybrid oilseed rape:

Male component – use 99.9% column (all categories).

Female component – use 99.0% column (all categories).

Reject numbers below 5 should be treated with caution. Assess more quadrats.

For sample sizes above 50,000 use the percentage off-types allowed since this is in practice the same as the reject value.

At a probability level of 0.05

7. Linseed, flax, hemp, soya bean

These species are covered by the Seed Marketing Regulations and the Classification 'K' crop inspectors' licence.

7.1 CATEGORIES

Dioecious hemp	Pre-basic Basic Certified	Pre-basic Basic Certified
Soya bean, monoecious hemp	Pre-basic Basic C1 C2	Pre-basic Basic C1 C2
Flax, Linseed	Pre-basic Basic C1 C2 C3	Pre-basic Basic C1 C2 C3

7.2 NUMBER AND TIMING OF INSPECTIONS

Seed crops of all these species can be approved on a single inspection during flowering. Linseed and flax must be inspected in the morning before petals from that day's flowers drop. It may be more convenient to do an additional earlier inspection to check labels and assess the population.

7.3 ISOLATION

There are no isolation requirements for linseed, flax and soya bean but it must be possible to recognise the boundaries of the crop. A 2 m gap or a physical barrier is good practice to prevent contamination of the seed from a neighbouring crop.

Seed crops of hemp must be isolated from all other hemp crops of a different variety by the following distances:

	PB/BS (m)	**CS, C1, C2 (m)**
Dioecious hemp	400	200
Monoecious hemp	5,000	1,000

7.4 GENERAL CROP ASSESSMENT

Guidance for the general crop assessment and headland walk is given in the introduction. In linseed and flax, at least 20 flowers should be picked at random and checked for flower type.

Given the importance of isolation in hemp, it is important to always include a sketch map of the field and surrounding crops on the CERT 3M.

7.5 DETAILED CROP ASSESSMENT

Except for hemp (see below), counts of plants (soya bean) or stems (linseed and flax) in metre rows or sample areas are made to estimate the population. In all species, varietal impurities are counted in quadrats 1m wide by 20m long across the direction of drilling.

In crops of 3 ha or less, assessment is of a minimum of five quadrats. In crops greater than 3 ha, assessment is of a minimum of ten quadrats.

7.6 VARIETAL PURITY STANDARDS

Varietal purity standards in crops to produce pre-basic/basic and certified seed are:

Species	**Pre-basic/ Basic (%)**	**C1 (%)**	**C2 (%)**	**C3 (%)**
Linseed	99.7	98.0	97.5	97.5
Flax	99.7	98.0	97.5	97.5
Soya bean	99.5	99.0	99.0	-

For hemp, the area standards are no more than one offtype per $30m^2$ in crops to produce Pre-basic/Basic seed and not more than one offtype per $10m^2$ crops to produce CS, C1 and C2 crops as appropriate to the type of variety.

For hemp, the reject levels are given in the following table. For all other species, use the reject tables at the end of this section.

Hemp Category	**Reject level: offtypes in 10 quadrats**
Pre-basic and Basic	7
CS, C1, C2, C3	20

7.7 COMPLETING THE CERT 3M CROP INSPECTION REPORT

- Calculate totals for each type of varietal impurity recorded and enter on the report.
- Calculate total varietal impurities.
- Complete the isolation box.
- For **linseed, flax and soya bean**:
- Calculate the population by one of the methods described in the introduction.
- Use the appropriate reject table to calculate reject numbers for the category and level entered and all lower categories and levels. Complete the boxes for reject numbers.
- Compare the results of the inspection against the reject numbers and standards, and complete the decision boxes.
- For **hemp**, calculate the total number of impurities and compare with the maximum number allowed. Complete the decision boxes.
- Sign and date the report.

7.8 TEN QUADRAT LINSEED AND FLAX REJECT TABLES AT PROBABILITY LEVEL OF 0.05

Population	Varietal Purity			Reject nos for 2 quadrats
	PB and BS	C1	C2 and C3	C2 and C3
	99.7%	98.0%	97.5%	97.5%
	Reject numbers for 10 quadrats (stems/ha)			
1,500,000	107	642	796	171
1,800,000	126	765	951	203
2,100,000	146	889	1,105	235
2,400,000	165	1,012	1,258	267
2,700,000	184	1,135	1,412	298
3,000,000	203	1,258	1,565	330
3,300,000	222	1,381	1,718	361
3,600,000	241	1,504	1,871	392
3,900,000	260	1,626	2,024	424
4,200,000	279	1,749	2,177	455
4,500,000	298	1,871	2,329	486
4,800,000	317	1,993	2,482	517
5,100,000	336	2,116	2,634	548
5,400,000	355	2,238	2,787	579
5,700,000	374	2,360	2,939	611
6,000,000	392	2,482	3,091	642
6,300,000	411	2,604	3,244	673
6,600,000	430	2,726	3,396	704
6,900,000	449	2,848	3,548	734
7,200,000	467	2,970	3,700	765
7,500,000	486	3,091	3,852	796
7,800,000	505	3,213	4,004	827
8,100,000	524	3,335	4,156	858
8,400,000	542	3,457	4,308	889
8,700,000	561	3,578	4,460	920
9,000,000	579	3,700	4,612	951
9,300,000	598	3,822	4,763	981
9,600,000	617	3,943	4,915	1,012
9,900,000	635	4,065	5,067	1,043
10,200,000	654	4,186	5,219	1,074

At a probability level of 0.05

7.9 FIVE QUADRAT LINSEED AND FLAX REJECT TABLES AT PROBABILITY LEVEL OF 0.05

Population	Varietal Purity		
	PB and BS	C1	C2 and C3
	99.7%	98.0%	97.5%
	Reject numbers for 5 quadrats (stems/ha)		
1,500,000	57	330	408
1,800,000	67	392	486
2,100,000	77	455	564
2,400,000	87	517	642
2,700,000	97	579	719
3,000,000	107	642	796
3,300,000	117	704	874
3,600,000	126	765	951
3,900,000	136	827	1,028
4,200,000	146	889	1,105
4,500,000	155	951	1,181
4,800,000	165	1,012	1,258
5,100,000	175	1,074	1,335
5,400,000	184	1,135	1,412
5,700,000	194	1,197	1,488
6,000,000	203	1,258	1,565
6,300,000	213	1,320	1,642
6,600,000	222	1,381	1,718
6,900,000	232	1,442	1,795
7,200,000	241	1,504	1,871
7,500,000	251	1,565	1,947
7,800,000	260	1,626	2,024
8,100,000	270	1,687	2,100
8,400,000	279	1,749	2,177
8,700,000	289	1,810	2,253
9,000,000	298	1,871	2,329
9,300,000	308	1,932	2,406
9,600,000	317	1,993	2,482
9,900,000	327	2,054	2,558
10,200,000	336	2,116	2,634

7.10 SOYA BEAN REJECT TABLES

Total no. plants in sample	Varietal Purity	
	PB and BS	C1 and C2
	99.5%	99.0%
	Reject number	
100	3	4
200	4	6
300	5	7
400	6	9
500	7	10
600	7	11
700	8	13
800	9	14
900	9	15
1,000	10	16
1,100	11	18
1,200	11	19
1,300	12	20
1,400	13	21
1,500	13	23
1,600	14	24
1,700	15	25
1,800	15	26
1,900	16	27
2,000	16	29
2,250	18	32
2,500	20	34
2,750	21	37
3,000	23	40
3,250	24	43
3,500	26	46
3,750	27	49
4,000	28	52
4,250	30	54
4,500	32	57
4,750	33	60
5,000	34	63

Total no. plants in sample	Varietal Purity	
	PB and BS	C1 and C2
	99.5%	99.0%
	Reject number	
5,250	36	66
5,500	37	68
5,750	39	71
6,000	40	74
6,250	42	77
6,500	43	80
6,750	45	82
7,000	46	85
7,250	47	88
7,500	49	91
7,750	50	93
8,000	52	96
8,250	53	99
8,500	54	101
8,750	56	104
9,000	57	107
9,250	59	110
9,500	60	112
9,750	62	115
10,000	63	118
10,250	64	120
10,500	66	123
10,750	67	126
11,000	68	129
11,250	70	131
11,500	71	134
11,750	73	137
12,000	74	139
12,250	75	142
12,500	77	145
12,750	78	147

Total no. plants in sample	Varietal Purity	
	PB and BS	C1 and C2
	99.5%	99.0%
	Reject number	
13,000	80	150
13,250	81	153
13,500	82	155
13,750	84	158
14,000	85	161
14,250	86	163
14,500	88	166
14,750	89	169
15,000	91	171
15,500	93	177
16,000	96	182
16,500	99	187
17,000	101	193
17,500	104	198
18,000	107	203
18,500	110	209
19,000	112	214
19,500	115	219
20,000	118	225
20,500	120	230
21,000	123	235
21,500	126	240
22,000	129	246
22,500	131	251
23,000	134	256
23,500	137	261
24,000	139	267

Total no. plants in sample	Varietal Purity	
	PB and BS	C1 and C2
	99.5%	99.0%
	Reject number	
25,000	145	277
26,000	150	288
27,000	155	298
28,000	161	309
29,000	166	319
30,000	171	330
31,000	177	340
32,000	182	351
33,000	187	361
34,000	193	372
35,000	198	382
36,000	203	392
37,000	209	403
38,000	214	413
39,000	219	424
40,000	225	434
42,000	235	455
44,000	246	476
46,000	256	497
48,000	267	517
50,000	277	538

Reject numbers below 5 should be treated with caution. Assess more quadrats

For sample sizes above 50,000 use percentage off-types allowed since this is in practice the same as the reject value

At a probability level of 0.05.

8. Grasses

Grasses are covered by the Seed Marketing Regulations and the 'L' crop inspectors' licence

8.1 CATEGORIES

Agricultural, amenity and fine leaved grasses have three categories of seed production: Pre-basic (PB), Basic (BS) and Certified (CS). Some species may also be certified as HVS but this is a seed standard only and does not apply in the crop.

8.2 NUMBER AND TIMING OF INSPECTIONS

All grass seed crops can be approved on a single inspection. Timing of the inspection is critical because time of ear emergence is the most distinguishing characteristic in assessing varietal identity. The ideal stage for crop inspection is between 5 and 25% ear emergence. Time of ear emergence is shown in the heading date tables as 'time in days after 1 March', issued to licensed inspectors each year by NIAB. Actual emergence times for early species or varieties within a species can be checked at the start of each season. In defoliated crops of Italian or hybrid ryegrass, the time of recovery to 5% ear emergence is approximately three weeks from the cutting date.

8.3 PREVIOUS CROPPING (SEE ANNEX)

8.4 ISOLATION

All grasses are cross-pollinating and seed crops must therefore be isolated from sources of undesirable pollen during the flowering period. The inspection includes a check of all fields and verges etc. surrounding the crop for species that can cross-pollinate with the crop. Given the importance of isolation, it is necessary to make a sketch map of the crop and surrounding area particularly if remedial action and re-inspection is likely.

The minimum isolation distances from sources of undesirable pollen are:

For production of	Crops of 2 ha or less (m)	Crops > 2 ha (m)
Pre-basic and Basic	200	100
CS	100	50

These distances do not apply if adjacent crops are sown with authenticated seed of the same variety. Sources of undesirable pollen are other varieties of the same species. For perennial, Italian and hybrid ryegrasses, varieties of the same ploidy are effectively one

species since they are capable of cross-pollinating with each other. Diploid and tetraploid varieties are unlikely to cross and produce viable seed and are therefore not a cross-pollination risk to each other. Uncultivated areas do not usually contain tetraploid plants. Small or dispersed areas containing a few plants are not considered to be a problem and may be ignored at the inspector's discretion.

Grasses

Isolation distances should be established, by preventing flowering (eg by mowing) of neighbouring grass leys and verges etc. if necessary, before flowering and maintained until pollination is finished. Flowering and pollination usually starts about two weeks after initial ear emergence and finishes about eight weeks after initial ear emergence. If there is an isolation risk to a seed crop during flowering, the isolation requirement can be met by mowing out part of the seed crop until the required distance is achieved. For all categories of seed and all species, a physical barrier or fallow strip is recommended throughout the growing season between the seed crop and any other crop likely to cause physical contamination at harvest.

8.5 GENERAL CROP ASSESSMENT

Guidance for the general crop assessment and headland walk is given in the introduction. While grasses can be identified to species, individual varieties cannot usually be identified in a crop inspection. Trueness to type can be authenticated using the official variety description as a guide. Ploidy is a supportive identification character in ryegrass. Tetraploid varieties usually have larger, darker and shinier leaves than diploid varieties.

8.6 DETAILED CROP ASSESSMENT

Since standards for varietal purity, and in some species the presence of other grass species, are applied on an area basis, there is no need to estimate the population. Assessments are made in quadrats:

In CS crops, quadrats are 1m wide, and 10m in length. In drilled crops, quadrats should be across the direction of drilling. In pre-basic and basic crops, the quadrat is 1m x 30m.

In pre-basic and basic crops of ryegrass, quadrats are extended to 1m x 50m to assess presence of other ryegrass species.

If the crop is in wide rows, which may be the practice for cocksfoot and timothy, the quadrat consists of a single row and the inter-row space to one side of it. In this case the quadrat length to cover $10m^2$ depends on the drill width:

Drill width (cm)	**CS Crops - Length of row and inter-row space (m) for $10m^2$**	**Pre-basic and basic crops – Length of row and inter-row space (m) for $30m^2$**
35-40	27	81
41-50	23	72
51-60	18	54
61 -70	16	48

The minimum number of quadrats depends on the area of the crop:

Area	**Minimum no. of quadrats**
Up to 2 ha	4
Up to 4 ha	8
Up to 7 ha	12
Up to 10 ha	16

Crops greater than 10 ha should be divided into roughly equal areas of 10 ha or less and each one assessed separately. A sketch map should be drawn on the CERT 3H Crop Inspection Report to identify the areas and corresponding assessments.

If impurities are found, acceptance or rejection of the crop is decided according to the following table. If the number of impurities falls in the uncertainty range, more quadrats should be assessed until the decision to accept or reject is clear or 20 quadrats have been examined.

No. of quadrats	**Accept if impurities do not exceed**	**Uncertainty range: assess more quadrats**	**Reject if impurities reach**
4	1	2-9	10
8	6	7-14	15
12	12	13-18	19
16	18	19-22	23
17	19	20-22	23
18	20	21-22	23
19	21	22	23
20	22	-	23

For crops greater than 10 ha which have been divided into two or more areas, the decision should be made separately for each area. The crop as a whole cannot be approved until each of the areas is acceptable.

There are no specific standards for weeds and diseases but it is good practice to note any which might affect the quality of harvested seed. In particular, wild oats, blackgrass, rough stalked meadow grass, annual meadow grass, couch and docks.

8.7 STANDARDS FOR VARIETAL PURITY AND OTHER GRASS SPECIES

The following varietal purity standards are applied during crop inspection:

Species	Pre-basic/Basic	Certified
All grass species except smooth stalked meadow grass	1 offtype/30 m^2	1 offtype/10 m^2
Smooth stalked meadow grass except apomictic uniclonal varieties	1 offtype/20 m^2	4 offtypes/10 m^2
Smooth stalked meadow grass: apomictic uniclonal varieties	1 offtype/20 m^2	6 offtypes/10 m^2

For perennial, Italian and hybrid ryegrass and festulolium, the standards for ryegrass or festulolium plants other than the crop species are:

	Pre-basic/Basic	Certified
Maximum number	1 plant/50m^2	1 plant/10m^2

8.8 USE OF 'INSTRUCTIONS TO HERBAGE SEED GROWERS'

Provided the crop applicant has given permission, the yellow form 'Instructions to Herbage Seed Growers' may be used to explain remedial action needed for the crop to be approved at a second inspection. This allows instructions about remedial action for isolation to be given clearly and in time to prevent cross-pollination.

The form is triplicated:

- One copy for the grower.
- Second and third copy for the inspector. On completion of the remedial action instructions and after re-inspection of the crop, the second copy is signed by the inspector and attached to the CERT 3H Crop Inspection Report. The inspector may keep a copy.

Isolation distances need to be maintained from the start of flowering until flowering and pollination have finished. Flowering usually starts about two weeks after initial ear emergence and finishes about eight weeks after initial ear emergence although this will vary with the season and location. Care must be taken when recommending roguing. Roguing is feasible where impurities are uniformly distributed through the crop and only slightly in excess of the standard. If contamination is localised, it may be more practical to mow out these areas. In either case, the crop must be re-inspected.

8.9 COMPLETING THE CERT 3H CROP INSPECTION REPORT

The CERT 3H Crop Inspection Report is completed after finishing the crop assessment:

- Calculate totals for each type of varietal impurity recorded, and species impurity if appropriate, and enter on the report.
- Calculate total varietal impurities.
- Calculate total species impurities if appropriate.
- Complete the isolation box.
- Compare the results of the inspection against the reject numbers and standards, and complete the decision boxes.
- It is good practice to note any weeds which might affect the quality of harvested seed.
- Sign and date the report.
- This report then needs to be stored and results declared or sent to NIAB for PB/BS crops.

9. Herbage, legumes and lupins

Herbage legumes and lupins are covered by the Seed Marketing Regulations and the 'L' Classification crop inspectors' licence. This wide range of species, of which the most commonly grown for seed in this country are red clover, white clover, common vetch, sainfoin, blue lupin, white lupin and yellow lupin.

9.1 CATEGORIES

All of these species have three categories of seed production, starting with Pre-basic (PB) and Basic (BS). For all species except vetches, lupins and lucerne *Medicago sativa* the final generation is Certified seed (CS). For vetches, lupins and lucerne *Medicago sativa* the final generation is C2.

Red clover, white clover and sainfoin may also be certified as HVS. This is a seed standard only and does not apply in the crop.

9.2 NUMBER AND TIMING OF INSPECTIONS

All herbage legume and lupin seed crops can be approved on a single inspection. For most species, this should be timed as crops approach full flowering before there are too many faded flowers or ripe seed heads:

Red clover	At full flowering. Under normal management, usually early to mid July for late varieties and late July to early August for broad red varieties.
White clover	When stolons are actively growing and crop approaching full flowering. Usually between mid June and early July depending on grazing management.
Vetches	At the start of flowering. Usually mid June for autumn sown crops and late June to early July for spring sown crops.
Sainfoin	At the start of flowering.
Lupins	At full flowering. Usually late May for autumn sown crops and late June to early July for spring sown crops

9.3 ISOLATION

Herbage legumes and lupins are at least partly cross-pollinating, mostly by bees rather than wind, and must therefore be isolated from sources of undesirable pollen during the

flowering period. The inspection includes a check of all fields and verges etc. surrounding the crop for species that can cross-pollinate with the crop. Given the importance of isolation, it is good practice to make a sketch map of the crop and surrounding area particularly if remedial action and re-inspection is likely.

The minimum isolation distances from sources of undesirable pollen are:

For production of	Crops of 2 ha or less (m)	Crops > 2 ha (m)
Pre-basic and Basic	200	100
C1, C2 and CS	100	50

These distances do not apply if adjacent crops are sown with authenticated seed of the same variety. Sources of undesirable pollen are other varieties of the same species. White, yellow and blue lupins are separate species and do not cross-pollinate between species. Small or dispersed areas are not considered to be a problem and may be ignored at the inspector's discretion.

Isolation distances should be established before flowering and maintained by mowing, tight grazing or with herbicides, until pollination is finished. Many of these species flower indeterminately over a long period of time. Any isolation risk to a seed crop during flowering, the isolation requirement can be met by discarding part of the seed crop until the required isolation distance is achieved. The remaining part of the crop must be identified by a rotavated strip or similar.

For all categories of seed and all species, a physical barrier or fallow strip is recommended throughout the growing season between the seed crop and any other crop likely to cause contamination at harvest.

9.4 GENERAL CROP ASSESSMENT

Guidance for the general crop assessment and headland walk is given in the introduction. While herbage legumes and lupins can be identified to species, individual varieties cannot usually be identified in a crop inspection. Trueness to type can be authenticated using the official variety description as a guide.

9.5 DETAILED CROP ASSESSMENT

Since standards for varietal purity are area based, there is no need to estimate the population. Assessments are made in quadrats. In C1, C2 and CS crops, quadrats are 1m wide, measured using the stick, and paced out to 10m in length. In Pre-basic and basic crops the quadrats are 1 x 30m.

The minimum number of quadrats depends on the area of the crop:

Area	Minimum no. of quadrats
Up to 2 ha	4
Up to 4 ha	8
Up to 7 ha	12
Up to 10 ha	16

Crops greater than 10 ha should be divided into roughly equal areas of 10 ha or less and each one assessed separately. A sketch map should be drawn on the CERT 3H Crop Inspection Report to identify the areas and corresponding assessments.

If impurities are found, acceptance or rejection of the crop is decided according to the following table. If the number of impurities falls in the uncertainty range, more quadrats should be assessed until the decision to accept or reject is clear or 20 quadrats have been examined.

No. of quadrats	Accept if impurities do not exceed	Uncertainty range assess more quadrats	Reject if impurities reach
4	1	2-9	10
8	6	7-14	15
12	12	13-18	19
16	18	19-22	23
17	19	20-22	23
18	20	21-22	23
19	21	22	23
20	22	-	23

For crops greater than 10 ha which have been divided into two or more areas, the decision should be made separately for each area. The crop as a whole cannot be approved until each of the areas is acceptable.

There are no specific standards for weeds and diseases but it is good practice to note any which might affect the quality of harvested seed. In particular, stem eelworm in red clover and lucerne.

9.6 VARIETAL PURITY STANDARDS

Varietal purity standards applied during crop inspection are:-

1 offtype/30m^2 Pre-basic and Basic crops

1 offtype/10m^2 C1, C2 and CS crops.

9.7 COMPLETING THE CERT 3H CROP INSPECTION REPORT

The CERT 3H Crop Inspection Report is completed after finishing the crop assessment:

- Calculate totals for each type of varietal impurity recorded and enter on the report.
- Calculate total varietal impurities.
- Complete the isolation box.
- Compare the results of the inspection against the reject numbers and standards, and complete the decision boxes.
- It is good practice to note any weeds or diseases which might affect the quality of harvested seed.
- Sign and date the report.

Annex

Guidance on previous cropping

Species and category	Good practice	Minimum compatibility
Wheat, barley, oats, triticale **PB/B**	No other variety of same species in previous 2 years. No other cereal species in previous 2 years	No other variety of same species in previous year
Wheat, barley, oats, triticale **C1 & C2**	No other variety of same species in previous 2 years No other cereal species in previous year	No other variety of same species in previous year
Rye	No other variety of rye or triticale in previous year	No other variety of same species in previous year
Field peas	No *Pisum sativum* or *Vicia faba* (or dredge corn containing these species) in previous 2 years	No crop of same species in previous year
Field beans	No *Pisum sativum* or *Vicia faba* (or dredge corn containing these species) in previous 2 years	No crop of same species in previous year
Ryegrass (perennial, Italian and hybrid)	No crop of same variety in previous year No other variety of same species in previous 4 years (CH/CL) or previous 6 years (PB/BS) No other ryegrass species in previous 4 years No cocksfoot, meadow or tall fescue in previous 3 years	No other variety of same species in the previous 4 years No other ryegrass species in previous 4 years No other grass in previous 2 years
Cocksfoot	No crop of same variety in previous year No other variety of same species in previous 4 years (CS) or previous 6 years (PB/BS) No ryegrass in previous 4 years No meadow or tall fescue in previous 3 years	No other variety of same species in previous 4 years No other grass in previous 2 years

Species and category	Good practice	Minimum compatibility
Meadow fescue	No crop of same variety in previous year. No other variety of same species in previous 4 years (CS) or previous 6 years (PB/BS). No ryegrass in previous 4 years No cocksfoot or tall fescue in previous 3 years	No other variety of same species in previous 4 years No other grass in previous 2 years
Tall fescue	No crop of same variety in previous year. No other variety of same species in previous 4 years (CS) or previous 6 years (PB/BS). No ryegrass in previous 4 years No cocksfoot or tall fescue in previous 3 years	No other variety of same species in previous 4 years No other grass in previous 2 years
Red fescue	No crop of same variety in previous year. No other variety of same species in previous 4 years (CS) or previous 6 years (PB/BS). No ryegrass in previous 4 years. No cocksfoot or tall fescue in previous 3 years. No ryegrass in previous 4 years.	No other variety of same species in previous 4 years
Timothy and any other grass species	No crop of same variety in previous year No other variety of same species in previous 4 years (CS) or previous 6 years (PB/BS)	No other variety of same species in previous 4 years
Red clover, white clover, lucerne, sainfoin and other small seeded legumes	No crop of same variety in previous year No other variety of same species in previous 4 years (C1, C2 and CS) or previous 6 years (PB/BS)	No other variety of same species in previous 4 years

Species and category	Good practice	Minimum compatibility
Crucifers, oilseed rape (except hybrids), fodder rape, turnip rape, brown mustard, black mustard, white mustard	No cruciferous crop in previous 5 years	No seed bearing cruciferous crop in previous 2 years. Soil sterilisation, soil replacement and transplanted crops will be considered on case by case basis.
Hybrid oilseed rape	Statutory requirement for no cruciferous crop in previous 5 years	Statutory requirement for no cruciferous crop in previous 5 years
Flax and linseed	No flax or linseed crop in previous 5 years	No flax or linseed crop in previous 2 years
Soya Bean	No peas or beans in previous 2 years No soya bean in previous 5 years	No crop of same species in previous year.
Beet	No beet seed crop in previous 5 years	No crop of same species in previous 2 years. Soil sterilisation, soil replacement and transported crops will be considered on a case by case basis.
Turnips	No cruciferous crop in previous 5 years or for transplanted crops in previous 3 years	No crop of same species in previous 2 years. Soil sterilisation, soil replacement and transported crops will be considered on a case by case basis.
Broad bean	No bean (*Vicia faba* or *Phaseolus* supp), pea, lucerne, red clover, white clover, alsike or sainfoin crop in previous 4 years.	No crop of same species in previous year.
French bean	No bean (*Vicia faba* or *Phaseolus* supp) crop in previous 4 years.	No crop of same species in previous year.
Lupins	No lupins in previous 2 years	No crop of lupins in previous year
Hemp	No hemp in previous 2 years	No crop of same species in previous 2 years

The Animal and Plant Health Agency is an Executive Agency of the Department for Environment, Food and Rural Affairs working to safeguard animal and plant health for the benefit of people, the environment and the economy.