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COLORADO RULES AND REGULATIONS FOR CERTIFICATION OF SEED POTATOES

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DEFINITION OF TERMS AS USED IN THESE STANDARDS

1. Potato Certification Service (PCS), Colorado State University, Fort Collins. A cooperative program of seed improvement and inspection carried on by Colorado State University and the Colorado Certified Potato Growers' Association, Inc. (CCPGA).
2. Certified Seed means that the potatoes were inspected while growing in the field and again after being harvested and were thereafter duly certified by PCS as provided in the Rules and Regulations approved by the Board of Governors of the CSU System..
3. Class refers to the status of any given seed lot (A, B, C, D) in regards to its disease content. Refer to page 14 for disease tolerances per class designation.
4. Seed refers to the vegetatively propagated tuber used for reproduction of the potato rather than true seed that is sexually produced from the potato flowers.
5. Limited Generation Seed refers to seed potatoes produced to meet the respective special requirements outlined in the Limited Generation System regulations.
6. Experimental Seed refers to those seed potatoes produced to meet the respective special requirements outlined in the Experimental Seed regulations.
7. Lot refers to a field, or the potatoes harvested therefrom.
8. Official State Tag means the tag carrying the official seal of the Board of Governors of the CSU System., cultivar, grower and address, seed class, generation level, lot number and year of production, which must be attached to seed represented to be "Colorado Certified Seed".
9. Bulk Certificate is an official document issued by PCS to verify the certified status of a specified quantity of Colorado Certified Seed potatoes which are shipped bulk.
10. Waiver of Grade Inspection - A statement which may be part of a sales contract or on a separate form wherein the buyer agrees to accept grade without official inspection.
11. Disease tolerance - Certification rules make provisions to allow the presence of certain diseases at levels sufficiently low as to preclude significant effect on seed value. In case of bacterial ring rot, there is zero tolerance, and the discovery of a single ring rot infected plant in the field, or tuber in the bin, brings about rejection of the lot from certification. Conversely, the lack of discovery of bacterial ring rot in any given seed lot does not necessarily mean the seed is free from the disease.
12. U.S. Standards for Seed Potatoes is understood to be grades of potatoes as defined and issued by the U.S. Department of Agriculture.
13. Inspector is a qualified person, approved by the Potato Certification Service as being capable of conducting field, cellar, grade, and post harvest test plot inspections.
14. Rejected when applied to a field or lot of potatoes means that the potatoes fail to meet the standards covering Generation, Non-Generation Certified or Experimental seed potatoes, and cannot be sold as such without being guilty of violation of the Seed Certification Law.

DEFINITION OF TERMS AS USED IN THESE STANDARDS

15. Withdrawn when applied to a field or lot of potatoes means that a grower has voluntarily removed this seed from certification. The field or lot is no longer eligible or qualifies as certified seed. The reason for withdrawing the field or lot will be noted on the official PCS field inspection report.
16. Roguing means the removal of all diseased or undesirable plants or tuber-units, and potatoes produced thereon.
17. Tuber-Unit Planting is a method of dropping two or more seed pieces from one tuber consecutively in a row. Tuber-Unit Field is a field: a) that is planted by tuber-unit method, and b) from which entire units are rogued if any plant in a unit is found to have virus disease.
18. Mass or Straight Planting - as opposed to tuber-unit planting. May refer to whole or cut seed planted in a conventional manner.
19. Field isolation is the physical separation between field plantings to minimize accidental mixing of tubers, transmission of virus diseases and contamination by certain bacterial diseases.
20. Storage isolation is the physical separation between seed lots in storage to prevent the accidental mixing of different lots or cultivars and minimize the tuber-to-tuber spread of disease.
21. Soft rot or wet breakdown means any soft, mushy, or leaky condition of the tissue.
22. Internal discoloration means any type of necrosis, stem-end browning, internal brown spot or other similar types of discoloration not visible externally, except blackheart.
23. Farming Operation - A seed potato enterprise that includes all land, equipment, storage facilities, and labor that are utilized in a common effort to produce certified seed potatoes. This includes all potato fields in the enterprise whether actually grown by the applicant or under growing agreements with common equipment and storages.
24. U.S. Plant Variety Protection Act - refers to the federal law administered by the USDA which outlines the regulations and rules of practice for protecting sexually reproduced or tuber propagated plant varieties.
25. Zero tolerance means none found during visual inspection. Certification of a lot, however, is not a guarantee that the lot inspected is free from any “zero tolerance” disease or pest. When a “zero tolerance” disease or pest is confirmed, the lot will be rejected from certification.
26. Grower - The applicant or owner paying the fees for certification of qualifying seed potatoes represented on a given farming operation.

CHARGES TO COVER THE COST OF THE CERTIFICATION PROGRAM

A. Acreage Fees: \$24.00 per acre, Generations 1-5 (\$22.00 for certification fees, \$2.00 for CCPGA membership fees) and \$16.00 per acre, Generation 6 (\$14.00 for certification fees, \$2.00 for CCPGA membership fees). If acreage fees do not meet 65% of the approved budget, an additional per acre charge will be billed in June to meet this funding level.

1. Minimum charge to any grower; \$100.00 for 6 acres or less. Future Farmers of America and 4-H members; minimum charge of \$3.00 for 3 acres or less.
2. Payment of acreage fees entitles the applicant to a one-year membership in the Colorado Certified Potato Growers' Association, Inc.
3. Acreage entered may be voluntarily withdrawn at any time.
4. There are special fees for growers participating in the grower entry program. Please see page 16 for further information.

CHECK OR MONEY ORDER, PAYABLE TO THE COLORADO CERTIFIED POTATO GROWERS' ASSOCIATION, INC., MUST ACCOMPANY THE APPLICATION FOR CERTIFICATION.

B. Tag and Bulk Certificate Fees:

1. Tag Fees: \$0.08 per tag. A tag is required on each sack of certified seed. All unused tags must be returned to the Potato Certification Office.
2. Bulk Certificates: \$0.08 per hundred weight (cwt). Bulk certificates are due at the end of the month in which they were written. New bulk certificates will not be issued to any grower who is not current on his/her bulk certificate submittals (growers who generate their own bulk certificates will need to stay current on their submittals, or risk losing this privilege).

C. Disease Testing Fees:

1. A complete listing of disease testing fees is included in General Requirements on page 10.

D. Billing Policy

1. All charges for tags, bulk certificates, laboratory services and plant materials will be billed on a monthly basis.
2. All checks or money orders must be made payable to the Colorado Certified Potato Growers' Association, Inc.

Mail or phone application, tag or bulk certificate orders to:

**Potato Certification Service
San Luis Valley Research Center
0249 East Rd. 9 North
Center, CO 81125
Phone (719) 754-3496
FAX (719) 754-2619
email: slvctr@coop.ext.colostate.edu**

GENERAL REQUIREMENTS WHICH APPLY TO ALL CERTIFIED SEED POTATOES

1. Application plus payment of fees for certification must be made on or before June 1st. Applications received after June 1st will be brought before the CCPGA board for review and discussion. Late applications will be accepted at the discretion of PCS. All growers will be assigned a permanent grower identification number upon submitting an application for Certification.
2. Each lot of seed potatoes entered for certification shall be identified as Limited Generation, Non-Generation Certified or Experimental. Experimental seed must be accompanied by written authorization from the potato breeding program from which the numbered potato selections originate (germplasm release notice). Each seed lot must meet all General Requirements and applicable Special Requirements mentioned herein.

**ANY SEED LOT BROUGHT INTO THE COLORADO LIMITED GENERATION SYSTEM FROM
OUT-OF-STATE WILL HAVE ITS ENTRY LEVEL DETERMINED BY THE
POTATO CERTIFICATION SERVICE**

- Any grower wishing to certify privately owned cultivars or cultivars under PVP status, must provide to PCS written documentation, stating that the grower has permission to grow that cultivar. In addition, greenhouses or labs must provide evidence that privately owned or PVP status cultivars have undergone all appropriate testing from from an accepted lab. It is the responsibility of the grower to provide PCS with descriptions and uses of cultivars that are not currently found in the PCS database.
3. **Any disease or other condition seriously affecting seed quality, and its ability to sprout and grow normally that is not mentioned herein, may be cause for rejecting a lot entered for certification.**
 4. **Any lot of seed may be rejected at any time such lot is found not to meet the Certification standards.** When non-PCS personnel or the seed potato grower discover a zero tolerance disease or pest during any phase of certified seed potato production, PCS will be notified by the seed potato grower so that follow-up inspections and final diagnosis can be made in a timely fashion. Roguing or disposing of infected plants and/or tubers prior to PCS notification and examination will not be allowed under any circumstance and may be cause for rejection of the lot for certification.
 5. All potato fields on the farm or in the farming operation must be eligible, that is, have met the minimum standards for certification either in Colorado's program or another official certification program, and be entered for certification. A farming operation means a seed potato enterprise that includes all land, equipment, storage facilities, and labor that are utilized in a common effort to produce certified seed potatoes. This includes all potato fields in the enterprise whether actually grown by the applicant or under growing agreements with common equipment and storage units.
 6. Any CCPGA member intentionally removing or killing the vines of a seed field or lot prematurely (prior to final inspection) and without PCS approval will be subject to a hearing by the CCPGA Board of Directors and PCS. The judgement on how to handle the field or lot in question will be rendered by PCS on a case by case basis, and may include adjusting the status of the farming operation to grower entry for the current year.
 7. If a member of the Colorado Certified Potato Growers' Association, Inc. violates the Rules and Regulations for Certification of Seed Potatoes in Colorado, or engages or persists in practices which in the judgment of the CCPGA Board of Directors are likely to injure or discredit the Association, the member may be suspended or expelled from membership by action of the Board at any regularly scheduled or special Board meeting. A two-thirds vote of the full voting membership of the Board shall be necessary for suspension of membership and a unanimous vote of the Board necessary for expulsion from the Association.

8. All certified seed successfully passing field inspection and eligible for sale will be listed in an annual directory published by PCS. Owners or representatives of private cultivars will be given the option to delist their seed stocks, but must notify PCS prior to publication of the directory each year.
9. Follow the recommendations and guidelines of Colorado State University for appropriate and accepted seed potato production (refer also to Appendix I).

10. ISOLATION

- a. All potato fields entered for certification must be adequately isolated by a minimum of 60 feet from adjacent fields not entered for certification or lots rejected for serious seed-borne diseases during the current season. Potato fields entered for certification not meeting isolation requirements will be reduced in acreage accordingly.
- b. Each lot of seed potatoes in storage must be physically separated from other potatoes to prevent mixture or contamination. Mixing of lots from different farming operations within a storage unit will not be allowed unless previously approved by PCS and appropriate separation is maintained.
- c. Each lot of certified seed potatoes must be kept in a storage building that contains only potatoes approved by PCS. Potatoes from seed lots rejected for certification due to bacterial ring rot will not be allowed under any circumstances.

11. SACKS

- a. New sacks must be used if seed potatoes are harvested and/or stored in sacks.
- b. New sacks must be used for the marketing of seed potatoes unless they are shipped in bulk.
- c. Mini-bulk bags (20-25 cwt/bag) are considered a bulk conveyance.

12. TAGS, BULK CERTIFICATES, SEALS

- a. No potatoes are recognized as officially certified unless properly tagged or identified with a bulk certificate. Illegal use of tags or bulk certificates will be prosecuted.
- b. Tags or bulk certificates will be issued only to the applicant or his agent. **NO MUTILATION OF TAGS OR BULK CERTIFICATES, BY WRITING OR MARKING OVER, OR OTHERWISE ALTERING ORIGINAL INFORMATION PRINTED THEREON, WILL BE PERMITTED.** The responsibility of proper use of tags and bulk certificates is placed on the person (CCPGA member) to whom such articles have been issued.
- c. A metal seal shall be placed on the conveyance doors of bulk shipment containers identified by a bulk certificate.
- d. Special permission may be granted by the CCPGA Board of Directors to imprint a duplicate image of an official Colorado Certified Tag on a small plastic bag (3 lbs. to 10 lbs.) to be used for marketing small quantities of certified seed potatoes. The art work layout must be approved by PCS prior to printing. Information normally printed on the Colorado seed tag (i.e., seed grower's name, cultivar, crop year, seed class, field generation, lot number, and maximum tuber size) will be printed on the bag in order that the reader can readily identify the seed source. One completed copy of a bag bearing all of the above mentioned information related to a given shipment must be filed with PCS. All such shipments must comply with designated grade inspection requirements. A bulk certificate will accompany each load.

13. GRADES AND GRADE INSPECTION

- a. All Certified Seed Potatoes must be graded to conform with the Colorado standard grades and sizes for seed potatoes unless a signed waiver of grade inspection has been obtained from the purchaser as outlined in Section 13-d-e-h.
- b. All seed potatoes must be shipped under tags or bulk certificates that represent the grade to which they have been sorted. Potatoes failing to meet the grade specified on the tag or bulk certificate will be; (1) resorted to meet the grade requirements, (2) re-tagged with new tags or re-issued a new bulk certificate representative of the grade of the potatoes, or (3) the tags must be removed.
- c. All shipments out of any Marketing Order Area must be inspected by a Federal/State Inspector at the time of shipment. The Federal/State Inspection Service is responsible for inspecting seed shipments to verify that proper grade standards have been met. If a "zero tolerance" disease such as bacterial ring rot or root knot nematode is suspected or any other condition which may disqualify a seed lot from certification is discovered during the inspection, PCS will be notified by the seed grower and suspect tubers submitted to PCS so additional procedures can be implemented to identify and confirm the true nature of the problem. Upon confirmation of a "zero tolerance" disease or pest, the remaining portion of the affected lot will be rejected from certification and it will be the responsibility of the seed grower to notify all recipients of the previous shipments of the lot of the finding of a "zero tolerance" disease or pest.
- d. Seed cut prior to shipment out of any Marketing Order Area must be accompanied by a signed cut seed disclaimer and waiver, and an official tag or bulk certificate indicating that the seed potatoes are "CUT SEED".
- e. Each lot sold within the Marketing Order Area shall be inspected by a Federal/State Inspector or a waiver of grade inspection must be secured from the purchaser at the time of delivery or acceptance.
- f. All Certified Seed Potatoes marketed in bags and carrying a tag must meet the highest grade requirements indicated by either the bag or the colored tag. U.S. No. 1 Seed Grade is not strictly a U.S. No. 1 grade, and may not be marketed in bags branded as U.S. No. 1.
- g. All Certified Seed Potatoes exported outside of the U.S. shall meet the U.S. EXPORT "SEED POTATOES" standards for the given generation and/or class being shipped.
- h. Certified Seed Potatoes marketed expressly for use as garden seed and shipped in quantities less than 10 cwt per cultivar or clone within the same load shall be exempt from Federal/State grade inspection. However, a certificate of privilege shall be obtained from the Marketing Order (Colorado Potato Administrative Committee - Area II) verifying the load's use as garden seed and the quantity shipped, and a waiver of grade inspection must be secured from the purchaser at the time of delivery or acceptance.

14. FIELD AND STORAGE INSPECTIONS

- a. Each field entered for certification shall receive at least two inspections. A third inspection may be made if growing conditions permit. Three or more inspections may be made on any field at the discretion of the inspector. PCS shall be responsible for determining when the final field inspection shall be conducted based upon experience, cultivar characteristics, and annual disease plot information. Each inspection shall consist of a visual examination of the growing plants in each field. At least 100 plants per acre shall be counted on the first and second inspections to determine disease percentages. When individual seed lots consist of less than 10 acres, at least 1000 plants or 100% of the lot shall be counted. A third inspection shall consist of a visual survey of plants that normally does not include a plant count unless a disease condition or other problem is discovered that requires a numerical estimate of affected plants. All disease diagnoses or problem identifications shall consist of visual examination of the plants in question, except in the case of latent viral infections, where a serological test such as ELISA may be used to supplement

14 a. cont.

the visual inspection. In the case of bacterial ring rot caused by *Clavibacter michiganensis* subsp. *sepedonicus*, the visual diagnosis shall be supplemented with the gram stain procedure as described by Glick, Ark, and Racicot in the American Potato Journal, Vol.21:311-14, 1944 and an appropriate laboratory serological test as outlined in the "Protocol for Indexing and Confirmation of Diagnosis of Bacterial Ring Rot of Potato" (accepted 12/01 by the NPC U.S. Seed Potato Certification Subcommittee). Field inspectors shall observe at least 4600 plants or 100% of the lot during the time that bacterial ring rot symptoms, if expressed, should be visible. Seed lots which are withdrawn or rejected during the season for reasons other than bacterial ring rot shall have a final field inspection.

- b. Each storage building shall be inspected following completion of harvest and prior to removal of the certified seed potatoes to determine the suitability of the structure and bins to provide reasonable security against contamination and/or cultivar mixing. The grower shall be responsible for proper disinfection of the storage building, bins and equipment utilized. Also, the grower shall identify the location of each seed lot by means of a label attached to the storage bin. The label information shall include the grower's name, seed lot number, cultivar, and number of hundred weight stored. In the event two or more seed lots are combined, the status of the entire bin shall be downgraded to the lowest generation and class concerned, and if a varietal mix has occurred, all seed lots which have been mixed shall be denied certification unless the varieties are capable of being visually separated and sorted, and such separation and sorting has in fact taken place to the satisfaction of PCS officials.
- c. Any lot of seed potatoes proven to be infected with bacterial ring rot will be rejected for certification regardless of the time or place of inspection. A farming operation which has grown any lot of potatoes rejected because of bacterial ring rot will have an * printed in front of the seed lot number(s) which were approved for certification and grown on that farming operation in the annual Seed Directory; also on certified tags and bulk certificates. Any seed lot with an * in its designation shall not be eligible for re-certification. However, any seed lot identified by an * may be replanted for certification the following year by the grower of the seed or on the farming operation where bacterial ring rot was found.
- d. In the event a farming operation has more than one field planted from the same seed lot source and bacterial ring rot is discovered in at least one of the fields, the remaining fields (planted with the same seed source) will be automatically rejected unless the pattern of infected plants observed by the inspector provides clear evidence that the cause of contamination was equipment used exclusively in connection with seed cutting, handling and/or planting the seed lot in question.
- e. Field inspection may be refused and seed lots rejected for certification if the inspector believes the field cannot be properly inspected due to: 1) excess weeds, 2) hail or frost damage, 3) damage caused by insects or disease, 4) chemical injury, or 5) any other condition that prevents visual identification of diseases or other factors affecting seed quality and performance. Any lot rejected due to hail and frost may be retained by the original grower for re-certification on his farm the following year provided post harvest test requirements are met.
- f. Seed fields must be marked so that the inspector can tell at all times where the different seed lots are located. (For example, blank rows separating the lots or brightly colored stakes at least 4 feet tall spaced about 600 feet apart with three to four across the field).
- g. Any grower of Certified Seed may appeal the decision of an inspector by making such appeal in writing to the Potato Certification Service, San Luis Valley Research Center, 0249 East Rd. 9 North, Center, CO 81125. Such appeal must be received within one week following the inspection and must state clearly the reason for the appeal and show cause why a re-inspection should be given. Roguing or sorting will not be permitted between the time of inspection and examination following appeal.

15. POST HARVEST TESTING. All Colorado certified seed potatoes must be subjected to a post harvest test and meet prescribed standards to be eligible for re-certification or sale.

- a. Purpose: Because of inability to detect certain virus diseases at all times under Colorado field conditions, samples from seed lots eligible for re-certification and /or sale are planted where these diseases can be observed in the greenhouse or in the field in a region appropriate for potato growth during the winter.
- b. Method: Samples are to be selected so as to represent all field areas of any given seed lot. Tubers must be in the 2-3 ounce size range. Actual sub-samples should be derived from a sample representing the entire number of tubers required per lot (i.e., 800 tubers sampled from lot; sample mixed thoroughly; two sub-samples of 400 tubers each taken).
- c. For Post Harvest Test:
 1. Generation 1 (stocks for sale only) - Not less than 25 tubers or 1.0% of the population, not to exceed 200 tubers in a given seed lot, shall be sampled. Tubers shall be laboratory tested for potato leafroll virus, PVY and PVX.
 2. Generation 2 - In any given seed lot (over 0.2 acre), not less than 200 tubers or 1.0% of the population, not to exceed 400 tubers, shall be sampled. Actual number selected will be established by PCS personnel.
 3. Generations 3-6
 - 400 tubers per seed lot for lots up to 40 acres.
 - An additional 400 tubers will be required for lots exceeding 40 acres to make a maximum sample of 800 tubers total for any given lot.
 4. Exceptionally small lots of Generations 2-6 (0.2 acre or less) - Not less than 25 tubers. Tubers shall be laboratory tested for potato leafroll virus, PVY and PVX.
- d. Under certain circumstances a greenhouse grow-out will be substituted for the field test to meet eligibility requirements for re-certification. Sample size shall be 200 tubers of 2-3 ounce size range per seed lot.
- e. Post harvest test samples of suitable size and representative of each given lot will be collected by the grower. Sample collection will be audited on a periodic basis by PCS. An additional sub-sample of up to 400 tubers from all lots to be sold as certified seed will be gathered during the post harvest test sample collection. These additional samples will be tested and/or examined as appropriate for various diseases and pests including, but not limited to, bacterial ring rot and root knot nematode. All samples must be delivered to a designated assembly point by the grower. The samples of seed tubers from all lots eligible for re-certification are grown in a post harvest test either in the greenhouse or in field test plots during the winter months to observe the plants for evidence of disease spread or chemical damage that may have occurred the previous growing season. Each plant in each seed lot sample is visually observed for disease symptoms. The stand count in each lot is recorded and disease content is calculated by dividing the number of diseased plants observed by the stand count. Seed lots found to contain tuber-borne diseases in excess of prescribed tolerances will be ineligible for certification the following season. Seed lots will be evaluated by PCS personnel for certification eligibility when the following conditions apply: 1) if tuber samples do not produce plants of adequate size due to dormancy problems or plants are destroyed due to weather, pests or other unforeseen problems at the test site or, 2) if a lot is rejected based upon excess mosaic. This will be accomplished on the basis of a laboratory test for potato leafroll, PVY and PVX on the additional tubers collected (B sample) or appropriate field inspection data. In the case of a lot rejected at post harvest test for PVY, and at the grower's request and expense, the PCS laboratory will test the tubers for PVY only. If PVY content is lower, the field reading will be replaced by the lab results.

- f. Post Harvest Testing Disease Tolerances: In addition to the general requirements for post harvest testing, the following special requirements must be met by generations 2-5, all classes of seed to be re-certified or sold, and G6 seed for sale. Any lot of seed exceeding a 10% total virus level, based upon the post harvest test, will be rejected from certification and no tags or bulk certificates will be issued for further sale. Seed lots of generation 2-3, for re-certification on the grower's own farm only, will be handled in the following manner. Generation 2 lots will have no PHT tolerances enforced, except for the tagging tolerance listed above. Generation 3 lots will have no PHT mosaic tolerance enforced except for the tagging tolerance.

Recertification Tolerances

Disease	All Seed Classes %
Leafroll	1.5
Total Mosaic Allowed	4.0
Mosaic (Visually Severe)	1.0
Mild Mosaic	4.0
Other Virus	0.5
Haywire	2.0
Spindle Tuber	0
Bacterial Ring Rot	0

16. Any potato cultivar or numbered clone brought in from out-of-state whose disease symptom expression resulting from infection with the ring rot bacterium (*Clavibacter michiganensis* subsp. *sepedonicus*) or potato leafroll virus is unknown under Colorado growing conditions shall be eligible for certification under the following conditions: a) If test results demonstrate adequate symptom intensity, that will normally permit inspectors to visually detect the presence of these diseases under field conditions, the seed lot will be allowed to proceed through the certification process and be approved provided other requirements are met. Testing to determine disease reaction will be concurrent with field production of the cultivars or numbered clones in question. Growers who intend to enter such stocks in the current year's certification program must provide a minimum of 75 tubers of each cultivar or numbered clone to PCS by May 1st of any given growing season. b) In the event disease expression is totally latent or mild to the degree which prevents detection during field inspection an affidavit must be signed by the buyer which acknowledges the limitations to disease detection.

17. LABORATORY VIRUS TESTING SERVICES

See pages 12-14 for details involving required laboratory testing for nuclear and G1-3 seed lots. All of the expenses for virus testing will be paid by the individual grower. Standard disease testing fees are listed below. Other testing which may be needed by the CCPGA membership will be billed to recover cost of labor and materials.

Description	Test	# Samples	Cost \$	Time
Mother Plants [^]	¹ PVX,S,Y,A,M, M-ID PMTV,PLRV, Potato Latent, PSTV,Cms & Erw	Individual	15.00/test + PSTV \$3.50/test	2 wks
Nuclear [^]	PVX,S,Y,M,Cms & Erw	Individual - Combined 5/test	\$10.00/test	2 wks
Greenhouse foliage [^]	PVX,S,Y or any other virus tested by using ELISA	Individual - Combined 5/test - 10 min. to 1% of plant pop.	\$0.70/test	3 days
Greenhouse tubers [^]	Erw (lenticel) Cms (IFAS and/or ELISA)	Individual with 10 min. to 0.5% of plant pop.. Up to 100 per group with 10 min. to 1% of plant pop.	Erw \$0.60/test Cms \$15.00/test	2 wks
Greenhouse Inspections [^] - for CCPGA members entering less than 50 acres seed	Within the Area II Marketing Order Region Outside of the Area II Marketing Order Region		\$100/visit \$200/visit	
Field foliage [^]	G1 - PVX,S G2,G3 - PVX; PVY- on cultivars with latent PVY reactions such as Russet Norkotah, Shepody, etc.	G1- Individual - 25 min. to 1% of plant pop. G2 - Individual - 200/acre with 200 min. G3 - Individual -20/acre with 100 min. G1-3 combined 5/test	\$0..70/test \$70.00/ELISA plate	3 days
Cms tuber test (post harvest)	Cms (IFAS and/or ELISA)	Individual - Combined 100 tuber cores/test upto 400 tubers min. per lot	\$15.00/test max of 100 cores/test	2 wks
Erw tuber test	Erw (lenticel)	Individual with 25 min.	\$0.60/test	2 wks
Late blight tuber screening	Tuber incubation, high humidity, 68-72°F, 21 days, visual examination.	See late blight test requirements for the San Luis Valley	\$7.50/50 tubers \$0.15/tuber	25 days

¹Potato viruses X, S, Y, A and M, M-Idaho, Potato Latent, PLRV (potato leafroll virus), PSTV (potato spindle tuber viroid), Cms (*Clavibacter michiganensis* subsp. *sepedonicus*), Erw (*Erwinia carotovora* subsp. *atroseptica* and *carotovora*)

[^]Required testing to qualify for certification.

These are base prices. Costs may increase if partial plates are utilized.

The prices listed above are on a “at cost basis “ for CCPGA growers only. Services provided to outside PCS customers will be billed on a retail cost basis.

SPECIAL REQUIREMENTS FOR LIMITED GENERATION SEED POTATOES

LIMITED GENERATION SYSTEM FOR COLORADO CERTIFIED SEED POTATOES

The major goal of all seed potato improvement is to maximize the productivity of marketable potatoes through: a) elimination of disease organisms and pests, and b) selection of superior clones within any cultivar. The Nuclear phase of seed improvement will be the focal point of insuring that the best seed stocks are introduced into the Colorado seed potato program. The methods of disease elimination and cultivar improvement may vary somewhat since new laboratory and greenhouse techniques to control diseases are constantly being developed. Colorado State University, the Potato Certification Service and research personnel will cooperate with producers of Nuclear seed stocks to maintain the highest level of technology available. Listed below are the various steps that any given seed stock will pass through in the Limited Generation System:

Nuclear	(Lab and/or greenhouse produced)
Generation 1	(1st year in field)
Generation 2	(2nd year in field)
Generation 3	(3rd year in field)
Generation 4	(4th year in field)
Generation 5	(5th year in field)
Generation 6	(6th year in field)

I. SEED SOURCES AND DISEASE TOLERANCE STANDARDS

A. NUCLEAR

1. Seed source must be from single hill field selections obtained from certified seed of Generation 5 or earlier generations or from a source approved by PCS.
2. Must be free of all visible disease symptoms. Testing for *Clavibacter michiganensis* subsp. *sepedonicus* will be handled as outlined in the "Protocol for Indexing and Confirmation of Diagnosis of Bacterial Ring Rot of Potato" (accepted 12/01 by the NPC U.S. Seed Potato Certification Subcommittee).
3. Mother plants: Those units (plantlets) initiated from field selected plants or tubers. All mother plants to be used for subsequent propagation must be tested and proven negative for the following disease organisms: *Clavibacter michiganensis* subsp. *sepedonicus*, *Erwinia carotovora* subsp. *atroseptica* and *carotovora*, potato viruses X, S, Y, A and M (hereafter referred to as PVX, PVS, PVY, PVA and PVM), PVM-ID, potato latent virus, potato leafroll virus (PLRV), and potato spindle tuber viroid (PSTV).
4. Nuclear stocks: Those stocks derived from mother plants. These include material used in maintaining a clone bank, plantlets increased for use in production of in-vitro microtubers, microtubers, plantlets increased for use in field production of tubers, and minitubers produced in a greenhouse. (see pg. 15 for additional requirements)
5. Clone bank: The clone bank in-vitro stocks will be tested on an annual basis and found negative for PVX, PVS, PVY, PVM, *Clavibacter michiganensis* subsp. *sepedonicus*, and *Erwinia carotovora* subsp. *atroseptica* and *carotovora*.

(5 cont.)

Plantlet/greenhouse production: Representative samples of micropropagated materials for use in field or greenhouse plantings, of not less than 10 units and not to exceed 1.0% of the planting stock, must be tested for PVX, PVS, and PVY to verify that such material still tests negative for these pathogens. In the case of greenhouse production, the testing will take place between the time of first and second visual inspections. In the event that trace amounts of virus are detected, the grower will be informed of the results and have the seed lot in question classified accordingly upon completion of the Generation 1 field testing. Greenhouse stocks will have an additional test for the presence of *Erwinia carotovora* subsp. and *Clavibacter michiganensis* subsp. *sepedonicus* (Cms) completed at the same rate as above on the minitubers. A positive test for presence of *Erwinia carotovora* subsp. will result in downgrading of the stocks to Generation 2 for sale outside the originating grower's program. However, the contaminated stocks may be replanted for certification and entered as Generation 1 on the original grower's farm. Under certain circumstances an additional test for *Phytophthora infestans* will be performed on the minitubers brought in for testing. A positive result for either *P. infestans* or *Cms* will result in rejection of the lot (s) from certification.

B. GENERATION 1¹

1. Seed source must be Nuclear stocks approved by PCS. All Nuclear seed stocks must have a Certificate of Origin, tag, or similar document available for inspection by PCS prior to being accepted into the certification program.
2. Tubers must be planted in identifiable family units. If greenhouse or laboratory production methods preclude this possibility consult with PCS personnel.
3. Each family unit will be lab tested for PVX and PVS and, at the growers option, for potato leafroll virus and/or PVY. At least 1.0% of the plants must be sampled. If there are indications that viral infection has taken place, then, at the grower's option, at least one leaflet from each plant in the infected family unit will be sampled to identify and aid in removal of the infected plants, or blocks of samples will be tested to determine the extent of the infection. If the grower refuses additional testing or the level of virus found in the stocks is too high for removal of infected plants, the lot will be downgraded to the next appropriate generation level. Trace PVX or PVS infections, as determined by PCS, will not result in downgrading of the lot if replanted for certification on the original grower's farm the following year.
- d. Must meet Class A requirements or will be downgraded to next appropriate generation level.

C. GENERATION 2¹

1. Seed source must be Nuclear or Generation 1 and family units may be maintained.
2. Representative samples of at least 200 leaflets per acre will be tested for PVX and, at the grower's option, tested for PVS.
3. Must meet Class A or B requirements or will be downgraded to Generation 3.

¹See Tables 1 and 1A on page 14 for disease tolerances.

D. GENERATION 3¹

1. Seed source must be Generation 2 or earlier generations.
2. Representative samples of at least 20 leaflets per acre and not less than 100 leaflets from any given seed lot will be tested for PVX and, at the grower's option, tested for PVS.

E. GENERATION 4^{1,2}

1. Seed source must be Generation 3 or earlier generations.

F. GENERATION 5^{1,2}

1. Seed source must be Generation 4 or earlier generations.

G. GENERATION 6^{1,2}

1. Seed source must be Generation 5 or earlier generations.
2. May be tagged and sold as Generation 6 but is not eligible for certification the following year.

II. ISOLATION FOR LIMITED GENERATION SEED**A. Field Isolation**

1. Generations 1-3 potatoes must be separated from Generations 4-6, Non-Generation Certified and Experimental lots by a minimum distance of at least two row widths not planted to potatoes.

B. Storage Isolation

1. Generation 1 potatoes must be isolated from all other certified potatoes in the same storage. Emphasis should be directed toward intensive sanitation and physical separation by solid wall partitions.
2. All certified seed lots must be kept in a storage building which contains only seed entered for certification. Non-certified stocks and potatoes rejected due to blackleg or zero tolerance diseases such as bacterial ring rot will not be allowed in the storage building; the presence of such potatoes will result in rejection of the certified seed lots present.

¹See Tables 1 and 1A on page 14 for disease tolerances.

²At the grower's option, Generations 4-6 seed lots may be tested for PVX and/or PVS. PCS will be notified at the time of application. Sampling procedures will be those used for Generation 3. Results will not be published in the Seed Directory, however, PVX content of the tested lots may be listed on the tag or bulk certificate at the grower's option. Tolerances do not apply.

III. FIELD INSPECTION TOLERANCES FOR LIMITED GENERATION SEED¹

Table 1. Percentages Allowed by Class - First Inspection

Item	A	B	C	D
Potato Leafroll Virus	0	0.1	0.5	0.8
Mosaic Viruses	0	0.2	1.0	3.0
Other Virus	0	0.1	0.5	1.0
Total Virus Allowed			1.5	3.5
Haywire	0	0.5	1.0	1.0
Giant Hill	0	0.5	0.5	
Variety Mix	0	0.1	0.25	0.5
Blackleg ¹	0	0.1	2.0	4.0

Bacterial ring rot and spindle tuber viroid - all classes have a zero tolerance

Table 1-A. Percentages Allowed by Class - Second Inspection

Item	A	B	C	D
Potato Leafroll Virus	0	0.05	0.2	0.4
Mosaic Viruses	0	0.1	0.6	2.0
Other Virus	0	0.05	0.5	0.5
Total Virus Allowed			0.7	2.4
Haywire	0.1	0.5	1.0	1.0
Giant Hill	0	0.5	0.5	0.5
Variety Mix	0	0.07	0.125	0.25
Blackleg ¹	0	0.1	2.0	4.0

Bacterial ring rot and spindle tuber viroid - all classes have a zero tolerance

¹Generation 1 and 2 seed lots exceeding specified blackleg tolerances will be downgraded to the next appropriate generation level. Roguing of these lots to restore them to blackleg tolerance will not be allowed.

Inspection policy: Growers of Generations 1 through 3 seed lots may be given one additional opportunity to restore the seed lot to tolerance following the first and second scheduled inspections providing the following conditions are met: 1) The grower agrees to complete roguing of the field as soon as possible and 2) Field conditions, plant development and other factors such as presence of insect vectors would not in the judgement of the inspector limit the accuracy and effectiveness of the roguing effort.

PVX (Lab Test): Will be performed on G1 through G3 seed lots with tolerances for G1=0 and G2=1.0. G1 and G2 lots exceeding the PVX tolerances will be downgraded to the next appropriate generation level.

IV. SALE OF NUCLEAR MATERIAL FROM PRIVATE OR GROWER OPERATED LABORATORIES

1. Rules governing the seed sources and disease tolerance standards (as outlined on pages 11-12) for Nuclear stocks must be followed. All stocks not initiated in the year of production or sale must have an annual testing for the presence of disease organisms and a grow-out or other test approved by PCS to verify trueness to type and varietal identification.
2. Accurate and complete accession records must be kept on all nuclear stocks and be available for review if requested by PCS. Information should include year of initiation into tissue culture, source of the line, general increase data, pertinent field performance characteristics, and disease testing history.
3. All greenhouse produced stocks (minitubers) shall have at least two inspections during their growth. At the time of the second inspection, prior to vine death, plants will be examined to verify trueness to type and varietal identification. Minitubers will be examined in storage for any apparent problems prior to shipment or subsequent field growth.
4. All nuclear stocks must be kept in a clone bank with accurate identification on each tube or vessel. These stocks shall be kept in the clone bank no less than one year from the date of any sale.
5. Nuclear stock production in Colorado can be contracted for out-of-state growers providing that the arrangements made fall within the capacity of PCS to carry out. If requested, a copy of the contract shall be made available to PCS prior to actual tissue culture increase and sale. Nuclear stocks under contract must meet minimum Colorado standards as described within this document.
6. Nuclear stocks sold will not be tagged with an official tag or bulk certificate used on other certified seed stocks. Instead, there will be an affidavit included with the nuclear material which carries information relating to its accession, disease testing records, varietal identification, numbers sold, and product identity (i.e., minitubers, tissue culture plantlets, microtubers, etc.). The stocks will be recorded as eligible for certification as Generation 1 under the Colorado Rules and Regulations.

SPECIAL REQUIREMENTS FOR NON-GENERATION SEED POTATOES

Seed identified as Non-Generation Certified is intended to provide limited opportunity for a grower to produce certified stocks of cultivars for which micropropagated, laboratory-tested seed sources are temporarily not available. Growers who intend to produce Non-Generation Certified seed must verify to PCS prior to April 1st of any given growing season that the cultivar in question is not available from a Limited Generation seed program, and furthermore have each request reviewed and approved by the CCPGA Board of Directors Executive Committee. However, any prospective seed lots must have been post harvest tested and meet qualifications for re-certification. Non-Generation Certified seed lots will be inspected and classified according to the disease tolerances and all of the applicable Rules and Regulations established for Generation 6. These stocks will be identified in the Seed Directory and when sold will be inspected for grade and properly identified with tags or bulk certificates. The symbols "NGC" shall be printed in the Seed Directory and on the tags and bulk certificates to denote their status.

SPECIAL REQUIREMENTS FOR GROWER ENTRY PROGRAM

The grower entry program is designed for growers who wish to enter the certification program, but are unable to fulfill all of the requirements during the first production year. This program should be valuable for an inexperienced seed grower who would get the benefit of PCS inspections and training before he would assume full responsibility for selling certified seed. A prospective grower must contact the PCS office prior to April 1 and outline how he expects to eventually meet all requirements for certification. A review of progress will be made at the end of each growing season to determine the feasibility of proceeding to full participation as a certified producer the next season. Normal fees will be assessed for acreage entered into the grower entry program. In addition, a \$3.00/acre fee will be assessed on all acreage within the farming operation not entered in the grower entry program for a one time bacterial ring rot field inspection. Since the seed produced under the Grower Entry program is not eligible for sale as certified, no tags or bulk certificates will be issued, nor will seed lots be included in the Seed Directory until the grower has qualified for full certification as per the Rules and Regulations.

SPECIAL REQUIREMENTS FOR EXPERIMENTAL SEED POTATOES

The Memorandum of Understanding between the Colorado Certified Potato Growers' Association and the Board of Governors of the CSU System. authorizes the Potato Certification Service to "cooperate with the Experiment Station in increasing and releasing new varieties of potatoes developed by the Experiment Station," thus it becomes necessary to develop acceptable guidelines for conducting the testing and seed increase program. In this respect, it is important to acknowledge the unavoidable limitations to the visual inspection process encountered when the disease symptom expression of any potato clone is unknown at the time a seed grower would like to enter it for certification. Therefore, the Experimental Seed category was established to expedite and facilitate field testing of numbered potato clones being considered for naming and official release. Two categories of Experimental Seed were established.

Category 1 will include only unnamed "Seedling" potato clones involved in the field testing phase of a potato cultivar development program on which bacterial ring rot and/or leafroll virus symptom expression is unknown. Seed stocks of such clones will not be eligible for certified tags or bulk certificates, nor will they be listed in the Seed Directory. Field plantings of such clones will be inspected and a written report submitted to the Leader of the Cultivar Development Program. When adequate field test data on disease expression and other performance characteristics has been collected to justify further evaluation on seed growers farms, any given clone may be transferred to Category 2 of the Experimental Seed category. This decision will be made jointly by the Leader of the Cultivar Development Program, the Potato Certification Service and the Seed Improvement Committee of the Colorado Certified Potato Growers' Association.

Category 2 seed lots will include only unnamed "Seedling" clones whose symptom expression of bacterial ring rot and potato leafroll virus are known to be adequate under Colorado field conditions. Such seed lots will be eligible for entry into the certification program on the following basis: There will be three years production allowed for Experimental Seed - Non-Generation Category 2 stocks. At the end of three years, the status of these stocks will be reviewed and, where possible, these stocks will be phased out and replaced with Limited Generation seed sources. If this is not possible, an annual review will be conducted to verify the status of the stocks. Non-Generation Category 2 seed lots will be inspected and classified according to the disease tolerances and all of the applicable Rules and Regulations established for Generation 6. All stocks which meet the criteria for certification will be listed in the Seed Directory. The symbols "Exp 2-" followed by a number designating the years in the field after initial release (i.e., Exp 2-1, Exp 2-2, etc.) will be printed both in the Seed Directory and on tags and bulk certificates. Limited Generation sources of these stocks will carry the same designations with the exception that the symbols after "Exp 2-" will reflect their status from the Limited Generation program, (i.e., Exp 2-G1, Exp 2-G2, etc.). Limited Generation stocks will be inspected and classified according to the disease tolerances and all of the applicable Rules and Regulations established for Limited Generation Seed. Because of the limited knowledge concerning potential disease reactions, and/or other problems in these seed stocks, the seed seller must obtain and submit to the Potato Certification Service an affidavit signed by the seed buyer prior to seed shipment which states that the buyer is willing to accept the risks involved with purchasing experimental seed. This affidavit or its equivalent will be kept with the tag or bulk certificate order in the grower's Potato Certification Service file. Also, it is understood that experimental seed stocks may be rejected at any time due to uncommon disease reactions.

SPECIAL REQUIREMENTS FOR EXPERIMENTAL SEED POTATOES (cont.)

Any seed grower/organization entering numbered potato selections for seed increase and evaluation in the potato certification program also agrees to abide by an agreement with the Colorado State University Agricultural Experiment Station, or to obtain written authorization from the potato breeding program from which the numbered potato selections originate. The CSU agreement "Notice to Receivers of Experimental Potato Selections" consists in part of the following:

COLORADO STATE UNIVERSITY AGREES TO:

1. Supply seed stocks or grant permission to utilize these stocks for further propagation and evaluation to the grower applicant.
2. The term of this agreement will be for a one year period beginning upon seed grower/organization receipt of the numbered stocks.

BY ACCEPTANCE OF SUCH POTATOES, THE SEED GROWER/ORGANIZATION AGREES TO:

1. Enter crop for certification. These stocks will be grown in accordance with the Rules and Regulations of the seed potato certification program for the appropriate seed level using generally accepted cultural practices.
2. Furnish land and labor, and meet all expenses involved in production and certification of the crop.
3. Permit representatives of the University to make observations and to obtain samples if desired.
4. Not to further propagate or distribute seed stocks of this (these) selections for propagation beyond the terms of this agreement unless authorized by the University.
5. Dispose of any numbered selection discarded from the Potato Cultivar Development Program. These stocks will not be eligible for entrance in any seed potato certification program unless authorized by the University.
6. Special disposition instructions: As directed by Cultivar Development Program Leader.
7. A meeting between the Seed Grower(s)/Organization Representative(s), the Seed Improvement Committee of the Colorado Certified Potato Growers' Association, the Potato Certification Service and the Project Leader of the Potato Cultivar Development Program prior to January 1st to establish guidelines on price and method of distribution of seed.
8. Not hold the University or its representatives financially liable for losses incurred as a result of production and/or disposition of this seed.

IT IS MUTUALLY AGREED:

1. The proceeds from the crop produced under this agreement shall be the property of the Seed Grower/Organization that submitted the stocks for certification.
2. That information derived from these evaluations shall be jointly shared by the parties to this agreement.
3. That the selections may be legally protected under the federal Plant Variety Protection Act or other mechanisms that may require royalty payments before being grown commercially.

COLORADO GRADE STANDARDS FOR CERTIFIED SEED POTATOES

The following grade standards apply to all certified seed potatoes.

<u>Grade Defect for Tubers</u>	<u>All Certified Seed %</u>
Stem end discoloration	5.0
Net Necrosis (Leafroll, after laboratory identification)	0.5
Net Necrosis (aster yellows)	2.0
Bacterial Ring Rot	0
Root Knot Nematode (visible tuber symptoms)	0
Corky Ring Spot (visible tuber symptoms coupled with confirmation of Tobacco Rattle Virus presence by accepted laboratory test)	0

Colorado Blue Tag Grade shall consist of potatoes which meet the requirements of the disease tolerances and grade standards previously listed for CERTIFIED SEED POTATOES. In addition, they shall be graded to conform with the U.S. No. 1 Seed Potatoes Grade as defined under U.S. Standards for Grades of Seed Potatoes (see pages 19-20) with the following exceptions:

1. Not more than 1% of the potatoes shall be damaged by dry rot.
2. Size shall be 1-1/2" to 12 oz. unless a smaller maximum is specified on the tag or bulk certificate.
3. Not more than 3% of the potatoes in any lot may be below the specified size and, in addition, not more than 8% may be above the specified size.
4. Physiological internal pigmentation shall not be considered a grade factor.

Colorado Yellow Tag Grade shall consist of potatoes which meet the requirements of the disease tolerances and grade standards previously listed for CERTIFIED SEED POTATOES. This grade is intended to provide the buyer and seller an opportunity to establish certain mutually agreed upon specifications not allowed in the Colorado Blue Tag Grade. The potatoes must be graded to conform with the U.S. No. 1 Seed Potatoes Grade as defined under U.S. Standards for Grades of Seed Potatoes (see pages 19-20) with the following exceptions:

1. Soft rot shall not exceed 1%.
2. Tuber size shall be specified on the tag or bulk certificate. Tolerances for specified size limits: Not more than 3% of the potatoes in any lot may be below the stated minimum and, in addition, not more than 10% may be above the stated maximum.
3. Tubers shall not be seriously damaged by external defects, or seriously misshapen unless otherwise specified, and shall meet the tolerances for a U.S. No. 2 Grade.
4. Physiological internal pigmentation shall not be considered a grade factor.

Applications of Tolerances: The application of grade and size tolerances shall be as outlined in the United States Standards for Potatoes, Section 51.3003.

U.S. Export "Seed Potatoes" shall consist of potatoes which meet the requirements, disease tolerances and grade standards for international export as listed under the U.S. EXPORT STANDARDS FOR SEED POTATOES; Appendix P - USDA Export Certification Manual (3/99).



**United States
Department of
Agriculture**

**Agricultural
Marketing
Service**

**Fruit and
Vegetable
Programs**

**Fresh
Products
Branch**

United States Standards for Grades of Seed Potatoes

Effective March 6, 1987
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United States Standards for Grades of Seed Potatoes

51.3000 General.

51.3001 Grade.

51.3002 Tolerances.

51.3003 Application of tolerances.

51.3004 Samples for grade and size determination.

51.3005 Definitions.

51.3006 Classification of defects.

§51.3000 General.

Compliance with the provisions of these standards shall not excuse failure to comply with provisions of applicable Federal or State Laws.

§51.3001 Grade.

"U.S. No. 1 Seed Potatoes" consist of unwashed potatoes identified as certified seed by the state of origin by blue tags fixed to the containers or official State or Federal State certificates accompanying bulk loads, which identify the variety, size, class, crop year, and grower or shipper of the potatoes, and the State certification agency. These potatoes must meet the following requirements:

(a) Fairly well shaped.

(b) Free from:

(1) Freezing injury;

(2) Blackheart;

(3) Late Blight Tuber Rot;

(4) Nematode or Tuber Moth injury;

(5) Bacterial Ring Rot;

(6) Soft rot or wet breakdown; and,

(7) Fresh cuts or fresh broken-off second growth.

(c) Free from serious damage caused by:

(1) Hollow Heart; and,

(2) Vascular ring discoloration.

(d) Free from damage by soil and any other cause. (See §51.3005 - 06).

(e) Size:

(1) Minimum diameter, unless otherwise specified, shall not be less than 1-1/2 inches (38.1 mm) in diameter;

(2) Maximum size, unless otherwise specified, shall not exceed 3-1/4 inches (82.6 mm) in diameter or 12 ounces (340.20 g) in weight.

(f) Tolerances. (See §51.3002).

§51.3002 Tolerances.

In order to allow for variations incident to proper grading and handling in the foregoing grade, the following tolerances, by weight, are provided as specified.

(a) For defects:

- (1) 10 percent for potatoes in any lot which are seriously damaged by hollow heart;
- (2) 10 percent for potatoes in any lot which are damaged by soil;
- (3) 5 percent for potatoes in any lot which are seriously damaged by vascular ring discoloration;
- (4) 11 percent for potatoes which fail to meet the remaining requirements of the grade including therein not more than 6 percent for external defects and not more than 5 percent for internal defects: Provided, that included in these tolerances not more than the following percentages shall be allowed for the defects listed:

	Percent
Bacterial Ring Rot	0.00
Serious damage by dry or moist type Fusarium Tuber Rot	2.00
Late Blight Tuber Rot	1.00
Nematode or Tuber Moth injury	0.00
Varietal mixture	0.25
Frozen, soft rot or wet breakdown	0.50

Provided, that en route or at destination, an additional 0.50 percent, or a total of 1 percent, shall be allowed for potatoes which are frozen or affected by soft rot or wet breakdown.

(b) For off-size:

- (1) For undersize: 5 percent for potatoes in any lot which fail to meet the required or specified minimum size.
- (2) For oversize: 10 percent for potatoes in any lot which fail to meet the required or specified maximum size.

§51.3003 Application of tolerances.

Individual samples (See §51.3004) shall not have more than double the tolerances specified, except that at least one defective and one off-size potato may be permitted in any sample; Provided, that en route or at destination, one-tenth of the samples may contain three times the tolerance permitted for potatoes which are frozen or affected by soft rot or wet breakdown; and provided further, that the averages for the entire lot are within the tolerances specified for the grade.

§51.3004 Samples for grade and size determination.

Individual samples shall consist of at least 20 pounds (9.06 kg). The number of such individual samples drawn for grade and size determination will vary with the size of the lot.

§51.3005 Definitions.

- (a) "Fairly well shaped" means that the potato is not materially pointed, dumbbell-shaped or otherwise materially deformed.
- (b) "Nematode or Tuber Moth injury" means the presence of, or any evidence of, Nematode or Tuber Moth.
- (c) Soil:
 - (1) "Fairly clean" means that at least 90 percent of the potatoes in the lot have no more than 10 percent of the surface covered with caked soil.
 - (2) "Damage by soil" means that caked soil covers more than 25 percent of a potato's surface.
 - (3) "Loose soil" -- A lot of seed potatoes is not considered damaged by the presence of loose soil, clods, rocks, vines, and foreign material, but such will be considered a tare factor if the following

allowances are exceeded:

- 8 ounces (226.80 g) in a 100 pound (45.3 kg) container.
- 4 ounces (113.40 g) in a 50 pound (22.65 kg) container.
- 2 ounces (56.70 g) in a 25 pound (11.33 kg) container or less.
- 1 percent in a bulk load.

(d) "Shriveling" -- Damage by shriveling means that the individual potato is more than moderately shriveled, spongy or flabby.

(e) "Freezing injury" means that the potato is frozen or shows evidence of having been frozen.

(f) "Soft rot or wet breakdown" means any soft, mushy or leaky condition of the tissue.

(g) "Zero Tolerance" (0.00) means none found during the normal inspecting procedures.

Certification of a lot is not a guarantee that the lot inspected is free of a zero tolerance disease or injury.

(h) "Damage" means any defect or any combination of defects which materially detracts from the internal or external appearance of the potato, or any external or internal defect which cannot be removed without a loss of more than 5 percent of the total weight of the potato (See §51.3006).

(i) "Serious damage" means any defect or any combination of defects which seriously detracts from the internal or external appearance of the potato, or any internal or external defect which cannot be removed without a loss of more than 10 percent of the total weight of the potato (See §51.3006).

(j) "External defects" are defects which can be detected by examining the surface of the potato. Cutting may be required to determine the extent of the injury (See §51.3006, Table I).

(k) "Internal defects" are defects which cannot be detected without cutting the potato (See §51.3006, Table II).

(l) "Permanent defects" are defects which are not subject to change during storage or shipment.

(m) "Condition defects" are defects which may develop or change during storage or shipment.

§51.3006 Classification of defects.

(a) Brown discoloration following skinning, dried stems, flattened depressed areas (showing no underlying flesh discoloration), greening, skin checks and sunburn do not affect seed quality and shall not be scored against the grade.

(b) Table I -- External Defects.

x-indicates method of scoring unless otherwise noted.

Defect	Damage	
	When materially detracting from the appearance of the potato	or When removal causes a loss of more than 5 percent of the total weight of the potato.
Air cracks.....	.....	X
Bruises.....	.....	X
Cuts and broken-off second growth (healed).....	X.....	X
Elephant hide (scaling)	X.....	
Enlarged, discolored or sunken lenticels.....	X.....	
Folded ends.....	X.....	
Second growth.....	X.....	
Shriveling.....	When more than moderately shriveled, spongy, or flabby.	
Sprouts.....	When more than 20 percent of the potatoes in any lot have any sprout more than 1 inch (25.4 mm) in length.	
Surface cracking.....	X.....	X
Flea Beetle injury.....	X.....	X
Grub damage.....	X.....	X
Rodent and/or bird damage.....	X.....	X
Wireworm or grass damage.....	Any hole more than 3/4 inch (19.1 mm) long or when the aggregate length of all holes is more than 1-1/4 inches (31.mm) ¹ .	
Dry rots.....	.....	X
Rhizoctonia.....	X.....	
Scab, pitted.....	X.....	X
Scab, russet.....	When affecting more than 1/3 of the surface.....	

Scab, surface.....	When affecting more than 5 percent of the surface	
Silver Scurf.....	When affecting more than 25 percent of the surface.....	
Growth cracks.....	When seriously detracting from the appearance.....	
Pressure bruises and sunken areas-with underlying flesh discolored.	.....	When removal causes a loss of more than 10 percent of the total weight.

¹Definitions of damage and serious damage are based on potatoes that are 2-1/2 inches (63.5 mm) in diameter or 6 ounces (170.10 g) in weight. Correspondingly lesser or greater areas are permitted on smaller or larger potatoes.

(c) Table II- Internal Defects.

Defect	Damage	
	When materially detracting from the appearance of the potato	or When removal causes a loss of more than 5 percent of the total weight of the potato
Ingrown sprouts.....	.....	X
Internal discoloration occurring interior to the vascular ring (such as, Internal Brown Spot, Mahogany Browning and Heat Necrosis).	When more than the equivalent of three scattered light brown spots 1/8 inch (3.2 mm) in diameter ¹	
All other internal discoloration excluding discoloration confined to the vascular ring.	.....	X

¹Definitions of damage and serious damage are based on potatoes that are 2-1/2 inches (63.5 mm) in diameter or 6 ounces (170.10 g) in weight. Correspondingly lesser or greater areas are permitted on smaller or larger potatoes.

Defect	Serious damage	
	When seriously detracting from the appearance of the potato.	or When removal causes a loss of more than 10 percent of the total weight of the potato.
Internal Discoloration confined to the vascular ring.	.....	X
Hollow Heart or Hollow Heart with discoloration.	When affected area exceeds that of a circle 3/4 inch (19.1 mm) in diameter. ¹	

¹Definitions of damage and serious damage are based on potatoes that are 2-1/2 inches (63.5 mm) in diameter or 6 ounces (170.10 g) in weight. Corresponding lesser or greater areas are permitted on smaller or larger potatoes.

APPENDIX I

GUIDELINES FOR THE PRODUCTION AND STORAGE OF LIMITED GENERATION SEED STOCKS

Field operations

1. If possible, use separate equipment for Generations 1-3 seed lots. Otherwise, be sure to follow a program of thorough cleaning and sanitation.
2. Maintain strict control over labor personnel and insist on use of clean outer garments and shoes when involved with handling plants or tubers.
3. Fields must be rogued early, starting when plants are 6-8 inches high. Rogue continuously until harvest. Remove all rogued plants from the field or bury same in adjacent rows. Recommendations concerning roguing will be made following field inspection.
4. Whenever possible, leave blank rows between different seed lots/cultivars. Plant the blank rows with a green non-potato crop to reduce potential increased aphid landing rates due to the edge effect.
5. Irrigate with well water instead of surface water whenever possible.

Storage operations

1. Have well water available at the storage cellar for use in sanitation procedures.
2. Make every attempt to minimize personnel and equipment contact between Generations 1-3 stocks and Generations 4-6 stocks in storage.
3. Maintain strict physical separation of Nuclear and Generation 1 stocks from all other seed lots.
4. Minimize handling and sorting of Nuclear and Generations 1-3 stocks to avoid bruising and potential disease spread.
5. Avoid using the same equipment in different storages. Also, thoroughly disinfect equipment between seed lots.
6. Sprouted seed potatoes pose a disease spread threat; therefore, manage storage conditions to minimize sprout growth prior to sorting. This does not include the use of sprout inhibitors.

General sanitation procedures

1. All storages used for storing seed potatoes must be cleaned and disinfected each year before storing.
2. Wash and steam clean equipment and storages prior to application of chemical disinfectants.
3. Select effective disinfectants; follow recommendations carefully and allow sufficient time for chemicals to kill disease organisms.
4. Pay special attention when attempting to clean and disinfect equipment such as seed cutters and planters.
5. Wash and thoroughly disinfect all conveyances used to handle or ship seed potatoes.

General protocols for collection soil samples for nematode testing

1. Decide on best approach to mapping individual field and/or lot for sampling. Growers may elect to sample one section intensively (approximately 1/4 of the field - 100 cores/area sampled) in a grid pattern or sample the entire field in increments of 2-4 acres each (one core/increment), again in a grid pattern.
2. A general time frame for taking soil samples is between 2-3 weeks prior to vine kill until actual harvest (mid to late fall). Samples should be taken as deep as the plow layer (typically 12-16" deep), representative of the rhizosphere area of the root zone, and mixed prior to placing in a sample collection bag. Samples must be kept cool and moist, and sent immediately to the appropriate lab for analysis. Keep in mind that collection of soil samples to be used for phytosanitary purposes (shipments into nematode-free zones or restricted areas) must be supervised by an official state agent (i.e., PCS, Department of Ag, etc.) and sent to an official state or federal lab for analysis for the results to be valid.
3. Analysis should be conducted for the presence of injurious nematodes including *Meloidogyne* spp., *Trichodurus* spp., and others of importance to potato production.
4. Once a report is received, results should be communicated to PCS.

Some general procedures useful to reduce the spread of PVY and/or potato leafroll virus

1. Plant problematic cultivars as early as possible and kill the vines as early as possible after final field inspection has been completed. Use quick vine kill methods (i.e., sulfuric acid) where feasible and make sure the vines are completely dead within three to four days after initial application. Whenever possible, use isolated fields (1-2 miles from any commercial potatoes) to produce early generation material. Consider the use of row covers or stylet oils to reduce the potential for virus spread in the earliest generations of problematic cultivars.
2. Differentiate between replant seed stocks (stocks for your operation) and commercial, saleable seed. Isolate earliest generation or lowest disease level stocks within the interior of the field. Utilize information such as post harvest test readings to avoid replanting the higher disease level stocks. Recognize that heavy disease loads are difficult to rogue and may be responsible for spread of virus to clean stocks nearby.
3. Rogue infected plants early in the season and rogue intensively until tubers start to bulk. Manage fertility to decrease the chance of early season masking of mosaic or leafroll symptoms. Be aware of cultivar differences in symptom expression and "windows" of opportunity to remove infected plants. This is especially critical when managing leafroll.
4. Use appropriate systemic insecticides to reduce or eliminate colonizing aphids from fields. Recognize that some insecticides will flare the population of certain aphid species like green peach aphid (GPA) and that certain systemic insecticides will decrease in their ability to provide control later in the season. Keep in mind that many insecticides are useful in controlling spread of leafroll both in-field and from outside sources, but no insecticides will really control the spread of stylet borne viruses such as PVY from outside sources. There are few aphids which effectively spread potato leafroll virus (GPA, potato aphid) while over 50 species of both colonizing and non-colonizing aphids will spread PVY to some degree.
5. Utilize field edge spraying when appropriate to reduce the use of insecticides and reduce the potential for GPA colonization within the field. GPA will typically colonize the first 12 meters of a field first prior to movement into the interior of the field.
6. Utilize border or trap crops to help in cleaning the stylets of PVY-infected aphids. Maintain fallow ground outside the crop border, but not between the crop border and the field or within the seed lot. Whenever possible, remove the edge of the field and/or lot (12 meters or 6 to 10 rows) and use as commercial potatoes rather than storing with the rest of the seed lot to reduce potential high virus levels due to aphid landing/edge effects.

APPENDIX II

The forms and affidavits used in the Colorado Certified Seed Potato Program will be added to this page at a later date. If you need any form or affidavit prior to that date, you can call (719) 754-3496 to get a copy. Thank you for your patience.

APPENDIX II



Potato Certification Service
 San Luis Valley Research Center
 0249 East Road 9 North
 Center, Colorado 81125
 (719) 754-3496
 FAX: (719) 754-2619
 E-mail: slvctr@coop.ext.colostate.edu

CUT SEED DISCLAIMER AND WAIVER FOR COLORADO CERTIFIED SEED POTATOES

This document is intended for use by seed growers cutting seed for customers outside of the Colorado Federal/State Potato Marketing Order (Area II).

Disclosure to Seed Buyer and Waiver

The certified seed potatoes listed below have been certified by the Potato Certification Service and inspected by the Federal/State Inspection Service prior to cutting. The Seed Buyer has requested that the Seed Grower custom cut these seed potatoes. **The Potato Certification Service and the Federal/State Inspection Service cannot and will not make any further certification, inspection or grading of the seed potatoes after they are cut. Cutting seed potatoes creates increased risk of disease spread, potential for poorly sized seed pieces with improper eye distribution, and potential for breakdown in transit; which the Seed Buyer understands and accepts.**

By signature below, the Seed Buyer accepts the risks involved in acquiring cut seed potatoes and waives all claims s/he/it may otherwise assert against the Potato Certification Service arising from or associated with the cutting of seed potatoes. **The Potato Certification Service shall have no liability whatsoever for any losses, claims, or causes of action arising from, after, or associated with the cutting of seed potatoes. The Seed Buyer assumes and accepts all liability and risk associated with or arising from the cutting of seed potatoes and subsequent use.**

Contract for Cut Seed Potatoes

The Seed Grower and Seed Buyer acknowledge that any contract for delivery of cut seed potatoes is between those two parties only, and the Potato Certification Service is **not** a party to such contract. By signature below, the Seed Grower and the Seed Buyer, as commercial parties, hereby agree to waive any and all claims against Colorado State University or the Potato Certification Service for losses, claims, damages, or problems associated with the cutting of seed potatoes.

Cultivar	CWT	Tag Color		Lot #	Bulk Certificate #
		Blue	Yellow		

 Buyer's signature

 Date

 Seed Grower's signature

 Date

(White copy to Buyer, Yellow copy to Seed Grower, Pink copy to Potato Certification Service)

POTATO CERTIFICATION SERVICE
 Colorado State University - Colorado Certified Potato Growers' Association, Inc.
 Colorado Certified Seed Potatoes

No. 28507

BULK CERTIFICATE

We, the undersigned, submit that the potatoes covered by this CERTIFICATE, not to exceed _____ (pounds) or _____ (cwt), have been grown and handled according to the Rules and Regulations governing the production of certified seed potatoes as promulgated by the Colorado State Board of Agriculture and administered by the Potato Certification Service.

Seed Grower _____	Cultivar (Addendum _____)	Year of Crop _____
<u>SEED CLASS (Specify)</u> _____	<u>LOT NO.</u> _____	<u>TAG GRADE</u> _____
Generation/Nuc _____ G1 _____ G2 _____ G3 _____ G4 _____ G5 _____ G6 _____ NGC _____	Blue _____ Yellow _____	Eligible _____ Eligible pending _____ Winter Test _____ Ineligible _____ Ineligible * _____
Virus Tested _____ Experimental Seed _____	Size Specifications _____	CUT SEED _____

U.S. Plant Variety Protection Granted or Applied For - UNAUTHORIZED PROPAGATION PROHIBITED! _____

Consignee _____	Address _____	
Owner of Conveyance _____	Number of Car or Truck License _____	
Date Loaded _____	Federal/State Inspection Certificate No. _____	PCS Seal No. _____
Signature of Grower _____	Date _____	

Since the use, crop, yields or quality of seed potatoes is beyond the control of the producer, the seller, the inspector, the Colorado Certified Potato Growers' Association, Inc. or the State Board of Agriculture, no warranty of any kind, express or implied, including merchantability, which extends beyond the description on the face of this Certificate is made concerning the performance or quality of these seed potatoes. Also, there is no representation or warranty that licensed cultivars listed on this bulk certificate will not infringe any patent or other proprietary right. By acceptance of these seed potatoes, buyer expressly agrees that its exclusive remedy for breach of any warranty shall be limited in all events to a return of the purchase price of the seed.

THIS CERTIFICATE IDENTIFIES THE ABOVE DESCRIBED SEED POTATOES AS CERTIFIED ONLY WHILE THEY ARE ON BOARD THE CONVEYANCE DESCRIBED ABOVE AND THE SEAL REMAINS UNBROKEN. ONCE THEY ARE UNLOADED, NO FURTHER IDENTITY WITH THIS CERTIFICATE MAY BE CLAIMED!

(White copy to Receiver; Yellow copy to Seed Grower; Pink copy to Potato Certification Service)



Potato Certification Service
 San Luis Valley Research Center
 0249 East Road 9 North
 Center, Colorado 81125
 (719) 754-3496
 FAX: (719) 754-2619

No 0793

NOTICE TO RECEIVERS OF EXPERIMENTAL POTATO SELECTIONS

I understand that the potato selections that I am receiving are experimental selections from the Colorado State University Agricultural Experiment Station (CSU-AES) potato breeding and selection program and may be used for research or evaluation purposes only. I further understand that experimental selections are in the process of being evaluated prior to official release and accept such additional risks that may be associated with such potatoes. I agree not to hold the University or its representatives liable for any losses incurred as a result of production and/or disposition of these potatoes.

I also understand that I may not provide these potatoes to anyone else without approval of CSU-AES or its designated representative. I further understand that any of these selections may be released as a cultivar, and may be legally protected under the federal Plant Variety Protection Act or other mechanisms which may require royalty payments before being grown commercially. No right or license to control seed stocks of these potatoes is granted to me by this agreement. Information I develop about these materials and disposition of production will be freely shared with the CSU-AES when requested.

I hereby acknowledge that I am receiving the following experimental potatoes:

Grower:	Buyer:
---------	--------

Lot Number	Selection	Amount (cwt)

Buyer
 Signature: _____ Date: _____

Address: _____

Telephone: _____

Fax: _____

Please return to Potato Certification Service, Attn: Dr. Robert D. Davidson at the letterhead address. Approval for sale of stocks will be authorized upon receipt of this completed form. Please call if you have questions.

Year:

Name:

Address:

Location:

Phone:



Colorado Potato Certification Service
 San Luis Valley Research Center
 0249 E. Rd. 9 North
 Center, CO 81125
 (719)754-3594

Application for Certification of Seed Potatoes

DIRECTIONS: Fill in form completely. Enter each seed lot of each cultivar on a separate line, prepare a map showing location each seed lot with each seed field. Return completed forms with payment (made out to the CCPGA) to the Potato Certification Service office. Application must be signed to be valid! PCS will assign a lot identity number and send back the top copy to you.

MAP ID	CIRCLE	VARIETY	ACREAGE	SEED SOURCE		INTENDED SEED CLASS	DATE
				LAST YR. GROWER	LAST YR. LOT NO.		
1							
2							
3							
4							
5							

Acreage Fee Total Acres (G1-G5) _____ x \$24.00/acre = \$ _____

Total Acres (G6) _____ x \$16.00/acre = \$ _____

PVX Testing G2 -- No. Acres _____ x \$28.00/acre = \$ _____

G3 -- No. Acres _____ x \$2.80/acre = \$ _____

GRAND TOTAL FEE = \$ _____

CONDITIONS OF APPLICATION: I hereby apply for certification and inspection of the above lots of potatoes and agree to abide by the Rules and Regulations established by the Colorado State Board of Agriculture for the Certification of Seed Potatoes.

SIGNATURE: _____ Date: _____

Each application must be signed

RETURN ALL COPIES TO PCS OFFICE. PCS WILL ASSIGN A LOT IDENTITY NUMBER AND RETURN ONE COPY TO YOU.



Colorado Potato Certification Service
 San Luis Valley Research Center
 0249 E. Rd. 9 North
 Center, CO 81125
 (719)754-3594

Application NO.

Year:

Name:

Address:

Location:

Grower NO: 180

Phone:

Map Circle ID	LOT ID	INSP NO	Ac	DATE	ST	V	Plant Count	CL	LR	MO	CA	HW	GH	VM	BL	VA	BRR	Status	Weather	Inspect	Misc
1	east 1 06180ATL41	1ST	60	06/28	85	4	6000		0.02	0.05							n/o		C CA W	RH	
1	east 1 06180ATL41	2ND	60	07/15			6000	B		0.03							n/o		PC CA W	CB	
1	east 1 06180ATL41	FIN	60	08/05													n/o				

SOIL MOISTURE, WEEDS, FROST OR HAIL DAMAGE, CHEMICAL INJURY, INSECT DAMAGE AND FOLIAGE OR SOIL-BORNE DISEASE MAY BE NOTED IN THE COMMENTS IF THESE FACTORS ARE PRESENT TO A DEGREE THAT MAY INFLUENCE INSPECTION ACCURACY.

LR - Leafroll, MO - Mosaic, VM - Varmint, BL - Blight, HW - Haywire, VA - Variant, GH - Gashill, CA - Calico,

*Blank indicates none observed except under the BRR column where N/O will be written.

T (Trace) indicates an amount less than 0.01% or plants observed out of plant count.

RJ - Rejected, WD - Withdrawn, DG - Downgraded

Vigor is from 1 - 5, 1 = Poor, 5 = Excellent

Weather: C = Clear, PC = Partly Cloudy, Cl = Cloudy, Co = Cool, W = Warm, H = Hot, Ca = Calm, B = Breezy, Wi = Windy



Application No. 0053
 YEAR _____
 Grower Name: _____
 Address: _____
 Location: _____
 Grower No: _____ Phone: _____

Potato Certification Service
 San Luis Valley Research Center
 0249 E. Rd. 9 North
 Center, Colorado 81125
 (719) 754-3594

APPLICATION FOR GROWER ENTRY PROGRAM

DIRECTIONS: Fill in the form *completely!* Enter each seed lot to be inspected on a separate line. Prepare a map on the back showing location of potato fields to be inspected and also those potato acreages not designated for certification, but to be inspected. Return completed form, with payment, to the Potato Certification Service. Application must be signed to be valid!

Total potato acreage planted in farming operation: _____

Map ID #	PCS Lot #	Cultivar or Seedling No.	Acreage	Last Year Grower	Last Year Lot #	Intended Seed Class	Date Planted
1							
2							
3							
4							
5							
6							
7							
8							

See Rules and Regulations for Seed Class Requirements

Acreage Fee = Total Acres _____ X \$ _____ /acre = \$ _____

BRR Inspection fee = Total Acres _____ X \$ 3.00/acre = \$ _____

Amount Enclosed = \$ _____

STATEMENT OF INTENT: As per the above described program, I hereby testify that all seed produced in the Grower Entry Program will be for my own use only, until such time as full certification status has been met. I further plan to enter all of my potato acreage for certification in the year _____.

SIGNATURE: _____ Date _____
 Each application must be signed

"By law and purpose, the Colorado State University Cooperative Extension Service is dedicated to serve all people on an equal and nondiscriminatory basis."

RETURN ALL COPIES TO PCS OFFICE. PCS WILL ASSIGN A LOT IDENTITY AND RETURN ONE COPY TO YOU

Grower Entry Program Check-Off list must accompany application