



Department of
Primary Industries and
Regional Development

Protect
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Innovate

Western Australian Certified Seed Potato Scheme

Production Rules

Department of Primary Industries and Regional Development in partnership with
Western Australian Seed Potato Producers Committee

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All paperwork relating to seed potato certification should be submitted to the administration email address. This address is monitored by inspectors to provide continuity.

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Current versions of these Rules, relevant forms and information relating to disease diagnostic services are available at the DPIRD website:

<https://www.agric.wa.gov.au/plant-biosecurity/potato-seed-certification>

This document is authored by the Department of Primary Industries and Regional Development (DPIRD) in consultation with the Western Australian Seed Potato Producers Committee (WASPP), the Potato Industry and growers of seed, ware, and processing potatoes.

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Western Australian Certified Seed Potato Scheme

Introduction

Western Australia (WA) is isolated from the rest of the world and eastern Australia by sea and desert. Western Australia's seed potato production areas are located predominantly in the southwest of Western Australia making them the most isolated in the world. As a result, these regions are free of most serious pests and diseases including those of potato. The serious potato pests and diseases shown in Table 1 have not been recorded in potato seed production districts in Western Australia.

Seed certification schemes exist in most potato-producing countries, for three prime reasons. They provide assurances on:

- trueness to type (i.e. that the variety is the one it is described to be)
- disease status of the seed
- quality of seed.

The Western Australian Seed Potato Certification Scheme (the scheme) is an industry cooperative scheme using the Australian National Standard for the Certification of Seed Potatoes (National Standard) as a minimum. Areas where the national standard is exceeded include virus testing, standards for aphids and isolation requirements.

The Department of Primary Industries and Regional Development, through its Diagnostic and Laboratory Services, administers the scheme and enforces the industry agreed standards. Potato Certification Officers are independent government employees who undertake inspections of both the growing crop and harvested tubers, provide advice and certify seed lots which meet quality standards. Accreditation of industry members to assess seed lots under an Authorised Tuber Inspection process for domestic markets is also a feature of the scheme.

A definition of terms used in this document can be found in Appendix 1.

Australian National Standard

The Australian potato industry recognises the need for a National Seed Potato Certification Standard, as a prerequisite for positioning itself to capitalise on the opportunities for domestic and international growth of the industry.

The purpose of the National Standard is to ensure that irrespective of the state of origin of seed potatoes, buyers will receive seed which is certified according to a single nationally agreed minimum standard.

The Western Australian Certified Seed Potato Scheme uses the Australian National Standard (November 2016) as the foundation.

Table 1. Pests and diseases which are absent in WA seed potato production districts.

Common name	Scientific name	Status in WA
Andean potato mottle virus	Andean potato mottle virus	Absent: the entire country is pest free
Andean potato weevil	<i>Premnotrypes solani</i>	Absent: the entire country is pest free
Bacterial wilt (brown rot)	<i>Ralstonia solanacearum</i>	Absent: pest eradicated
BCTV	Beet curly top virus	Absent: the entire country is pest free
Colorado beetle	<i>Leptinotarsa decemlineata</i>	Absent: the entire country is pest free
Late blight (A1 & A2 mating strains)	<i>Phytophthora infestans</i>	Absent: pest no longer present
Mop-head or mop-top	Potato mop-top virus	Absent: the entire country is pest free
Phoma leaf spot	<i>Stagonosporopsis andigena</i>	Absent: the entire country is pest free
Potato cyst nematode	<i>Globodera pallida</i>	Absent: the entire country is pest free
Potato cyst nematode	<i>Globodera rostochiensis</i>	Absent: pest eradicated
Potato tuber nematode	<i>Ditylenchus destructor</i>	Absent: pest records invalid
Potato wart	<i>Synchytrium endobioticum</i>	Absent: pest not recorded
PVA	Potato virus A	Absent: pest not recorded
PVM	Potato virus M	Absent: the entire country is pest free
PVS (Andean strain only)	Potato virus S	Absent: the entire country is pest free
PVT	Potato virus T	Absent: pest not recorded
PVV	Potato virus V	Absent: the entire country is pest free
PYDV	Potato yellow dwarf virus	Absent: the entire country is pest free
Ring rot	<i>Clavibacter sependonicus</i>	Absent: pest not recorded
Rubbery rot	<i>Geotrichum candidum</i>	Absent: the entire country is pest free
Serpentine leafminer	<i>Liriomyza huidobrensis</i>	Absent: pest not recorded
Skin spot	<i>Polyscytalum pustulans</i>	Absent: pest not recorded



Common name	Scientific name	Status in WA
Smut	<i>Thecaphora solani</i>	Absent: the entire country is pest free
Tobacco rattle virus	Tobacco rattle virus	Absent: pest not recorded
Zebra chip	<i>Candidatus Liberibacter solanacearum</i> (CLso)	Absent: pest not recorded

The Western Australian Scheme Rules

Definition of certification

Certification of seed potatoes is strictly limited to the endorsement that the seed potatoes have been produced in accordance with these scheme rules.

The method of determining compliance with standards is visual inspection of the growing crop and inspection of random samples of the graded product.

The National Standard does not require that the certifying authorities test for varietal purity.

When zero tolerances are applied, certification does not mean the lot is free from disease, but that none was visually observed during the routine inspections.

No warranties, expressed or implied, of quality factors not specified in these rules or merchantability or fitness for any particular purpose is given by the Certifying Authority in respect to Certified seed produced. The Certifying Authority disclaims all responsibility and liability for any incorrectness and inaccuracy caused or contributed to by any circumstances beyond its control.

Suitable seed sources

In vitro tissue stocks

Certified seed potatoes are derived from minitubers, microtubers, plantlets or other approved planting material produced in accredited laboratories from pathogen-tested stocks maintained in tissue culture.

The benefit of using pathogen-tested material is that it ensures a constant source of disease-free stock as the basis for further multiplication.

1. All potato stocks (existing and new cultivars) for use as starting material in this Certification Scheme must be visually free of all diseases before being pathogen tested for the presence of a suite of important potato viruses and disease, either in quarantine, or by an approved testing authority.

2. Such pathogen-tested stocks must be maintained in vitro by the testing authority under conditions of high security (to minimise the risk of re-infection) and must be retested for the presence of contaminating fungi and bacteria, prior to their release to accredited laboratories for further multiplication. The in vitro material is not retested again for the specific pathogens listed above. Accredited laboratories can maintain stocks for further multiplication and, if necessary, re-apply to the testing authority for new stocks.

Generation zero (G0) material

3. All laboratories and associated facilities (e.g. glasshouses, etc.) which accept pathogen-tested stocks from approved repositories, to produce Generation zero (G0) seed, i.e. minitubers, microtubers, plantlets, or other defined propagules must be accredited.
4. Accreditation of laboratories is conducted by recognised Certification Agencies. Protocols for accreditation of laboratories are available should be requested from AuSPICA.
5. Accredited laboratories will be re-inspected annually, by the Certification Agency, to ensure that standards are being maintained.

Certified seed field generations

6. Seed potatoes can be multiplied for up to a maximum of five field generations of which any generation may be sold as Certified seed provided it meets the standard (See image 1 and Table 2).



Image 1 Graphic illustrating limited Certified seed potato production generations

Generation 1 to 4 (G1-G4)

This material is produced in the field and may be sold directly for commercial use or for subsequent multiplication under the scheme.

Generation 5 (G5)

Generation five harvested seed produced in the field and may be sold as Certified seed directly for commercial use but is not eligible for subsequent multiplication under the scheme.

Table 2 *Multiplication of Certified seed*

Planting source material	Growing crop	Seed harvested
Minitubers, microtubers or plantlets (G0)	1	Generation 1
Generation 1 (G1)	2	Generation 2
Generation 2 (G2)	3	Generation 3
Generation 3 (G3)	4	Generation 4
Generation 4 (G4)	5	Generation 5

Exceptional circumstances

7. In exceptional circumstances generation five (G5) harvested Certified seed can be used to produce a sixth generation of Certified seed.
8. The Certifying Authority will assess applications on a case-by-case basis where exceptional circumstances can be demonstrated and where suitable alternative planting seed cannot be identified.
9. The G5 seed source must achieve a crop rating one or two.
10. The growing crop must be sampled and laboratory tested and have a virus level of <0.1%.
11. 'Generation six' (G6) must be printed on the seed label.

Field multiplication

Selection and pre-registration of paddocks

12. Growers must register their production areas intended for Certified seed production, each year, at least 60 days prior to planting. Crops intended for certification cannot be planted until the paddock has been checked and approved by an inspector as meeting the rotational requirements under 'Crop Rotation'.

13. Seed can be produced only on properties where the Certifying Authority is satisfied that there is no apparent risk of the pests and diseases shown in Table 1 affecting the crop.

Potato cyst nematode (PCN)

In 2010 Western Australia declared Area Freedom for Potato cyst nematode (PCN). See Appendix 2 for more information regarding WA freedom from PCN.

14. Under no circumstances can seed be grown on land that has previously grown bulbs, corms, or tubers imported from areas where PCN has been known to occur.

Crop rotation

Crop rotation is undertaken to maintain high health status of certified crops. Minimum rotational standards are required to reduce the risk of carryover of soil-borne diseases from hosts such as weeds, solanaceous species or other crops.

15. Growers must keep proper records, including whole farm plans which show:

- paddock boundaries with paddock numbers or names
- where all potatoes are planted each year
- fence line/boundary changes.

16. Land, on which seed generations one to three (G1–G3) harvested material are produced, must not have had potatoes or other solanaceous crops cultivated on the land for a minimum of five years (60 months) from the date of planting.

17. Land, on which subsequent generations are produced (i.e. G4 and G5 harvested) must not have had potatoes or other solanaceous crops cultivated on the land for a minimum of three years (36 months) from the date of planting.

Table 3 Crop rotation example showing number of seasons of non-solanaceous plantings between seed potato crops

Crop harvest gen	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
G1-G3	Seed Potatoes	Non solanaceous	Non solanaceous	Non solanaceous	Non solanaceous	Seed Potatoes
G4-G5	Seed Potatoes	Non solanaceous	Non solanaceous	Seed Potatoes	Non solanaceous	Non solanaceous

18. The Certifying Authority must be satisfied that the land on which the seed crop is to be grown does not have a cropping history which would increase the risk of disease carryover.



Selection of seed

19. Growers may choose the seed generation they intend to grow from any of the following:

- Minitubers, microtubers, plantlets or other approved planting material available from accredited laboratories
- Certified seed of generation 1, 2, 3 or 4 (G1, G2, G3, G4) which they have produced themselves or purchased from another Certified seed grower along with a current, completed TADs form
- Seed approved by the Scheme Administrator.

Crop isolation

Note 1: 'Any other crop' means any potato crop sown with Certified or Registered seed potatoes and not for multiplication within the Certified seed scheme.

Note 2: Isolation distances described below are for G0 to G4 sown seed crops submitted for inspection under the certification scheme. Crops not submitted for inspection will be considered 'other crops' and required to meet the minimum isolation requirement for other crops.

20. There must be a gap of at least two metres between varieties when they are planted in the same row.

21. Seed crops must comply with the following isolation distances further outlined in Image 2:

- **Minitubers sown**—Crops sown with Minitubers (G0) seed must be at least two blank rows from seed crops sown with G1 to G3 Certified seed, at least 5 metres from seed crops sown with G4 Certified seed, at least 10 metres from seed crops sown with G1 to G3 Registered seed and at least 20 metres from any other crop
- **G1 sown**—Crops sown with G1 Certified seed must be at least two blank rows from seed crops sown with G2 to G3 Certified seed, at least 5 metres from seed crops sown with G4 Certified seed, at least 10 metres from seed crops sown with G1 to G3 Registered seed and at least 20 metres from any other crop
- **G2 sown**—Crops sown with G2 Certified seed must be at least two blank rows from seed crops sown with G3 Certified seed, at least 5 metres from seed crops sown with G4 Certified seed, at least 10 metres from seed crops sown with G1 to G3 Registered seed and at least 20 metres from any other crop
- **G3 sown**—Crops sown with G3 Certified seed must be at least two blank rows from seed crops sown with G4 Certified seed, at least 10 metres from seed crops sown with G1 to G3 Registered seed and at least 20 metres from any other crop

- **G4 sown**—Crops sown with G4 Certified seed must be at least 10 metres from seed crops sown with G1 to G3 Registered seed and at least 20 metres from any other crop
22. Isolation distances should be free of solanaceous plants. Sacrificial potato crops planted in the isolation zone will not be considered to meet isolation requirements.
 23. Travelling irrigators are not to be used where they would pass from Registered seed crops to Certified seed crops, or from seed crops sown with G2, G3 or G4 seed to seed crops sown with G0 or G1 seed, unless a sufficient unplanted area is left for the irrigator to pass through without contact by wheels or hoses.
 24. No ware potatoes from uncertified seed are to be planted on any farm (including leased land) that grows Certified seed without the prior approval of the Certifying Authority.

	G0	G1	G2	G3	G4	Registered G1 to G3	Any other crop**
G0	*	2 blank rows **	2 blank rows **	2 blank rows **	5m	10m	20m
G1	2 blank rows **	*	2 blank rows **	2 blank rows **	5m	10m	20m
G2	2 blank rows **	2 blank rows **	*	2 blank rows **	5m	10m	20m
G3	2 blank rows **	2 blank rows **	2 blank rows **	*	2 blank rows **	10m	20m
G4	5m	5m	5m	2 blank rows **	*	10m	20m
Registered G1 to G3	10m	10m	10m	10m	10m		
Any other crop**	20m	20m	20m	20m	20m		

Image 2 Summary of isolation for Certified seed generations (see full description above)

* At least a 2m gap between varieties when they are planted in the same row

** 2 blank rows means the equivalent minimum distance of two complete empty hills and not the spacing between plants

*** 'Any other crop' means any potato crop sown with seed potatoes sourced from the certified or registered seed scheme and not for multiplication within the certified seed scheme



Application for certification inspection

25. Applications for inspection of crops under the WA Certified Seed Potato Scheme must be made on the Application form (Form 401, Application for inspection of Potato Crops for Certified and Registered Seed Production Appendix 5).

Growers wishing to participate in the scheme must make application giving details of:

- evidence of pre-approval of the growing site by the Certifying Authority
- property owner details
- crop area sown (hectares) or number of minitubers sown
- variety and generation
- source of seed (label colour and serial number)
- dates of planting and estimated harvest
- plot number
- a location plan of plantings outlining north point and identifiable landmarks.

26. Proof of purchase in the form of certification labels and a TADs form number, must be provided with the application form when seed is purchased from external sources.

27. Application forms must be returned within one (1) week of first crop sowing. In consultation with an inspector, subsequent plantings can be added to initial application and map within one (1) week of each subsequent planting.

Application forms are available from local Potato Certification Officers or DDLS STAC at <https://www.agric.wa.gov.au/plant-biosecurity/potato-seed-certification>

Field crop inspections

Signed application forms provide inspectors with the authority to inspect crops unaccompanied and without an appointment. However, inspectors will endeavour to make appointments whenever possible and will always notify the grower that inspections are being undertaken.

28. Growers are responsible for notifying the Seed Potato Unit, or their local inspector, when their crop(s) is at 10 days prior to row closure to facilitate scheduling of the first inspection. As a guide, inspectors must be able to see the base of plants in the fourth row when looking across the crop.

29. All areas on the property on which potatoes are grown must be disclosed on the application and/or shown to the Potato Certification Officer at the time of the first inspection.

30. All plots must be clearly labelled to define plot number, variety and generation.

31. There will be a minimum of two inspections of the growing crop by Potato Certification Officers from the Certifying Authority.

- the first crop inspection will be made close to but before row closure



- the second crop inspection will be conducted approximately four weeks after first inspection unless required earlier and must be made pre-senescence.
32. Applicants must ensure the Potato Certification Officer has completed these inspections and collected all samples required, prior to top removal or crop spray off.
 33. At each crop inspection, an inspector must assess at least the minimum number of plants:
 - 500 plants per hectare; and
 - a minimum of 2000 plants per plot; or
 - if less than 2000 plants in the plot, all plants must be inspected.
 34. At the time of inspection crops must not exceed the listed permitted tolerances for diseases as outlined in Appendix 3.
 35. Crops submitted for inspection may be rejected at any stage of growth.
 36. Crops may be rejected if they show poor establishment, unthrifty plants, significant growth of weeds, severe hail or frost damage, severe damage caused by, or suspected to be caused by chemicals, or are too advanced for inspection.
 37. Self-sown plants are considered to be foreign plants regardless of variety.
 38. Roguing levels shall be at the discretion of the Certifying Authority. However, as a general guide, 1 per cent above the defined tolerance would be considered as the maximum roguing level achievable in a certified crop.
 39. All rogued material (tops and tubers) must be removed from the field and destroyed. In certain circumstances, PCOs may order destruction of foliage to avoid disease transmission to other plots on the same property or other properties.
 40. Where only a part of a crop is accepted as certifiable, then the rejected plants must be removed from the property before the harvest of the remaining crop.
 41. Potato Certification Officers may require plant samples to be collected and sent for laboratory testing for pathogens. These samples will be at the client's expense and results of these tests may be used as the basis for crop rejection.

Aphid control

42. If, at the time of inspection, any aphids (green peach aphid, *Myzus persicae* or potato aphid, *Macrosiphum euphorbiae*) are found in the crop, the grower will be advised that aphids are present. If aphid numbers are seen to be greater than five aphids on five petioles, the following action will be taken:
 - a sample of 100 randomly selected petioles will be examined for the presence of aphid colonies. A colony is defined as a leaf containing three or more aphids of which at least two are wingless



- if more than five colonies are found, the crop will either be rejected immediately, or the grower may choose to submit a sample to test for potato leaf roll virus (PLRV) and potato virus Y (PVY). If excessive aphids are found at the first inspection leaves may be sampled at the second inspection and tested for aphid transmitted viruses. If excessive aphids are found at the second inspection 300 tubers will be sampled at harvest and tested for PLRV and PVY.

Disease surveillance

43. All Generation 2 sown plots (G3 harvest) to be laboratory tested for Tomato spotted wilt virus, Potato leaf roll virus, Potato virus S, Potato virus X, and Potato virus Y by Enzyme-linked Immunosorbent Assay (ELISA) or Polymerase Chain Reaction (PCR).
 - a. Approximately 360 leaves will be tested for the five viruses per grower, with a minimum of 60 leaves tested per G2 sown plot, per grower.
 - b. Samples will generally be collected at second inspection unless requested by the applicant at the time of application for collection at first inspection.
 - c. Where virus levels are detected at the first inspection, and roguing is considered achievable, a second set of samples must be tested at the grower's expense to verify roguing has been successful.
44. Every production area submitted for certification under the Scheme will be subjected to PSTVd surveillance. 4 x 50 leaf samples will be collected under the control of the Certifying Authority and tested by PCR for the presence of PSTVd.

Grower requested crop and tuber testing

Growers may choose to request the collection of leaves or tubers for analysis to meet market requirements or internal quality assurance aims.

It is the responsibility of the grower to understand their market requirements.

Where possible, inspectors will accommodate sampling requests. In some cases, inspectors might oversee sampling activities undertaken by growers to meet such requests.

45. Grower initiated sampling of crops must be advised at application.
46. Growers will be responsible for the costs of sampling and analysis.

Field crop standards

47. Irrespective of the generation, crops will be rated from 1 to 3, according to the tolerances for foreign varieties, viruses, and other diseases (see Table 4).
48. Seed potatoes cannot receive a higher rating than as deemed at the previous certification. For example, a crop sown with seed with a rating of 2, cannot be upgraded to a rating of 1 for the subsequent generation.

Table 4 Summary of tolerances for diseases and foreign varieties (also see Appendix 3)

% of plants at inspection	Rating 1		Rating 2		Rating 3	
	1st	2nd	1st	2nd	1st	2nd
Foreign varieties	0.05	0.00	0.10	0.01	0.10	0.10
Virus diseases	0.10*	0.01*	0.25*	0.10*	1.00	1.00
Other diseases	0.25	0.10	0.50	0.25	2.00	2.00
Total diseased plants	0.25	0.10	0.50	0.25	2.00	2.00

* All rating 1 and 2 crops must be 0% for Potato virus Y (PVY)

49. Any seed having a field rating of 3 cannot be further multiplied for Certified seed.

50. The highest number rating in any category shall determine the overall rating for that crop (e.g. for a foreign variety rating of 1, virus rating of 2, and other diseases rating of 3, then the overall rating is 3). Crops exceeding tolerances for Rating 3 will be rejected.

Grading and packing

Seed potatoes intended for certification must be harvested, transported, graded, packed, and stored in such a way as to preserve their identity and limit cross contamination by diseases or varieties.

Seed graded on a harvester may be presented for inspection for certification if the tubers are practically free of soil. Paddock picked and hand-graded seed potatoes are only eligible for certification if approved by the Certifying Authority.

51. Packers/growers must contact the Certifying Authority before grading and packing, to request printing of seed labels and to schedule inspection for the seed lots to be certified. Five days' notice is required for the labels to be printed.

52. Labels must be attached to each container of seed intended for certification, at the time of grading and packing.

Tuber inspections

Tuber inspections are a means of determining whether seed tubers meet the certification standards set out in these rules.

Tuber inspections will be carried out by a Potato Certification Officer unless a quality assurance program is implemented by the grower and approved by the Certifying Authority and an Authorised Tuber Inspector (ATI) is accredited to undertake the inspection according to the terms of their authorisation.

53. The inspector will inspect unwashed tubers for diseases and defects by examining random samples from each lot of produce presented for inspection as per the tuber inspection work instruction SPW7-2a.

54. All tuber inspections for lots destined for international markets must be officially conducted by a Potato Certification Officer.
55. Tuber inspections must be undertaken for Certified seed that is to be sold, before leaving the property on which they were grown.
56. The grower and ATI's must notify the Certifying Authority three working days prior to the tubers requiring inspection, by completing and submitting a TADs form (Form 402 Appendix 6), for each seed lot to be inspected.
57. Tubers shall be assessed for diseases and defects. Irrespective of the generation assessed, seed shall be certified providing it does not exceed the maximum tolerance levels in Appendix 4.
58. At least 5% from each seed lot shall be cut and inspected for internal defects.
59. Tuber samples may be taken by the inspector for diagnostic disease testing in the laboratory, at the client's expense. Results from these laboratory tests may form the basis for seed lot rejection.
60. If the seed lot passes the tuber standards at the time of inspection, it will be approved for final certification. The tuber inspection result is valid for 28 days from the date of inspection.

Note: Tuber inspections are not required for seed lots to be retained by the seed grower for further multiplication as Certified seed. Inspection of retained seed by the grower is highly recommended to identify potential issues prior to planting.

Authorised tuber inspections

61. Authorised Tuber Inspectors (ATIs) must have undergone training and be current in their authorisation to conduct tuber inspections. ATI's are subject to audit by the Seed Potato Unit.
62. Authorised Tuber Inspectors are delegated the responsibility for all post-harvest quality control procedures leading to final certification of the seed in accordance with their ATI manual.
63. Authorised Tuber Inspectors may only inspect seed lots produced by their company and are still required to complete and submit a TADs form for each seed lot to be certified at the time of grading and packing.

ATI status cancellation

64. Where the SPCO receives enquiries of seed quality issues or evidence that ATIs may not be following approved processes, the SPCO will record the enquiry or concern and commence an investigation.

Reasons for an investigation may include:

- failure to notify the SPU of a tuber inspection being conducted
- not sending completed documents outlined in approved work instructions

- a registered complaint regarding seed quality from buyers of Certified seed
- any discrepancy in a Check Inspection deemed significant by the SPCO.

These investigations will be handled according to Rules 83 and 84.

Tuber sample size

Seed lots are often packed in 1250kg bulker bags, 500kg bins or 25kg bags, or occasionally as a bulk truck container. The number of samples to be inspected is proportional to total seed lot weight of all bags, bins, or containers.

A sample is defined as 100 tubers.

For bagged lots (i.e. 25kg bags) each sample of 100 tubers must be taken from separate and randomly selected bags.

To calculate the minimum number of tubers to be assessed, use the following formula:



For example: The minimum number of samples to be assessed is the total number of tonnes divided by five (e.g. 40 tonnes divided by five, equals eight samples or 800 tubers)

- The minimum number of samples is three
- The maximum required number of samples is 12
- An inspector may choose to assess more than 12 samples where they deem it necessary or where the percentage of faults are close to the tolerance
- For seed lots of two bags or less, the entire seed lots will be assessed

Tuber inspection standards

Tubers assessed during inspection must meet the tolerances set out in these rules to be considered Certified seed.

Three groups of diseases/defects are recognised for the purposes of tuber inspections:

- Group 1 Exotic quarantine diseases
- Group 2 Diseases and nematodes
- Group 3 Insect damage and defects.

A full list of tolerances for disease and defects are in Appendix 4.



Other general tuber specifications

65. Inspectors will also assess the following specifications during inspection:

- tubers are to be practically free of soil
- tubers must be of good characteristic shape for the cultivar
- the standard method of grading Certified seed potatoes is based on size dimensions using a square hole template. Unless agreed to between buyer and seller prior to delivery, seed shall be graded to a standard of 30mm to 75mm. If grading is to be by weight, then tubers will usually be graded within the limits of 35g to 175g
- the maximum total permitted tolerances for all diseases in Group one or two is 2 per cent unless negotiated items as below
- the level of silver scurf (*Helminthosporium solani*), black dot (*Colletotrichum coccodes*), undersized or oversized tubers may be negotiated between the buyer and the seller and documented, these will be included as defects.

Export seed potatoes must comply with the phytosanitary requirements of the Australian Department of Agriculture Fisheries and Forestry (DAFF) and those of the importing country.

Results and records for tuber inspection

66. Growers/packers must complete and submit a Seed Works Summary Sheet (Form 404 Appendix 7) for all seed lots they retain or sell.
67. Black/White (WWP) seed labels must be attached to all containers of retained seed at the time of grading and packing.
68. Growers/packers must submit a TADs form (Form 402 Appendix 6) for each seed lot sold at completion of grading and packing.

Finalising certification

Certified seed sold to other seed growers

Generations 1 to 4 can be transferred and/or traded between Certified seed growers and/or contracted producers for the purpose of further production of Certified seed. Such seed will have a field rating of 1 or 2, pass tuber inspection standards, be labelled with an official 'Black and White' label and be accompanied with a current TADs inspection form.

Certified seed sold to growers outside the seed scheme

Generations 1 to 5 can be sold and/or traded to growers and/or contract producers for the production of Registered seed, ware or processing potatoes. Such seed will have a field rating of 1, 2 or 3, will have met the tuber standards and be labelled with an official 'Red and White' label.



Results from laboratory testing

Laboratory testing may be undertaken in a number of circumstances:

- on samples collected by inspectors during routine inspections
- as part of an industry survey
- when requested by growers for market access
- through incident surveillance.

69. The results from any laboratory tests relating to certified crops or seed lots, may form the basis for rejection of certification where the results exceed the tolerances in these rules.

Labels

Growers are responsible for the safe storage and correct use of official labels. The use of official labels for other purposes than those intended may result in exclusion of the grower from the certification process.

For each seed lot that passes tuber inspection, official printed labels will be issued for attachment to each container. These labels can be attached either by the PCO or by the seed grower. In both cases, the labels are attached on the understanding that the seed grower guarantees the contents of the container to be produce of the crop which passed field inspection and complied at the time of inspection of the tubers with the standards prescribed for Certified seed potatoes.

Until the produce from a certified crop passes a tuber inspection and the container carries an official Certified seed label, the contents are not recognised as Certified seed.

When a lot of seed is rejected or is required to be re-graded, it is the grower/packer's responsibility to remove the previously attached official labels. Where lots are rejected, the labels must be returned to the Certifying Authority.

Domestic labels

70. All seed retained for further multiplication within the seed scheme must be labelled with a black and white label.

71. Labels and lettering will be of a standard size and design as determined by the Certifying Authority and will include the following basic details:

- seed grower
- state of origin
- seed lot code
- registered area number
- serial (label) number
- variety
- the approved Certifying Authority
- generation

- date harvested
- endorsement by the Certifying Authority
- definition of Certification, and grower's declaration

Export labels

72. Certified seed intended for export must be labelled with a red and white label. All official labels are serially numbered for traceability purposes.

73. Labels used for export seed will comply with Australian Department of Agriculture Fisheries and Forestry (DAFF) standards and will include the following details:

- EXPORT SEED Produce of Australia
- seed lot code
- variety
- generation
- registered area number
- serial (label) number
- month harvested
- month packed
- size range
- mass of container
- approved Certifying Authority
- endorsement by the Certifying Authority
- definition of Certification, and grower's declaration

Packing and transport of seed

Official certification labels must be securely attached to prevent loss during transport. Records must be kept of label numbers used for each seed lot and reported to the Seed Potato Unit on the Shed Summary together with TADs forms (Appendices 6 & 7).

74. Seed may only be packed and transported in new bags, bulk bags or appropriately cleaned bins.

75. Seed will not be recognised as Certified seed unless all containers are clearly labelled to maintain the identity and integrity of the seed as approved by the Certifying Authority.

76. A TADs form (Form 402 – Appendix 6) must accompany all Certified seed lots sold.

Storage of seed

It is important that seed generations be physically separated and that, wherever possible, bin covers be employed where bins are stacked to minimise contamination between upper and lower bins.

77. Seed potatoes must be separated from ware potatoes and stored under conditions which are suitable to maintain high seed health.

78. Each generation of seed must be separated, to prevent lines from being mixed or diseases being transferred.

79. All containers of Certified seed must be clearly identified to maintain the identity and integrity of the seed as approved by the Certifying Authority.

Certified seed which has been packed in bulk containers will be recognised only if the integrity of the lot can be verified.

Seed that has been repacked will not be recognised as Certified seed unless such packing maintains the identity and integrity of the seed as approved by the Certifying Authority.

Records

80. Detailed records must be kept and made available to the Certifying Authority as required. The produce may not be accepted for certification if accurate records are not maintained. These include such details as, source of seed and proof of purchase, variety, time of planting, paddock history, fertiliser and chemical applications, and harvest date.

Hygiene management and biosecurity measures

81. Seed growers and Potato Certification Officers must ensure that a level of hygiene is adopted which will facilitate the production of high-quality Certified seed. As a guide:

- access to seed crops should be limited to personnel authorised by the grower
- all operations to be performed on seed crops of different generations should be undertaken such that work commences on the crop of the highest health status (i.e. G2 before G4 or from apparently healthy G4 before G4 with poor emergence). Personnel and machinery should never move from a crop of lower status to a crop of higher status without hygiene precautions being implemented
- travelling irrigators should be avoided where they would pass from seed crops sown with G3, G4, or G5 seed to seed crops sown with G1 or G2 seed, unless sufficient unplanted area (see Isolation requirements) is left for the irrigator to pass through without contact by wheels or hoses
- the packing shed should have a concrete floor
- lighting over the grading table should be sufficient to enable accurate assessment of tubers
- agricultural chemicals and produce are not to be stored in the same area as Certified seed potatoes
- sprout suppressants are not to be used or stored in or near the potato grading or storage areas
- the shed surrounds are to be kept tidy, free of rubbish and weeds



- soil and crop debris is not allowed to accumulate in sheds. Waste potatoes, soil and crop debris are to be regularly removed from the shed and surrounding areas and disposed of in a dedicated pit or waste disposal facility
- waste should not be returned to potato paddocks used to produce Certified seed
- all containers used for storage (e.g. bins) of seed should be washed and disinfected between seasons, or more frequently as required
- machinery should be cleaned with a hospital grade disinfectant (approved sterilant) as required
- a designated area should be provided for cleaning and disinfection of machinery and equipment
- packing sheds and machinery should be thoroughly cleaned between seasons.
- biosecurity best practises should be implemented to minimise pest and disease spread onto seed properties. The WA Potato Growers Biosecurity Manual is available at the [WA Potatoes website](#).

Reporting suspected exotic pests

Biosecurity is a shared responsibility. Any growers, packers, Authorised Tuber Inspectors or Potato Certification Officers must report suspected exotic pests immediately.

Potato Certification Officers will follow internal DPIRD procedures in relation to suspected exotic pests or diseases detected in the course of their work.



Significant crop failure

82. Growers will be required to provide evidence of the destination of potatoes from substantial areas of crop that has been rejected from certification. Required documentation to substantiate approved disposal includes:

- record of sales with documentary evidence from the purchaser detailing variety and tonnage
 - fresh market
 - processing
 - export
- crop maps that include GPS data

Rejected seed that is to be dumped or fed to stock must be done under supervision by the Certifying Authority (at the grower's cost).

Failure to observe requirements of the WA Certified Seed Potato Rules

83. The Certifying Authority will investigate issues where there is concern around non-compliance with these rules and will determine an appropriate course of action.

84. A grower, packer or Authorised Tuber Inspector who is suspected of failing to observe the requirements of these scheme rules must provide to the Certifying Authority an entire set of documentation including the following:

- seed works summary sheets (Appendix 7) for the total seed production for the current season including seed sold and kept for own use.
- a summary of all non-seed production and sales with documentary evidence from the purchaser detailing variety and tonnage:
 - fresh market
 - processing
 - export
- all TADs forms or Product Description Forms for all seed sold
- crop maps that include GPS data.

Failure to comply in providing this documentation to the satisfaction of the Certifying Authority, or where evidence is found of non-compliance, may result in the Certifying Authority suspending any authorised tuber inspection activities, ceasing any further processing of applications for the production of seed potatoes, withdrawal of official labels and cancellation of tuber inspections.



Growers, packers or Authorised Tuber Inspectors who fail to observe the requirements of the National Standard governing the production of seed potatoes or, who act in any way against the successful implementation of the standard, may be excluded from the scheme.

Growers whose crops fail to meet the required standards for certification either partly, or wholly, in two successive years may also be excluded from the scheme.



Appendices

Appendix 1. Definition of terms

Accreditation

Accreditation means the official process in which laboratories are approved by the Certification Authority to produce planting material for further multiplication.

Accredited laboratory

Accredited laboratory means a laboratory approved by the Certification Authority to produce minitubers, microtubers and plantlets for further multiplication.

Authorised Tuber Inspector (ATI)

Authorised Tuber Inspector (ATI) is an employee of a seed grader who has been trained, assessed and accredited by the Department of Primary Industries and Regional Development to inspect seed potato lots for compliance with tuber inspection standards outlined in these rules.

Certification

'Certification' is the grower's warranty that the seed potatoes have been produced and visually inspected in accordance with the National Standard for Certification of Seed Potatoes, and that it conforms to the genetic, pest and disease, and physical tolerances prescribed by that Standard.

Certifying Authority

Certifying Authority means a recognised organisation responsible for the implementation of the National Standard through official seed potato certification schemes. Currently these are: Department of Primary Industries and Regional Development (WA), AuSPICA (Victoria), TasSeed (Tasmania) and the Crookwell Potato Association Inc. (NSW).

DDLs Seed Testing and Certification

The DPIRD Diagnostic and Laboratory Services (DDLs) is a business unit inside the Department of Primary Industries and Regional Development. DDLs Seed Testing and Certification is the project responsible for the administration of the WA seed potato schemes.

Defect

Defect means a non-infectious tuber abnormality caused by such things as insects, mechanical damage, or other factors causing abnormal features.

Disease

Disease means a condition caused by an infectious agent such as a fungus, bacterium, nematode or virus.



Disease/defect tolerances

Disease/defect tolerances means the maximum permitted incidence of disease, or plant defect present in either the growing crop, or on harvested tubers, to meet a defined quality standard.

Exceptional circumstances

Exceptional circumstances in the context of these rules means the loss of a seed source due to circumstances beyond the reasonable control of the applicant. Such causes include flooding, fire, significant virus or disease impact. Assessment of exceptional circumstances will require the provision of suitable supporting evidence.

Field rating

The assessment of the health and varietal purity of the growing crop at the time of inspection by the Certifying Authority.

In vitro

In vitro means potatoes grown in tissue culture in the laboratory.

Label

The official certification tag attached to each unit of Certified seed.

Other crop

Other crop means any potato crop sown with seed potatoes sourced with a certified or registered class and not for multiplication within the Certified seed scheme.

Pathogen

Pathogen means a disease-causing agent (e.g. fungus, bacterium, nematode, virus).

Pathogen-tested

Pathogen-tested means tested for and found to be free of disease-causing agents as listed.

Plot

A crop sown with a unique seed source, on land with a common history through the rotational period specified and sown within a 10 day period.

Potato Certification Officer (PCO)

Potato Certification Officer (PCO) is the term for an officer employed by the Department of Primary Industries and Regional Development to conduct inspections and activities under the WA Certified Seed Potato Scheme.



Production area

A production area is defined as an area on a property designated for seed potato production of Certified seed potatoes. The area may be a pivot, a paddock or a group of paddocks on the same property where the distance between the paddocks is less than 2km. Close paddocks separated significantly by planting date may be treated as more than one production area. Therefore, each property where Certified seed is produced will have a minimum of one production area but may have more than one.

Quality assurance

The systematic control of quality factors of a product through the whole production process to ensure that it meets market specifications. It applies to the growing, harvesting, grading, packing, transporting, and marketing of Certified seed potatoes to satisfy the needs of the customer.

Scheme

Scheme means the Western Australian Seed Potato Certification Scheme which is an industry cooperative scheme using the Australian National Standard for the Certification of Seed Potatoes (National Standard) as a minimum. The Rules outlined in this document and associated operational procedures form the basis for implementation of the scheme.

Seed crop

Seed crop means a potato crop intended for further seed multiplication and sown with eligible G0 – G4 Certified seed. Seed crops must be entered for inspection within the Certified or Registered seed schemes.

Tuber inspection

The assessment of the health/defects of harvested seed potato tubers, by the Certifying Authority.

Appendix 2. WA Freedom from Potato Cyst Nematode (PCN)

Phytosanitary measures to maintain potato cyst nematode freedom

Regulations

Globodera rostochiensis, potato cyst nematode is declared as a Prohibited Organism under Section 12 of the Biosecurity and Agriculture Management Act 2007 (BAM Act).

Entry to WA of prescribed potential carriers of PCN is not allowed unless in accordance with published import requirements or in accordance with an Import Permit issued under r.72 of the Biosecurity and Agriculture Management Regulations 2013.

Seed potatoes may enter WA where certified as produced under the Tasmanian Certified Seed potato scheme or mini tubers produced by accredited production facilities under the AuSPICA scheme.

Extension advice to producers

Information relating to PCN symptoms are available on the Department of Primary Industries and Regional Development website at: agric.wa.gov.au/potatoes/potato-cyst-nematode-western-australia

Information advising growers on appropriate farm biosecurity measures to prevent the introduction of pests, diseases and weeds onto their property is contained in the WA Potato Growers Biosecurity Manual. The Manual is available at the [WA Potatoes website](#).

Checks to verify potato cyst nematode (PCN) freedom is maintained

In line with Standard ISPM 8 of the International Plant Protection Convention the following checks to verify Area Freedom of PCN are carried out:

- ad hoc inspection and testing of exported consignments
- seed potato crops undergo two field inspections. The second inspection is in the later growing period when symptoms of PCN infestation can be seen by trained inspectors
- inspectors may sample and submit for analysis, plant material and soil from any symptomatic plants of concern
- PCN is a declared pest and any detection must be reported to DPIRD Plant Biosecurity.

Appendix 3. Field inspection tolerances for disease at final inspection

Zero tolerance diseases

Potato disease	Causal organism
Bacterial wilt	<i>Ralstonia solanacearum</i>
BCTV	Beet curly top virus
Late blight A2 mating strain	<i>Phytophthora infestans</i>
Phoma leaf spot	<i>Phoma andina</i>
Potato cyst nematode	<i>Globodera rostochiensis</i> and <i>Globodera pallida</i>
Potato wart	<i>Synchytrium endobioticum</i>
PMTV	Potato mop top virus
PSTVd	Potato spindle tuber viroid (PSTVd)
PVM	Potato virus M
PVS (Andean strain only)	Potato virus S (Andean strain only)
PVV	Potato virus V
PVY ^N and PVY ^{NTN}	Potato virus Y necrotic strains (PVY ^N and PVY ^{NTN})
Ring rot	<i>Clavibacter michiganensis</i> subsp. <i>sepedonicus</i>
Skin spot	<i>Polyscytalum pustulans</i>
Smut	<i>Angiosorus solani</i>
Tobacco rattle	Tobacco rattle virus

This list of zero tolerance diseases will by necessity have to change if the status of any diseases on the list changes.

Fungal and bacterial diseases

Potato disease	Causal organism	Final inspection rating		
		R1	R2	R3
Fungal diseases				
Fusarium wilt	<i>Fusarium</i> sp.	0.1%	0.25%	2%
Verticillium wilt	<i>Verticillium dahliae/albo-atrum</i>	0.1%	0.25%	2%
Bacterial diseases				
Blackleg	<i>Pectobacterium</i> spp.	0.1%	0.25%	2.0%
Blackleg	<i>Dickeya</i> spp.	0.0%	0.0%	1.0%
Vine rot	<i>Pectobacterium</i> spp.	0.1%	0.25%	2.0%
Vine rot	<i>Dickeya</i> spp.	0.0%	0.0%	1.0%
Total fungal and bacterial diseases*		0.1%	0.25%	2.0%

* Fungal and bacterial diseases are treated in the same category and have a maximum allowable tolerance.

Notable fungal and bacterial diseases

Notable diseases will be recorded on field inspection records. They will not necessarily result in crop rejection or downgrading. These diseases are assessed at tuber inspection.

The Certifying Authority reserves the right to reject the paddock based on poor crop performance because of these diseases.

Notable disease		Noted at	Assessed at
Fungal diseases			
Rhizoctonia	<i>Rhizoctonia solani</i>	Field inspection	Tuber inspection
Pink rot	<i>Phytophthora erythroseptica</i>	Field inspection	Tuber inspection
Leak	<i>Phythium</i> sp.	Field inspection	Tuber inspection
Sclerotinia	<i>Sclerotinia sclerotiorum</i>	Field inspection	Tuber inspection
Target spot	<i>Alternaria solani</i>	Field inspection	Tuber inspection
Bacterial diseases			
Common scab	<i>Streptomyces scabies</i>	Field inspection	Tuber inspection

Virus disease tolerances

If virus diseases are noted in the field, the results may be confirmed by laboratory testing.

Note that laboratory testing on a 300-leaf sample, has a detection limit of 0.34%.

Potato virus disease	Final inspection rating		
	R1	R2	R3
Potato leafroll virus (PLRV)	0.01%	0.1%	1.0%
Potato virus S (PVS) ¹	0%	0%	1.0%
Potato virus X (PVX)	0%	0%	1.0%
Potato virus Y (PVY ⁰) ²	0%	0%	1.0%
Purple top wilt	0.01%	0.1%	1.0%
Tobacco mosaic virus	0.01%	0.1%	1.0%
Tomato spotted wilt virus	0.01%	0.1%	1.0%
Total virus diseases	0.01%	0.1%	1.0%
Total diseased plants	0.1%	0.25%	2.0%

Insect pests

If the following pests are detected in the paddock, sampling and laboratory testing may be carried out at the discretion of the inspector.

Insect	Causal organism	Noted at
Aphids	<i>Myzus persicae</i> , etc.	Field inspection
Thrips	<i>Thrips tabaci</i> , etc.	Field inspection
Leaf hoppers	Various	Field inspection

¹ Detections of PVS will be sequenced to determine strain identity

² Detections of PVY will be sequenced to determine strain identity

Appendix 4. Tuber inspection pest and disease tolerances

Three groups of diseases/defects are recognised for the purposes of tuber inspections:

- Group 1 Zero tolerance pests and diseases
- Group 2 Tuber diseases and nematodes
- Group 3 Insect damage and defects

Group 1. Zero tolerance pests and diseases

Zero tolerance will apply to the following diseases:

- Bacterial wilt (*Ralstonia solanacearum*)
- Late blight (*Phytophthora infestans*)
- Potato cyst nematode (*Globodera rostochiensis* or *G. pallida*)
- Potato spindle tuber viroid (PSTVd)

The discovery of these diseases, or any exotic quarantine disease, automatically rejects the crop for certification.

Group 2. Tuber diseases and nematodes

Tolerances are based on the sample as inspected. Assessment of Group 2 diseases by visual inspection of unwashed tubers.

Fungal or bacterial disease or nematode		% by tuber count	Style accepted ³
Fusarium dry rot	<i>Fusarium</i> sp.	2.0%	
Gangrene dry rot	<i>Phoma exigua</i> var. <i>foveate</i>	2.0%	
Late blight	<i>Phytophthora infestans</i>	2.0%	
Pink rot	<i>Phytophthora</i> sp.	0.25%	
Rhizoctonia	<i>Rhizoctonia solani</i>	2.0%	
Powdery scab	<i>Spongospora subterranean</i>	2.0%	
Silver scurf	<i>Helminthosporium</i> sp.	4	
Black dot	<i>Colletotrichum</i> sp.	4	
Soft rots	<i>Pectobacterium</i> spp. and <i>Dickeya</i> spp.	0.25%	
Common scab	<i>Streptomyces</i> sp.	2.0%	
Root-knot nematode	<i>Meloidogyne</i> sp.	2.0%	A

³ Where assessment refers to a style accepted, this relates to Styles A to C in the publication 'Product Description Language for Potatoes' (ISBN 0 7311 4357 4).

⁴ Tolerance for these diseases may be negotiated between the seed grower and seed buyer. The tolerance should relate to the number of tubers in the sample, with levels of the disease present as per the style guide in the publication 'Product Description Language for Potatoes' (ISBN 0 7311 4357 4).

Group 3. Insect damage and defects

Tolerances are based on the sample as inspected. Assessment of Group 3 defects by visual inspection of unwashed tubers.

85. Tubers shall be practically free of soil. Tubers with sprouts in excess of 20mm length are not eligible for certification.

Defect	% by tuber count	Defect Style ⁵
Insect damage	2.0% ⁶	
Potato tuber moth	1.5%	
Malformed, growth cracks, root constriction	2.0%	B
Mechanical damage — shatter, splitting, cuts, cracks, bruise (damage >3mm deep)	2.0%	B
Stem end browning (cut 5% of inspected tubers for internal defects)	2.0%	B
Miscellaneous (e.g. sunburn, sprouting shrivelling)	1.0%	C
Foreign cultivars	0%	
Oversize	1.0% ⁷	
Undersize	2.0% ⁷	
Hollow heart	2.0%	C
Soil		A
Black heart	0%	
Maximum tolerance for all defects in Group 3	2.0%	

⁵ Where assessment refers to a defect style, this refers to Styles A to C in the publication 'Product Description Language for Potatoes' (ISBN 0 7311 4357 4) and is the style at which a tuber is considered as a fault.

⁶ An additional 2% of tubers may show minimal insect feeding damage (i.e. where these tubers have no more than two feeding holes per tuber, not more than 3mm deep, containing no soil, damaged skin is healed, and tuber eyes are not damaged from black beetle).

⁷ The tolerance for these defects may be negotiated between seed grower and seed buyer.



Appendix 6. Form 402 Delivery note (TADs Form)



TADs Form

Serial Number

Part 1. Applicant Details

Name:
 Export Establishment Registration Number:
 Postal Address:
 Telephone:
 Email:
 Signature: Date:

Part 2. Seed source declaration

Note: To be completed and signed by the Owner/Exporter of the seed.
 I declare that the seed described on this form was harvested in compliance with Seed Certificated/Registered Rules for the Registered Area Number indicated.

Name:
 Telephone:
 Email:
 Signature: Date:
 TADs No: TADs Dated:

Part 3. Seed grader's declaration

(Where the tubers are graded by a third party)
 I declare that the seed described on this form was processed from seed delivered by the Grower as described above.

Name:
 Telephone:
 Email:
 Signature: Date:

Certified Quality Assurance Officer Y N

Part 4. Carrier Declaration

Name:
 Signature: Date:

Transport type (Circle) Refrigerated / Bulk / Taut liner / Taped

Part 5. Inspection details

DPIRD PCO Authorised Tuber Inspector

Name:
 Signature: Date:

1st copy (white) - grower/packer 2nd copy (white) - DDLS - SPU
 3rd copy (yellow) - buyer 4th copy (blue) - retain for audit

Seed lot details			Seed lot 1	Seed lot 2	Seed lot 3			
Registered Area Number								
Variety								
Generation								
Destination								
Irigated or dryland								
Harvest date								
Crop rating								
Chemical (i.e. fungicide)								
Seed lot code								
Packing date								
Tuber size (mm or grams)								
Container type (i.e. bag, bin, bulk bin)								
Number of containers								
Mass of container								
Total mass								
Label colour								
Label numbers		to		to				
		to		to				
Tubers Cut	Y / N							
Defects	Defect Style	Max % tolerance	Numbers found	% found	Numbers found	% found	Numbers found	% found
1. Soft rot (<i>Pectobacterium</i>)		0.25%						
2. Dry rot (<i>Fusarium sp.</i> , <i>Phoma sp.</i>)		2%						
3. Pink rot (<i>Phytophthora erythroseptica</i>)		0.25%						
4. Eelworm (<i>Meloidogyne spp.</i>)	A	2%						
5. Powdery scab (<i>Spongospora subterranea</i>)		2%						
6. Common scab (<i>Streptomyces scabies</i>)		2%						
Total of faults 1 - 6		2%						
7. Insect, bird and rodent damage **		2%						
8. Potato tuber moth (<i>Phthorimaea operculella</i>)		1.5%						
9. Malformed, growth cracks, root constriction	B	2%						
10. Mechanical damage - shatter, splitting, cuts, cracks, bruise (damage >3mm deep)	B	2%						
11. Foreign cultivars		0%						
12. Oversize *		1%						
13. Undersize *		2%						
14. Miscellaneous (e.g. sunburn, sprouting, shrivelling)	C	2%						
15. Soil adhesion	A							
16. Stem end browning (cut 5% of inspected tubers for internal defects)	B	2%						
17. Hollow heart	C	2%						
18. Black heart		0%						
19. Black scurf (<i>Rhizoctonia solani</i>) *		2%						
Total of faults 7 - 19		2%						
Number of tubers assessed								
PASS / FAIL								

* The tolerances for *Rhizoctonia* and size may be negotiated between the seed grower and seed buyer. **An additional 2% of tubers may show minimal insect feeding damage (i.e. where these tubers have no more than two feeding holes/tuber, not more than 3mm deep, containing no soil, damaged skin is healed, and tuber eyes are not damaged).

Tuber inspection valid for a period of 28 days from the date of inspection.

