



MINNESOTA CROP
IMPROVEMENT ASSOCIATION

Agronomic Seed Certification Standards

Seed Certification Handbook Supplement

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PURPOSES OF SEED CERTIFICATION

The purposes of seed certification are to preserve the genetic purity and identity, increase the supply and accelerate the distribution of seed of new and improved field crop varieties. In the ordinary distribution of commercial seed, the buyer must accept the information on the label as to variety and source. In contrast, the variety and origin of certified seed can be traced back to the producer through the information on the label. Field inspection of the growing crop, sampling, laboratory analysis, and proper labeling of seed produced by careful, conscientious growers are requirements for certification. These procedures provide the best possible assurance of good quality seed of known purity and heredity.

DEFINITIONS

- A. **Variety:** an assemblage of cultivated individuals, distinguished by any character (morphological, physiological, cytological, chemical or others) significant for the purposes of agriculture, which retain their distinguishing features when reproduced or reconstituted.
- B. **Open pollination:** pollination that occurs naturally as opposed to controlled pollination, such as by detasseling, cytoplasmic male sterility, self-incompatibility or similar processes.
- C. **Inbred line:** a relatively true breeding strain resulting from at least five successive generations of controlled self-fertilization, or from backcrossing to a recurrent parent with selection or its equivalent for specific characteristics.
- D. **Foundation single cross:** the first-generation hybrid between two inbred lines to be used in the production of double, three-way or top crosses.
- E. **Foundation Backcrosses**
 - 1. A first generation foundation backcross shall be the first generation cross between a foundation single cross of related inbred lines and an inbred line which shall be the same as one of the inbred lines in the foundation single cross.
 - 2. A second generation foundation backcross shall be the cross of a first generation backcross (ear parent) with its recurrent inbred parent (pollen parent).
- F. A **commercial hybrid** is one to be planted for production for any use except seed. It may be any one of the following:
 - 1. A **double cross:** the first generation of a cross between two single crosses.
 - 2. A **three-way cross:** the first generation of a cross between a single cross and an inbred line.
 - 3. A **single cross:** a first generation cross between two inbred lines. (To be used for commercial production and not for the production of double or three-way crosses).
 - 4. A **top cross:** the first generation of a cross between an inbred line and an open-pollinated variety, or the first generation of a cross between a single cross and an open-pollinated variety.
- G. **Classes Recognized in Seed Certification**
 - 1. **Breeder seed** is directly controlled by the originating plant breeding institution, firm or individual. It is the source for the production of seed of the certified classes.
 - 2. **Foundation seed** is the progeny of breeder or foundation seed handled to maintain specific genetic purity and identity. Production must be acceptable to the certifying agency.
 - 3. **Registered seed** is the progeny of breeder or foundation seed handled under procedures acceptable to the certifying agency to maintain satisfactory genetic purity and identity.
 - 4. **Certified seed** is the progeny of breeder, foundation or registered seed handled to maintain satisfactory genetic purity and identity and approved by the certifying agency.
- H. **Other varieties and off-types:** plants or seeds that do not conform to the characteristics of a variety as described by the breeder. They do not include variations that are characteristic of the variety.
- I. **Variant:** any seed or plant that: (a) is distinct but occurs naturally within a variety, (b) is stable and predictable with a degree of reliability comparable to other varieties of the same kind, within recognized tolerances, when the variety is reproduced or reconstituted, and (c) was originally a part of the variety as released. A variant is not an off-type.

- J. **Objectionable weed seeds:** weed seeds for which the rate of occurrence in certified seed is limited as indicated in the specific crop standard.
- K. **Prohibited weed seeds:** weed seeds specified by Minnesota Seed Law and Regulations: Bull thistle, Canada thistle, musk thistle, perennial sowthistle, plumeless thistle, field bindweed, hemp, leafy spurge, perennial peppergrass, Russian knapweed and Palmer amaranth.
- L. **Restricted weed seeds:** weed seeds specified by the Minnesota Seed Law and Regulations: buckhorn plantain, dodder, Frenchweed, hoary alyssum, horsenettle, wild mustard, quackgrass, wild radish, giant foxtail and Eastern black nightshade. The rate of occurrence in certified seed is limited as indicated in the specific crop standard.
- M. **Total viability:** The sum of percentage germination plus dormant plus hard seeds.
 - 1. **Germination:** In seed laboratory practice, germination is the emergence and development of the essential structures of the seed embryo that, for the kind of seed in question, are indicative of the ability to produce a normal plant under favorable conditions.
 - 2. **Dormant seed:** viable seeds, other than hard seeds, that fail to germinate when provided the specified germination conditions for the kind of seed in question.
 - 3. **Hard seed:** seed that remain hard at the end of the prescribed test period because they have not absorbed water due to an impermeable seed coat.
- N. **Seed conditioning:** includes all activities performed on the seed between harvest and marketing, such as cleaning, packaging, labeling, and storage.

DISCLAIMER OF WARRANTY

The Minnesota Crop Improvement Association expressly represents that it has acted in accordance with those standards and procedures established for seed certification in Minnesota. The issuance of a certified seed label or certificate for a lot of seed neither warrants that any other person or entity has acted in accordance with such standards and procedures, nor constitutes any other warranty, express or implied, including merchantability or fitness for purpose or otherwise which extends beyond the certification that the seeds inspected met the regulations of the agency.

CERTIFICATION OF CROPS NOT LISTED IN THESE STANDARDS

Certification of crops not listed in this manual will be governed by standards established by the Association of Official Seed Certifying Agencies, which are available upon request.

HYBRID CORN

A commercial hybrid is one to be planted for production for any use except seed. It may be any one of the following:

1. A double cross: the first generation of a cross between two single crosses.
2. A three-way cross: the first generation of a cross between a single cross and an inbred line.
3. A single cross: a first generation cross between two inbred lines. (To be used for commercial production and not for the production of double or three-way crosses.)
4. A top cross: the first generation of a cross between an inbred line and an open-pollinated variety, or the first generation of a cross between a single cross and an open-pollinated variety.

Eligibility of Stock Seed

Only certified Foundation single-cross seed may be planted for the production of double-cross, three-way cross, or top-cross hybrids.

Inbred line seed planted for the production of hybrid corn seed for export must be certified.

Only the class "Certified" is recognized.

Land Requirements

Seed fields shall not be planted on land that has grown corn of another color or endosperm type during the preceding season/crop.

Field Inspections

At least three field inspections shall be made during the pollinating period. These inspections will be made without previous notification to the grower.

Isolation

1. Fields must be isolated as required in the table that follows. Isolation requirements may be met by distance alone, or by a combination of distance and male border rows as specified in the table. The stand of male border rows must be satisfactory and effective. The distance is from the female parent to other corn outside of the crossing field.

Minimum distance from other corn to the first seed parent plant	Field Size	
	To 20 acres	20 acres or more
feet	Minimum border rows	
660	0	0
570	4	2
490	6	2
410	8	4
330	10	6
270	12	8
210	14	10
150	16	12
90	18	14
< 90	24 ¹	16 ²

¹ Minimum of 60 feet including border rows

² Minimum of 40 feet including border rows

2. Where pollen parent border rows are ineffective or missing, effectively shedding pollen parent rows within the field may be used in accordance with the table to determine the isolation distance correction in the seed parent.
3. Adequate natural barriers are permitted for modifying isolation distance.
4. Differential maturity dates are permitted for modifying isolation distance, provided that less than 5% of the seed parent plants have receptive silks at the time pollen is being shed in the contaminating field.

5. Hybrid seed fields must be so located that the seed parent is not less than 660 feet from corn of a different color or texture. Isolation distance from Sweet corn plots totaling less than one-quarter acre on one exposure of a Hybrid seed corn field may be modified in accordance with the table found above.

Detasseling

1. A field will be rejected when more than 1.0% of the plants in seed rows on any one inspection, or more than a total of 2.0% on three or more inspections, have shed pollen when more than 5.0% of the seed parent plants have receptive silks (based on the number of plants in the tasseling stage).
2. When more than one combination is being grown in the same isolation and the seed parent of one or more of them is shedding pollen in excess of 1.0%, all ear parents having 5.0% or more apparently receptive silks at the time will be disqualified unless adequately isolated from the shedding seed parent.
3. Sucker tassels, portions of tassels, or tassels on main plants will be counted as shedding pollen when two inches or more of the central stem, the side branches, or a combination of the two have anthers extended from the glumes and are shedding pollen.

Roguing

Off-type plants must be removed from a specific field in such a manner that suckers will not develop.

A field will be rejected where more than 0.1% off-type plants have shed pollen when 5.0% or more of the ear parent plants in the field have receptive silks.

A field will be rejected at the last field inspection where more than 0.1% of the ear parent plants are off-types.

Male Sterile Ear Parent

A male sterile ear parent may be used to produce certified hybrid corn seed by either of two methods.

1. Seed of the normal fertile ear parent must be mixed with the seed of the male sterile ear parent of the same pedigree either by blending in the field at harvest or by size at processing time. The ratio of male sterile ear parent seed to normal ear parent seed shall not exceed 2:1.
2. The pollen parent must involve a certified pollen restoring line or lines so that not less than one-third of the plants grown from hybrid corn seed produce pollen which appears to be normal in quantity and viability.

FOUNDATION SINGLE CROSS CORN

A foundation single cross is the first-generation hybrid between two inbred lines to be used in the production of double, three-way or top crosses. It must be produced from certified seed of approved lines.

Male Sterile Lines

1. A male sterile line may be substituted for its fertile counterpart as one parent of a Foundation single cross provided:
 - A. The male sterile line has been backcrossed for not less than five generations to its fertile counterpart, and
 - B. The male sterile line is the same in other characteristics as its fertile counterpart.

Fertility Restoring Lines

A fertility restoring line may be substituted for its non-restoring counterpart in a Foundation single cross provided the fertility restoring line is the same in other observable characteristics as its non-restoring counterpart.

Land Requirements

Seed fields shall not be planted on land that has grown corn of another color or endosperm type during the preceding season/crop.

Isolation

A production field of a specific Foundation single cross involving male sterile or fertile material must be so located that it is not less than 660 feet from any kind of corn, except no isolation is required for the increase of hand-pollinated seed. The following exceptions may be considered, when the contaminating field is of the same color and texture.

1. Adequate natural barriers are permitted for modifying isolation distances, and
2. Differential maturity dates may permit modifying isolation distances, provided that less than 5% of the seed parent plants have receptive silks at the time pollen is being shed in the contaminating field.

Field Inspections

At least four field inspections shall be made before and during the pollinating period. These inspections will be made without previous notification to the grower.

The applicant must obtain a genetic purity test from an approved MCIA laboratory on the harvested seed of each field or on each seed lot. The total purity must result in 98% or greater in order to pass.

Detasseling

A field will be rejected when more than 0.5% of the plants in seed rows on any one inspection, or more than a total of 1.0% on three or more inspections, have shed pollen when more than 5.0% of the seed parent plants have receptive silks (based on the number of plants in the tasseling stage).

Roguing

Off-type plants must be removed from a specific single cross field in such a manner that suckers will not develop. Any plant shedding pollen in male sterile rows must be destroyed at pollination time to eliminate the possibility of its seed production.

A field will be rejected when more than 0.1% off-type plants have shed pollen when 5.0% or more of the ear parent plants in the field have receptive silks.

A field will be rejected at the last field inspection when more than 0.1% of the ear parent plants are off-type.

CORN INBRED LINES

To be eligible for certification an inbred line must be from a source whose identity may be assured and approved by the certifying agency.

An inbred used as a pollinator in a foundation single cross or foundation backcross in isolation may be certified provided all the seed parents in the isolated field are inspected for certification and meet all field requirements for certification.

An inbred line must be a relatively true breeding strain of corn resulting from at least five successive generations of controlled self-fertilization, or from backcrossing to a recurrent parent with selection or its equivalent.

A recovered parent fertility restoring inbred line must have been backcrossed to its recurrent parent with selection for fertility restoration relative to a specific cytoplasmic sterile source for not less than five generations.

Proof of the fertility-restoring ability of the line will be supplied by the originator.

Land Requirements

Seed fields shall not be planted on land that has grown corn of another color or endosperm type during the preceding season/crop.

Isolation

A production field of a specific Corn Inbred Line involving male sterile or fertile material must be so located that it is not less than 660 feet from any kind of corn, except no isolation is required for the increase of hand-pollinated seed. The following exceptions may be considered, when the contaminating field is of the same color and texture.

1. Adequate natural barriers are permitted for modifying isolation distances, and
2. Differential maturity dates may permit modifying isolation distances, provided that less than 5% of the seed parent plants have receptive silks at the time pollen is being shed in the contaminating field.

Field Inspections

At least four field inspections shall be made before and during the pollinating period. These inspections will be made without previous notification to the grower.

The applicant must obtain a genetic purity test from an approved MCIA laboratory on the harvested seed of each field or on each seed lot. The total purity must result in 98% or greater in order to pass.

Detasseling

A field will be rejected when more than 0.5% of the plants in seed rows on any one inspection, or more than a total of 1.0% on three or more inspections, have shed pollen when more than 5.0% of the seed parent plants have receptive silks (based on the number of plants in the tasseling stage).

Roguing

Off-type plants must be removed from a specific inbred line field in such a manner that suckers will not develop. Any plant shedding pollen in male sterile rows must be destroyed at pollination time to eliminate the possibility of its seed production.

A field will be rejected when more than 0.1% off-type plants have shed pollen when 5.0% or more of the ear parent plants in the field have receptive silks.

A field will be rejected at the last field inspection when more than 0.1% of the ear parent plants are off-type.

Post control testing may be used to determine the final percent hybridization and genetic purity. Final certification of seed lots as determined by the certifying agency may be contingent upon determination of percent hybridization using the following methods:

- a. Molecular assay testing methods which determine the percent hybridization by identifying selfs within the seed lot by grade size.
- b. Field grow-outs of seed from production fields or isolations by grade size.
- c. The following varietal purity levels shall be applied:
 - i. Certified single cross hybrids 97%
 - ii. other Certified crosses 95%

Seed Standards

Factor	Foundation single crosses and inbred lines	Certified commercial hybrid corn
Pure seed (minimum)	99.00%	99.00%
Inert matter (maximum)	1.00%	1.00%
Weed seeds (maximum)	None	None
Other crop seeds (maximum)	None	None
Other varieties (maximum) ¹	None	0.50%
Germination (minimum) ²	90%	90%

¹ Pertains to a mechanical (visual) purity test where kernels of different color or endosperm type will be weighed to determine the percentage.

² Minimum germination for popcorn is 85%.

SMALL GRAINS, FLAX, AND SOYBEANS

General Field Standards

1. A crop will not be eligible for certification if planted where the same kind of crop was grown the previous year unless the previous crop was grown from certified seed of the same variety. All market classes of wheat are considered one crop.
2. Field inspection shall be made as follows:
 - A. Wheat, oats, barley, rye, triticale, annual canarygrass, millet: after the crop is fully headed.
 - B. Flax and buckwheat: when field is in full bloom.
 - C. Soybeans: usually when the crop is approaching maturity but may be at flowering time.
3. The field shall be considered the unit for certification. Fields shall be separated from any other variety, uncertified seed of the same variety, and from other inseparable crops by a distance adequate to prevent mechanical mixture.
4. Wheat fields producing certified seed must be isolated by at least 50 feet for Foundation, 30 feet for Registered, and 20 feet for Certified from fields of any wheat of differing colors or textures, for example, white from red wheat.
5. Rye and buckwheat fields producing certified seed must be isolated by at least 660 feet from fields of any other variety of the same crop, or fields of the same variety that do not meet the varietal purity requirements for certification.

Small Grains—Wheat, Barley, Oats, Rye, Triticale, Buckwheat, Millet, Annual Canarygrass

Specific Field Standards

Factor	Maximum permitted ratio of heads		
	Foundation	Registered	Certified
Other varieties			
Crops except millet	1:10,000	1:5,000	1:2,000
Millet	1:3,000	1:2,000	1:1,000
Inseparable other crops	None	1:30,000	1:10,000

Seed Standards—Wheat, Barley, Rye, Triticale, Buckwheat, Millet, Annual Canarygrass

Factor	Standards for each class		
	Foundation	Registered	Certified
Pure seed (minimum) ¹	99.00%	99.00%	99.00%
Inert matter (maximum) ¹	1.00%	1.00%	1.00%
Weed seeds (maximum) ²	0.05%	0.05%	0.10%
Prohibited weed seeds	None	None	None
Restricted and objectionable ³ weed seeds	1 per 2 lb	1 per 2 lb	1 per lb
Other crop seeds (maximum)	1 per 2 lb	1 per lb	3 per lb
Other varieties (maximum)	0.01%	0.01%	0.10%
Germination (minimum) ⁴	85%	85%	85%
Barley loose smut (maximum) ⁵	N.S.	4.00%	4.00%

¹ Minimum pure seed for durum, winter wheat, rye and triticale is 98.00%; maximum inert matter is 2.00%.

² Maximum total weed seeds for Annual canarygrass: Foundation – 0.10%; Registered – 0.20%; Certified – 0.30%.

³ Wild oats and wild vetch are classified as objectionable weed seeds in certified seed.

⁴ Minimum germination for durum, winter wheat and rye is 80%.

⁵ Loose smut percentage on barley must appear on label for all classes. Seed lots containing more than 4.00% may be labeled substandard. The grower is responsible for having a loose smut test on the harvested seed of each field. If seed from more than one field is blended before testing, loose smut test must be made on each seed lot.

Seed Standards—Oats

Factor	Standards for each class		
	Foundation	Registered	Certified
Pure seed (minimum)	99.00%	99.00%	99.00%
Inert matter (maximum)	1.00%	1.00%	1.00%
Weed seeds (maximum)	0.05%	0.05%	0.10%
Prohibited weed seeds	None	None	None
Restricted and objectionable ¹ weed seeds	1 per 2 lb	1 per 2 lb	3 per lb
Other crop seeds (maximum)			
<i>Excluding rye</i>	1 per 2 lb	1 per lb	3 per lb
<i>Including rye</i> ²	1 per 2 lb	1 per lb	10 per lb
Other varieties (maximum)	0.10%	0.20%	0.30%
Germination (minimum)	85%	85%	85%

¹ Wild oats and wild vetch are classified as objectionable weed seeds in certified seed.

² When including rye, total crop seed of other species (e.g., wheat) may not exceed 3 per pound.

Flax

Specific Field Standards

Factor	Maximum permitted ratio of plants		
	Foundation	Registered	Certified
Other varieties	1:10,000	1:5,000	1:2,000

Seed Standards

Factor	Standards for each class		
	Foundation	Registered	Certified
Pure seed (minimum)	99.00%	99.00%	98.50%
Inert matter (maximum)	1.00%	1.00%	1.50%
Weed seeds (maximum)	0.05%	0.05%	0.10%
Prohibited weed seeds	None	None	None
Restricted and objectionable ¹ weed Seeds	1 per lb	1 per lb	3 per lb
Other crop seeds (maximum)	1 per 2 lb	1 per lb	3 per lb
Other varieties (maximum)	0.01%	0.01%	0.02%
Germination (minimum)	85%	85%	85%

¹ Wild oats and wild vetch are classified as objectionable weed seeds in certified seed.

Soybeans

Specific Field Standards

Factor	Maximum permitted ratio of plants		
	Foundation	Registered	Certified
Other varieties	1:1,000	1:500	1:200
Inseparable other crop	None	1:5,000	1:2,000
Corn and sunflower plants bearing seed	None	None	None

Seed Standards

Factor	Standards for each class		
	Foundation	Registered	Certified
Pure seed (minimum)	99.00%	99.00%	99.00%
Inert matter (maximum)	1.00%	1.00%	1.00%
Weed seeds (maximum) ¹	None	0.05%	0.05%
Prohibited weed seeds	None	None	None
Restricted weed seeds	None	None	None
Total other crop seeds (maximum)	0.10%	0.25%	0.60%
Other varieties (maximum)	0.10%	0.20%	0.50%
Other kinds (maximum) ²	None	0.05%	0.10%
Germination and hard seeds (minimum)	85%	85%	85%

¹ Weed seed maximum: Registered – 1 per pound; Certified – 2 per pound.

² Other crop kinds shall not exceed 1 per pound in any class, with no corn or sunflowers allowed.

SUNFLOWERS

General Field Standards

1. A crop will be ineligible for certification if planted where sunflowers were grown the previous year.
2. At least three field inspections shall be made, one during the bud to very early blooming stage and two during bloom.
3. At least 50% of the male parent plants in a field producing hybrid sunflower seed must be in bloom and producing pollen when the female parent is in full bloom. Plants shedding pollen in female rows must be removed and disposed of in a manner that will prevent their pollen from being disseminated.
4. The field shall be considered the unit for certification. Fields shall be separated from other sunflowers by 5,280 feet and from other inseparable crops by a distance adequate to prevent mechanical mixture.
5. In inbred lines and Foundation single crosses, only the Foundation class shall be recognized. In hybrid varieties, only the Certified class shall be recognized.
6. In increase fields of inbred parental lines, and in the male rows of commercial hybrid production fields, all off-types must be removed before any pollination has taken place.
7. Standards for seed-borne diseases in sunflowers are not specified; however, the inspector may reject fields for disease if the quality of the seed will be affected.

Specific Field Standards

Factor	Standards for each class		
	Foundation	Registered	Certified
Off-type plants (maximum per 1,000) ¹			
Open-pollinated varieties	5	5	5
Hybrid production:			
Female seed parent	4		4
Male pollinating parent	4		4
Isolation (feet) ²	5,280	5,280	5,280

¹ To include not more than one plant of wild type branching, purple, or white-seeded types.

² Must be isolated from other varieties, strains, hybrids, non-certified crops of the same variety not being monitored, volunteer sunflowers and wild *Helianthus annuus*.

Seed Standards

Factor	Standards for each class		
	Foundation	Registered	Certified
Pure seed (minimum)	98.00%	98.00%	98.00%
Inert matter (maximum)	2.00%	2.00%	2.00%
Sclerotia bodies	5 per lb	5 per lb	5 per lb
Weed seeds (maximum)	None	None	0.10%
Prohibited weed seeds	None	None	None
Restricted weed seeds	None	None	None
Total other crop seeds (maximum)	0.02%	0.07%	0.20%
Other varieties (maximum)	0.02%	0.02%	0.10% ²
Other kinds (maximum)	None	0.05% ¹	0.10% ¹
Germination (minimum)	85%	85%	85%

¹ Shall not exceed one seed per pound.

² Shall not include more than 0.04% purple or white seeds.

Pre-Control Standards

If field inspection shows one or more of the following, the applicant may request that seed certification be based on the results of a pre-certification grow-out test approved by the certification agency:

1. Inadequate isolation.
2. Too few male parent plants shedding pollen when female parent plants are receptive.
3. Excess off types not to include wild types.

In such cases, at least 2,000 plants must be observed, and they must meet the following standards before seed can be certified from fields with problems listed above.

Post-control Standards

Factor	Hybrid	Inbred
Sterile plants	5.0%	—
Sterile or fertile plants	—	5.0%
Morphological off types	0.5%	0.5%
Wild types	0.2%	0.2%
Total, including above types	5.0%	5.0%

FIELD BEANS

General Field Standards

1. A crop will not be eligible for certification if planted on land on which dry field beans or green beans were produced in any of the preceding two years.
2. Two field inspections shall be made: the first when approximately 75% of the plants are flowering; the second when at least 75% of the leaves have fallen and pods are showing maturity.
3. The field shall be considered the unit of certification. Fields shall be separated from any other variety, uncertified seed of the same variety, and from other inseparable crops by a distance adequate to prevent mechanical mixture. A fence row, natural boundary, or a strip at least 6 feet wide is considered adequate isolation.
4. Poor stands, poor vigor, lack of uniformity, excess weeds or conditions which are apt to make inspection or seed testing inaccurate shall be cause for rejection.

Specific Field Standards

Factor	Maximum permitted ratio of plants		
	Foundation	Registered	Certified
Other varieties	1:10,000	1:2,000	1:1,000
Inseparable other crops	None	None	None
Bacterial bean blights	None	None	1:10,000
Common bean mosaic	None	1:200	1:100
Anthraxnose	None	None	None
Wilt	None	1:10,000	1:5,000

Seed Standards

Factor	Standards for each class		
	Foundation	Registered	Certified
Pure seed (minimum)	98.00%	98.00%	98.00%
Inert matter (maximum) ¹	1.00%	1.00%	1.00%
Weed seeds (maximum)	None	1 per lb	2 per lb
Prohibited weed seeds	None	None	None
Restricted weed seeds	None	None	None
Other crop seeds (maximum)	None	None	1 per 2 lb
Other varieties (maximum)	0.01%	0.05%	0.10%
Germination (minimum)	N.S.	85%	85%
Bacterial blight infected seed ²	*	*	*
Anthraxnose infected seed ³	None	None	None

¹ Foreign matter other than broken seed may not exceed 0.50%.

² The applicant must obtain a bacterial blight test on each field or on each seed lot if more than one field is commingled prior to testing. The Dome Test value shall be 4 or less.

³ The applicant must obtain an Anthracnose test on the harvested seed of each field or on each seed lot if more than one field is commingled prior to testing. Anthracnose test results shall be printed on the certification label.

FIELD PEAS

General Field Standards

1. A crop will not be eligible for certification if planted where the same kind of crop was grown the previous year unless the previous crop was grown from certified seed of the same variety, or when planted on land on which chickpeas, field beans, green beans, or soybeans were produced the preceding year.
2. Field inspection shall be made prior to harvest when the crop is in bloom.
3. The field shall be considered the unit of certification. Fields shall be separated from any other variety, uncertified seed of the same variety, and from other inseparable crops by a distance adequate to prevent mechanical mixture.

Specific Field Standards

Factor	Maximum permitted ratio of plants		
	Foundation	Registered	Certified
Other varieties	1:3,000	1:2,000	1:1,000
Inseparable other crops	None	None	None

Seed Standards

Factor	Standards for each class		
	Foundation	Registered	Certified
Pure seed (minimum)	98.00%	98.00%	98.00%
Inert matter ¹ (maximum)	2.00%	2.00%	2.00%
Weed seeds (maximum)	None	None	0.10%
Prohibited weed seeds	None	None	None
Restricted weed seeds	None	None	None
Other crop seeds (maximum)	None	0.10%	0.20%
Other varieties (maximum)	0.05%	0.10%	0.20%
Germination and hard seed (minimum)	N.S.	85%	85%

¹ Foreign matter other than broken seed may not exceed 0.50%.

PERENNIAL GRASSES AND LEGUMES

Application for field inspection is required the year the seeding is established. Neither inspection fees nor field inspection will be required in the year of establishment, but will be required each successive year the crop is in seed production. Lapse of inspection will result in permanent disqualification for the field, unless permission is obtained by the applicant prior to the time inspection is required.

Eligibility for certification is maintained as long as field is continuously in production of certified seed, subject to limitation of length of stand for specific varieties and/or crops. Fields that are not harvested in a given year must be placed on “hold” to maintain eligibility.

Fields on “hold” will be observed by an MCIA inspector during or immediately following the harvest period for the crop and area. These fields lose eligibility to produce certified seed if seed is harvested from them. Any seed lot containing seed from such fields is ineligible for certification. Any applicant or contract grower who harvests seed from these fields more than once will be ineligible to produce certified seed either as an applicant or contract grower.

Red Clover and Alfalfa

General Field Standards

1. For the production of Foundation red clover or alfalfa seed, Breeder seed shall be planted on land on which no red clover or alfalfa has been seeded or grown for at least six years. During those six years cultivated crops shall have been grown at least three years.
2. For the production of Registered seed, Foundation seed shall be planted only on land where no red clover or alfalfa seed of any other variety has matured for at least six years, with at least two cultivated crops. An exception is made when the red clover or alfalfa crop is of the same variety, the same or higher seed class, and has passed field inspection for certification.
3. For the production of Certified seed, Registered seed shall be planted only on land where no red clover or alfalfa seed of any other variety has matured for at least four years, with at least two cultivated crops. An exception is made when the red clover or alfalfa crop was of the same variety, the same or higher seed class, and passed field inspection for certification.
4. Stands of red clover or alfalfa will be ineligible to produce any class of certified seed after two seed crops.
5. A field shall be considered the unit for certification.

Specific Field Standards

Factor	Standards for each class		
	Foundation	Registered	Certified
Other varieties ¹	None	1:500	1:200
Sweetclover plants	None	—	—
Isolation:			
Fields less than 5 acres (feet)	1,320	660	330
Fields larger than 5 acres (feet)	1,320	370	165

¹ Maximum permitted ratio of plants.

Seed Standards

Factor	Standards for each class		
	Foundation	Registered	Certified
Pure seed (minimum)	99.00%	99.00%	99.00%
Inert matter (maximum)	1.00%	1.00%	1.00%
Weed seeds (maximum)	0.15%	0.15%	0.25%
Prohibited weed seeds	None	None	None
Restricted weed seeds	9 per lb	9 per lb	9 per lb
Other crop seeds (maximum) ¹	18 per lb	0.25%	0.25%
Sweetclover seeds	9 per lb	9 per lb	27 per lb
Other varieties (maximum)	0.10%	0.25%	0.25%
Germination and hard seeds (minimum)	85%	85%	85%

¹ Including sweetclover.

Birdsfoot Trefoil

General Field Standards

1. For the production of Foundation birdsfoot trefoil seed, Breeder seed shall be planted where no birdsfoot trefoil has been seeded or grown for at least five years. The land shall have been in a cultivated crop or in fallow, in the year prior to seeding.
2. For the production of Registered seed, Foundation seed shall be planted only on land that has not grown birdsfoot trefoil for a period of at least four years, with at least one cultivated crop, unless the birdsfoot trefoil crop was of the same variety, the same or a higher seed class, and passed field inspection for certification.
3. For the production of Certified seed, Registered seed shall be planted only on land that has not grown birdsfoot trefoil for a period of at least three years, with at least one cultivated crop, unless the birdsfoot trefoil crop was of the same variety, the same or higher seed class, and passed field inspection for certification.
4. When all other conditions are met, fields are permitted to produce Foundation, Registered or Certified seed for not more than seven years from the original planting (one year of seeding and six years of crop).

Specific Field Standards

Factor	Standards for each class		
	Foundation	Registered	Certified
Other varieties ¹	1:1,000	1:400	1:200
Sweetclover plants	None	—	—
Isolation:			
Fields less than 5 acres (feet)	1,980	990	495
Fields larger than 5 acres (feet)	1,980	660	330

¹ Maximum permitted ratio of plants.

Seed Standards

Factor	Standards for each class		
	Foundation	Registered	Certified
Pure seed (minimum)	99.00%	99.00%	98.00%
Inert matter (maximum)	1.00%	1.00%	2.00%
Weed seeds (maximum)	0.10%	0.20%	0.50%
Prohibited weed seeds	None	None	None
Restricted weed seeds	9 per lb	9 per lb	25 per lb
Other crop seeds (maximum) ¹	0.10%	0.10%	1.00%
Sweetclover seeds	9 per lb	9 per lb	54 per lb
Other varieties (maximum)	0.10%	0.10%	1.00%
Germination (minimum)	45%	45%	45%
Germination and hard seeds (minimum)	80%	80%	80%

¹ Including sweetclover.

Bluegrass

General Field Standards

1. A field to be eligible for the production of Foundation seed must not have grown or been seeded to the same species during the previous five years.
2. A field to be eligible for the production of Registered or Certified seed must not have grown or been seeded to the same species during the previous three years, except to the same variety of the same or a higher seed class that passed field inspection for certification.
3. The certifying agency will determine the length of time fields will be eligible for certification.

Specific Field Standards

Factor	Standards for each class		
	Foundation	Registered	Certified
Other varieties (maximum) ¹	None	1:100	1:50
Isolation (feet) ²	60	30	15

¹ Ratio of plants.

² Isolation requirements may be reduced to 25% of these distances when different classes of seed of the same variety are being grown on the same or adjacent farms.

Seed Standards

Factor	Standards for each class		
	Foundation	Registered	Certified
Pure seed (minimum) ¹	95.00%	95.00%	95.00%
Inert matter (maximum)	5.00%	5.00%	5.00%
Weed seeds (maximum)	0.30%	0.30%	0.50%
Prohibited weed seeds	None	None	None
Restricted weed seeds	9 per lb	9 per lb	9 per lb
Other crop seeds (maximum)	0.20%	0.50%	1.00%
Other bluegrass species (maximum) ²	0.10%	0.10%	0.25%
Other varieties (maximum)	0.10%	1.00%	2.00%
Germination (minimum)	75%	75%	75%

¹ For the variety Merion the standards are: Pure seed (minimum) 92.00%; inert matter (maximum) 8.00%.

² Includes fowl bluegrass.

PERENNIAL CROSS-POLLINATED GRASSES

General Field Standards

1. Breeder seed for the production of Foundation seed shall be planted where the same species has not been seeded or grown for at least five years. In the case of Tall fescue, land must not have been grown nor been seeded to Festulolium, Meadow fescue, or Tall fescue for at least five years.
2. A field to be eligible for production of Registered or Certified seed must not have grown or been seeded to the same species during the previous two calendar years unless the crop was of the same variety, the same or a higher seed class, and passed field inspection for certification, or had been summer fallowed for two full seasons prior to seeding to another variety. Fall seeding is permitted in the second year. In the case of Tall fescue, the land use restriction also applies to Festulolium and Meadow fescue.
3. The certifying agency will determine the length of time fields will be eligible for certification.
4. Fields must be rogued prior to harvest to remove off-type plants and other grasses or weeds whose seed cannot be removed by mechanical means.

Specific Field Standards

Factor	Standards for each class		
	Foundation	Registered	Certified
Other varieties ¹	None	1:100	1:50
Isolation (feet) ²	1,320	660	165 ³

¹ Maximum permitted ratio of plants.

² Isolation requirements may be reduced to 25% of these distances when different classes of seed of the same variety are being grown on the same or adjacent farms. For Tall fescue, this distance must be maintained from Tall fescue and Festulolium and for Foundation and Registered classes from Meadow fescue.

³ For fields certifiable except for isolation, the field boundary may be established by placing permanent 5-foot posts on either edge of the field, 90 feet from the offending field. The crop between the newly established boundary lines and the offending field may be removed after flowering as a separate field. It may be harvested as uncertified seed.

When two fields are separated by a natural or permanent barrier such as a (1) township, county, state or federal highway, (2) county or judicial drainage ditch or (3) trees or bush, the isolation may consist of a 15-foot strip next to the barrier that can be either destroyed by mowing after bloom but before harvest, or harvested as uncertified seed. The barrier must be free of headed plants of the crop being inspected.

Seed Standards—Festulolium

Factor	Standards for each class		
	Foundation	Registered	Certified
Pure seed (minimum)	97.00%	97.00%	97.00%
Inert matter (maximum)	3.00%	3.00%	3.00%
Weed seeds (maximum)	0.10%	0.20%	0.50%
Prohibited weed seeds	None	None	None
Restricted weed seeds	None	9 per lb	9 per lb
Other crop seeds (maximum)	0.10%	0.25%	0.50%
Germination (minimum)	80%	80%	80%

Seed Standards—Perennial Ryegrass

Factor	Standards for each class		
	Foundation	Registered	Certified
Total ryegrass (minimum)	97.00%	97.00%	97.00%
Inert matter (maximum)	3.00%	3.00%	3.00%
Weed seeds (maximum)	0.10%	0.20%	0.50%
Prohibited weed seeds	None	None	None
Restricted weed seeds	None	9 per lb	9 per lb
Total other crop seeds (maximum)	0.42%	1.25%	3.50%
Annual ryegrass ¹	0.32%	1.00%	3.00%
Crops other than ryegrass	0.10%	0.25%	0.50%
Germination (minimum)	85%	85%	85%

¹ As determined by a fluorescence test or other test supplemental thereto, at a MCIA authorized laboratory.

Seed Standards—Reed Canarygrass

Factor	Standards for each class		
	Foundation	Registered	Certified
Pure seed (minimum)	96.00%	96.00%	96.00%
Inert matter (maximum)	4.00%	4.00%	4.00%
Weed seeds (maximum)	0.30%	0.30%	0.50%
Prohibited weed seeds	None	None	None
Restricted weed seeds	9 per lb	9 per lb	9 per lb
Other crop seeds (maximum)	0.20%	1.00%	2.00%
Other varieties (maximum)	0.1%	1.0%	2.0%
Germination (minimum)	75%	75%	75%

Seed Standards—Tall fescue

Factor	Standards for each class		
	Foundation	Registered	Certified
Pure seed (minimum)	98.00%	98.00%	98.00%
Inert matter (maximum)	2.00%	2.00%	2.00%
Weed seeds (maximum)	0.30%	0.30%	0.30%
Prohibited weed seeds	None	None	None
Restricted weed seeds	None	9 per lb	9 per lb
Other crop seeds (maximum)	0.10%	0.10%	0.50%
Germination (minimum)	85%	85%	85%

Seed Standards—Timothy

Factor	Standards for each class		
	Foundation	Registered	Certified
Pure seed (minimum)	99.00%	99.00%	99.00%
Inert matter (maximum)	1.00%	1.00%	1.00%
Weed seeds (maximum)	0.20%	0.20%	0.50%
Prohibited weed seeds	None	None	None
Restricted weed seeds	9 per lb	9 per lb	9 per lb
Other crop seeds (maximum)	0.20%	0.50%	0.50%
Other grass crop seeds	0.10%	0.10%	0.20%
Other varieties (maximum)	0.10%	0.50%	0.50%
Germination (minimum)	80%	80%	80%

MISCELLANEOUS CROPS

Annual Ryegrass

General Field Standards

1. Breeder seed for the production of Foundation seed shall be planted where the same species has not been seeded or grown for at least five years
2. A field to be eligible for production of Registered or Certified seed must not have grown or been seeded to the same species during the previous three calendar years unless the crop was of the same variety, the same or a higher seed class, and passed field inspection for certification.
3. The certifying agency will determine the length of time fields will be eligible for certification.
4. Fields must be rogued prior to harvest to remove off-type plants and other grasses or weeds whose seed cannot be removed by mechanical means.

Specific Field Standards

Factor	Standards for each class		
	Foundation	Registered	Certified
Other varieties ¹	None	1:100	1:50
Isolation (feet) ²	1,320	660	165 ³

¹ Maximum permitted ratio of plants.

² Isolation requirements may be reduced to 25% of these distances when different classes of seed of the same variety are being grown on the same or adjacent farms.

³ For fields certifiable except for isolation, the field boundary may be established by placing permanent 5-foot posts on either edge of the field, 90 feet from the offending field. The crop between the newly established boundary lines and the offending field may be removed after flowering as a separate field. It may be harvested as uncertified seed.

When two fields are separated by a natural or permanent barrier such as a (1) township, county, state or federal highway, (2) county or judicial drainage ditch or (3) trees or bush, the isolation may consist of a 15-foot strip next to the barrier that can be either destroyed by mowing after bloom but before harvest, or harvested as uncertified seed. The barrier must be free of headed plants of the crop being inspected.

Seed Standards—Annual Ryegrass

Factor	Standards for each class		
	Foundation	Registered	Certified
Total ryegrass (minimum)	97.00%	97.00%	97.00%
Inert matter (maximum)	3.00%	3.00%	3.00%
Weed seeds (maximum)	0.10%	0.20%	0.50%
Prohibited weed seeds	None	None	None
Restricted weed seeds	None	9 per lb	9 per lb
Total other crop seeds (maximum)	0.42%	1.25%	3.50%
Perennial ryegrass ¹	0.32%	1.00%	3.00%
Crops other than ryegrass	0.10%	0.25%	0.50%
Germination (minimum)	85%	85%	85%

¹ As determined by a fluorescence test or other test supplemental thereto, at a MCIA authorized laboratory.

Chickling Vetch

General Field Standards

1. Chickling vetch shall be planted on land on which the preceding crop was of another kind, or the same variety of a certified class.
2. Poor stands, poor vigor, lack of uniformity, excess weeds or conditions which are apt to make inspection inaccurate or bring certified seed into disfavor shall be cause for rejection.
3. Isolation shall be adequate to prevent mechanical mixtures.

Specific Field Standards

Factor	Maximum Permitted Ratio of Plants		
	Foundation	Registered	Certified
Other varieties	1:1000	1:400	1:100

Seed Standards

Factor	Standards for each class		
	Foundation	Registered	Certified
Pure seed (minimum)	95.00%	98.00%	98.00%
Inert matter (maximum)	N.S.	2.00%	2.00%
Weed seeds (maximum)	N.S.	None	0.10%
Prohibited weed seeds	None	None	None
Restricted weed seeds	None	None	9 per lb
Other crop seeds (maximum)	0.05%	0.10%	0.20%
Other varieties (maximum)	0.05%	0.10%	0.20%
Germination (minimum)	N.S.	85%	85%

Cytoplasmic Male Sterile Hybrid Rye

Comingled Parent Lines: 75% to 95% Hybrid

Application of Genetic Certification Standards

1. A commercial hybrid is one to be planted for any use except seed production.
2. Only the Certified class is recognized in the production of commercial hybrid seed.
3. Commercial hybrids must be produced from Foundation class seed stocks. These seed stocks shall consist of male sterile lines, inbred lines, and/or hybrids.
4. Only the Foundation class is recognized for parental lines.

General requirements

The following genetic standards are applicable for the production of parental lines and hybrid rye seed produced by comingling a cytoplasmic male-sterile seed parent and a fertility restorer line.

1. Standards applicable to rye varieties apply to the production of pollinator lines.
2. Definition of parental types
 - A. Maintainer (B-line). A line with normal fertile cytoplasm that is used as a pollinator to increase the seed parent.
 - B. Seed parent (A-line). A cytoplasmic male-sterile line (CMS), that is genetically identical to the Maintainer line that when pollinated by a Restorer, produces hybrid seed.
 - C. Restorer (R-line). A male fertile line possessing nuclear restoration genes used as a pollinator in the production of commercial hybrid seed.

General Field Standards

1. A crop including Maintainer and Restorer lines, Seed parents, and/or commercial hybrid seed production will not be eligible for certification if planted where the same kind of crop was grown the previous two years unless the previous crop was grown from certified seed of the same variety or lines and inspected. All market classes of rye are considered one kind of crop.
2. Field inspection shall be made as follows:

Rouging to remove undesirable plants must be done prior to field inspection and rogued plants must be removed from the field.

 - A. AxB production. Seed parents shall be inspected three times. The first inspection shall be done after heading but before anthesis to check for off-type plants. The second and third inspection shall be done during anthesis to check for shedders in the seed parent, the presence of which shall immediately be communicated with the seed producer to allow for rouging.
 - B. Maintainers and Restorers. Male lines shall be inspected at least once for purity after the crop is fully headed.
 - C. Commercial hybrid production fields shall be inspected at least once.
3. Isolation:
 - A. Seed Parent increases (AxB) Field must be located not less than 3,280 feet (0.62) miles from fields of any kind of rye unless it is of the same seed class, kind, variety and seed parent.
 1. The A-line and B-line shall be separated by a distance to prevent mechanical mixture.
 - B. Maintainers and Restorers. The field must be isolated from inseparable other crops by a distance to prevent mechanical mixture.
 - C. Commercial hybrid seed production fields shall be isolated by a distance of at least 3,280 feet (0.62) miles from any kind of rye unless it is of the same seed class, kind, variety and hybrid seed production.

Specific Field Standards

Factor	Maximum permitted ratio of heads		
	A-Line Foundation	B and R Lines Foundation	Commercial Hybrid Certified
Pollen Shedders	1:3,000	NA	NA
Other Varieties	1:3,000	1:3,000	1:3,000
Inseparable other crops	1:30,000	1:30,000	1:10,000

Seed Standards

Factor	Standards for Certified Seed Class	
	A, B, R-Lines	Certified
Pure seed (minimum)	98.00%	98.00%
Hybridity (minimum) ¹	N/A	75%
Total weed seeds (maximum)	0.10%	0.10%
Other varieties (maximum)	0.05%	0.10%
Other crop seeds (maximum)	1 per 2 lb	3 per lb
Inert matter (maximum)	2.00%	2.00%
Prohibited weed seeds	None	None
Restricted and objectionable ² weed seeds (maximum)	1 per 2 lb	1 per lb
Germination	80%	80%

¹ Hybridity will be determined by a method acceptable by the certifying agency.

² Wild oats and wild vetch seeds are classified as objectionable weeds in certified seed.

Forage Chicory

General Field Standards

1. For the production of Foundation forage chicory seed a field shall be planted where no forage chicory has been seeded or grown for at least five years. The land shall have been in a cultivated crop or in fallow, in the year prior to seeding.
2. For the production of Certified seed, the seed shall be planted only on land that has not grown forage chicory for a period of at least three years, with at least one cultivated crop, unless the forage chicory crop was of the same variety, the same or higher seed class, and passed field inspection for certification.
3. When all other conditions are met, fields are permitted to produce Foundation or Certified seed for not more than seven years from the original planting (one year of seeding and six years of crop).

Specific Field Standards

Factor	Standards for each class	
	Foundation	Certified
Other varieties ¹	1:1,000	1:200
Sweetclover plants	None	-
Isolation:		
Fields less than 5 acres (feet)	660	495
Fields larger than 5 acres (feet)	660	330

¹ Maximum permitted ratio of plants

Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	95.00%	95.00%
Inert matter (maximum)	3.00%	3.00%
Weed seeds (maximum)	0.50%	0.50%
Prohibited weed seeds	None	None
Restricted weed seeds	25 per lb	25 per lb
Other crop seeds (maximum) ¹	0.50%	0.50%
Sweetclover seeds (maximum)	54 per lb	54 per lb
Other varieties (maximum)	0.10%	1.00%
Germination (minimum)	70%	70%

¹ Including sweetclover

Hemp

Eligibility of stock seed

1. Only varieties of hemp approved by regulatory authorities are eligible for certification.
2. Growers may be required by regulatory agencies to obtain THC test results according to applicable regulations. Growers may be required to submit these results to the seed certifying agency before a crop certificate is issued.

Land Requirements

1. Crops should not be planted on land where volunteer growth from a previous crop may cause contamination.
2. Fields for Foundation and Registered classes of hemp seed must not be planted on land which in the previous 3 years grew a crop of hemp.
3. Crops for Certified seed must not be grown on land in which:
 - a. The preceding year, a certified crop of the same variety was grown.
 - b. The preceding two years, a non-certified crop of hemp was grown.
 - c. The preceding two years, a different variety was grown.
4. Fields with presence of Broomrape (*Orobancha spp.*) will not be eligible for certification.
5. Fields may be refused certification due to excessive weeds.

General Field Standards

Crop Inspection

1. It is the grower's responsibility to ensure that fields are inspected by an authorized inspector at least once prior to swathing or harvesting, except in the case of Foundation and Registered monoecious type and unisexual female hybrids, in which two inspections are required.
2. Fields should be planted to facilitate inspection, roguing and harvesting.
3. A field that is cut, swathed or harvested prior to crop inspection is not eligible for certification.
4. Fields must be inspected at a stage of growth when varietal purity is best determined. Crops not inspected at the proper stage for best determining varietal purity may be cause for declining certified status.
 - a. First inspection for all classes of monoecious types must be made just before or at early flowering. First inspection for all classes of dioecious types must be made after flowering when male plants are beginning to senesce.
 - b. Second inspection for all classes of monoecious types, and the Foundation class of dioecious types must be made when seeds are well forming.
 - c. Isolation areas will be inspected for volunteer hemp plants on each inspection.

Isolation

1. There shall not be any hemp plants within 100 meters of the crop and not more than 20 plants per acre beyond 100 meters.
2. The required isolation as outlined in Table 1 must be in place prior to the time of flowering and crop inspection.

Table 1: Minimum Isolation Distances Required Between Inspected Hemp and Other Crops

Inspected Crop	Other Crops	Isolation Distance Required (feet)
Dioecious type: Registered and Foundation	- Different varieties of Hemp - Non-certified crop of same kind	15,748
	- Lower certified class seed crop of same variety	6,460
	- Same class of certified seed of same variety	10
Dioecious type: Certified	- Different varieties of Hemp - Non-certified crop of same kind	2,624
	- Lower certified class seed crop of same variety	656
	- Same class of certified seed of same variety	3
Monoecious type and Hybrids: Registered and Foundation	- Dioecious variety of Hemp - Non-certified crop of same kind	15,748
	- Different varieties of the same type of Hemp (Monoecious or Female Hybrid)	6,460
	- Lower certified class seed crop of same variety	3,230
	- Same class of certified class of same variety	3
Monoecious type and Hybrids: Certified	- Dioecious variety of Hemp - Non-certified crop of same kind	3,230
	- Different varieties of the same type of Hemp (Monoecious or Female Hybrid)	656
	- Lower certified class seed crop of same variety	3
	- Same class of certified class of same variety	3

Impurity Standards

1. Impurities should be removed prior to crop inspection.
2. Any combination of impurities may be reason for declining certified status.
3. A Hemp crop for certified status, unless otherwise specified by the Breeder, must not exceed the limits, as outlined in Table 2, of harmful contaminants (species that can cross pollinate with the inspected crop), plants of other varieties or distinct types foreign to the variety being inspected, weeds or other crops with seeds that are difficult to separate from Hemp seed (e.g., Hemp Nettle).
4. Table 2 indicates the maximum number of impurities permitted in 10,000 plants of the inspected crop. The inspector makes at least 6 counts (10,000 plants each) or the equivalent to determine the number of impurities. The resulting average of these counts must not exceed the maximum impurity standards in Table 2.

Table 2: Maximum Impurity Standards

Inspected Crop	Maximum Impurity Standards per 10,000 plants	
	Maximum Number of Dioecious Male Plants Shedding Pollen	Maximum Number of Other Impurities
DIOECIOUS TYPE: FOUNDATION	–	3
DIOECIOUS TYPE: REGISTERED	–	10
DIOECIOUS TYPE: CERTIFIED	–	20
Monoecious type: Foundation	1	3
Monoecious type: Registered	2	10
Monoecious type and Hybrids: Certified	100	20

Seed Standards

Factor	Standards for each class		
	Foundation	Registered	Certified
Pure seed (minimum)	98.00%	98.00%	98.00%
Inert matter (maximum) ¹	2.00%	2.00%	2.00%
Weed seeds (maximum)	0.10%	0.10%	0.10%
Prohibited weed seeds	None	None	None
Restricted weed seeds	1 per lb	1 per lb	3 per lb
Total other crop seeds (maximum)	0.01%	0.03%	0.08%
Other varieties (maximum)	0.005%	0.01%	0.05%
Other kinds (maximum) ²	0.01%	0.03%	0.07%
Germination (minimum)	80%	80%	80%

¹ Inert matter shall not include more than 0.50% of material other than seed fragments of the variety under consideration.

² Other kinds shall not exceed 2 per lb for Foundation; 6 per lb for Registered; 10 per lb for Certified.

Mustard and Rapeseed (Canola)

General Field Standards (including open-pollinated and synthetic canola)

1. The crop must be planted on land that has not produced rapeseed, canola or mustard during the previous five years for Foundation seed production, or the previous three years for Certified seed production.
2. Field inspection shall be conducted during the bloom stage.
3. The field shall be considered the unit of certification.

Specific Field Standards (including open-pollinated and synthetic canola)

Factor	Standards for each class	
	Foundation	Certified
Off-type plants ¹	1:2,000	1:500
Plants of other Brassica species ¹ (including wild mustard)	1:10,000	1:10,000
Inseparable other crops ¹	1:2,000	1:500
Isolation (feet) ²	1,320	660

¹ Maximum permitted ratio of plants.

² Minimum distance from other varieties of rapeseed, canola, mustard, or non-certified seed of the same variety. Distance between classes of the same variety shall be at least 10 feet.

General Field Standards (hybrid canola)

1. The crop must be planted on land that has not produced rapeseed, canola or mustard during the previous five years for both the Foundation and Certified classes of hybrid production.
2. At least two field inspections shall be made, one at seedling to pre-bloom and one during bloom. The first inspection should be done to allow for roguing prior to bloom.
3. The field shall be considered the unit of certification; fields should be isolated by the proper distance.
4. Breeder or Foundation seed must be used to establish all fields of hybrid canola for certification. The direction of the cross must remain unchanged throughout the certification program unless adequate data is provided to MCIA to show that no change in variety performance results from the reversal of parentage.

Specific Field Standards (hybrid canola)

Factor	Standards for each class	
	Foundation	Certified
Off-type plants ¹	1.5:10,000	1.5:10,000
Plants of other Brassica species ¹ (including wild mustard)	1:10,000	1:10,000
Inseparable other crops ¹	1:2,000	1:500
Isolation (feet) ²	2,640	2,640

¹ Maximum permitted ratio of plants.

² Minimum distance from other varieties of rapeseed, canola, mustard, non-certified seed of the variety.

Seed Standards

Factor	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	99.00%	99.00%
Inert matter (maximum)	1.00%	1.00%
Sclerotia bodies ²	7 per lb	7 per lb
Weed seeds (maximum)	0.05%	0.10%
Prohibited weed seeds ¹	None	None
Restricted weed seeds	7 per lb	14 per lb
Total other crop seeds (maximum)	0.05%	0.25%
Other varieties	0.05%	0.25%
Other kinds	0.01%	0.01%
Germination (minimum)	85%	85%
Blackleg test	*	*
Erucic Acid and Glucosinolate Content ³ (Canola)	Pass	Pass
Hybrid Canola only ⁴	80%	80%

* The applicant must obtain a blackleg test on each seed lot. The test must be conducted by a laboratory authorized by MCIA and be blackleg free.

¹ Including cleavers/bedstraw.

² Sclerotia or fragments of sclerotia of *Sclerotinia sclerotiorum*. Seed lots containing more than 7 sclerotia per pound may be labeled substandard.

³ MCIA requires a certificate from an authorized laboratory indicating a satisfactory erucic and glucosinolate content prior to final certification for all canola.

⁴ A declaration stating the minimum percent hybrid seed and the method of determining the hybridity must be submitted to MCIA prior to final certification.

Radish

General Field Standards

1. A crop will not be eligible for certification if planted where the same kind of crop was grown unless a three-year year time interval from previous harvest and the previous crop was grown from certified seed of the same variety.
2. A crop will not be eligible for certification when planted on land on which other varieties or crops of the *Brassicaceae family* were produced in the preceding five years.
3. Field inspection shall be made prior to harvest when the crop is in early bloom.
4. The field shall be considered the unit of certification. Fields shall be separated from any other variety, uncertified seed of the same variety, and from other inseparable crops by a distance adequate to prevent cross pollination as listed in the Isolation Requirements table below.

Specific Field Standards

Factor	Maximum permitted ratio of plants		
	Foundation	Registered	Certified
Other varieties	None	1:1,000	1:500
Inseparable other crops	None	None	None

Isolation Requirements¹

Factor	Foundation	Registered	Certified
Fields of cross-pollinated varieties	1320 feet	1320 feet	660 feet

Seed Standards

Factor	Standards for each class		
	Foundation	Registered	Certified
Pure seed (minimum)	99.00%	99.00%	99.00%
Inert matter (maximum)	1.00%	1.00%	1.00%
Weed seeds (maximum)	0.01%	0.01%	0.25%
Prohibited weed seeds	None	None	None
Restricted weed seeds (per 300 g noxious)	1	1	2
Objectionable weed seeds ² (per 300 g noxious)	1	1	2
Other crop seeds (maximum)	0.05%	0.10%	0.25%
Germination	85%	85%	85%

¹ Isolation distances are minimums and must be met in all cases.

²Objectionable weeds including Black mustard (*Brassica nigra*) and Brown mustard (*Brassica juncea*).

Sod Quality Seed Standards

Determination of sod quality seed shall pass through three evaluations:

1. Purity and noxious exam;
2. MCIA Sod Quality exam; and
3. Germination testing.

Seed lots submitted shall meet all standards for certification by the Minnesota Crop Improvement Association. The standards governing the sod quality seed are listed below.

“Noxious” and “all crop and weed” analysis shall be based on a seed analysis of 50 grams for Perennial Ryegrass and Tall fescue, and 25 grams of Kentucky bluegrass (including a 10 gram *Poa annua* check in Kentucky bluegrass).

Sod Quality Seed Standards

Factor:	Minimum Purity	Minimum Germination	Maximum Other Crop ¹	Maximum Weeds ²
Kentucky Bluegrass ³	97.00%	80%	0.10%	0.02%
Perennial Ryegrass ⁴	98.00%	90%	0.10%	0.02%
Tall fescue	98.00%	90%	0.10%	0.02%

¹ Must be free of Bermudagrass (*Cynodon dactylon*), Bentgrass (*Agrostis spp.*), Black medic (*Medicago lupulina*), Clover (*Melilotus spp.*, *Trifolium spp.*), Orchardgrass (*Dactylis glomerata*), Redtop (*Agrostis gigantea*), Reed canarygrass (*Phalaris arundinacea*), Rough bluegrass (*Poa trivialis*), Ryegrass (*Lolium spp.*), Smooth brome grass (*Bromus inermis*), Tall fescue (*Festuca arundinacea*) and Timothy (*Phleum pratense*). When the base sample is one of these kinds, the species will not be considered a contaminant (e.g., ryegrass in ryegrass).

² Must be free of Annual bluegrass (*Poa annua*), Big bluegrass (*Poa secunda*), Chickweed (*Cerastium spp.* and *Stellaria media*), Crabgrass (*Digitaria spp.*), Dock (*Rumex spp.*), Plantain (*Plantago spp.*), Velvet-grass (*Holcus spp.*) and other All States noxious weed seeds, except Hawaii.

³ Maximum other varieties of Kentucky bluegrass (*Poa pratensis*) allowed is 2.00%; maximum allowed Canada bluegrass (*Poa compressa*) is 0.02%.

⁴ Certification fluorescence levels and appropriate calculations will be applied when determining levels of other crop.

Wild Rice

General Field Standards

1. The Minnesota Crop Improvement Association's general requirements for certification of all seed classes shall apply to certification of wild rice.
2. The applicant must furnish proof of the seed source.
3. It is the responsibility of all applicants, growers and handlers of certified seed to maintain genetic purity and identity at all stages of seed production, processing and handling.
4. The applicant desiring to have this crop certified must apply to the Minnesota Crop Improvement Association on the application form supplied by the Association.
5. The applicant's signature on the application is affirmation that:
 - a. The information submitted for verification of seed eligibility is representative of the total amount of seed used.
 - b. The seed verified in "a" (above) was planted on the field(s) described on the application.
 - c. The procedures listed below for managing fields prior to production of certified seed have been followed.
 - d. All equipment involved with planting, harvesting, other handling, was or will be adequately cleaned to maintain genetic purity of the seed.
 - e. The identity of the seed will be maintained from harvest to the time it leaves the applicant's possession through the use of number or other identification system.
6. A crop will be eligible for Foundation class only if planted on land that has never produced wild rice.
7. Registered seed may be produced on land that has never produced wild rice. The following sequence of management is required for growing Registered seed on land previously planted to wild rice:
 - a. In the fall, burn stubble.
 - b. First Year:
 - Fallow with the following method:
 1. Flood spring and drain down.
 2. Cultivate to kill germinated seed.
 3. Cultivate with a cultivator that will leave the soil ridged.
 4. Cultivate three or four times during first summer.
 5. Plow field in fall, depth of 7–9 inches.
 - Or produce an alternative crop using practices that will prevent wild rice seed formation.
 - c. Second Year:
 - Fallow with the following method:
 1. Flood and drain down.
 2. Cultivate same as first year, three or four times.
 - Or produce an alternative crop using practices that will prevent wild rice seed formation.
 - d. Third Year:
 - Flood field and apply for field inspection to MCIA, for plant density evaluation. (*Plant density should be no more than one plant/square foot; if more than one plant/square foot, must re-flood and prove again the following year.*)
 - Cultivate as before, no deep tillage.
 - Monitor ditches and dikes for volunteer wild rice. Treat volunteer wild rice plants to prevent seed formation within 660 feet of the field.
 - e. Fourth Year:
 - Plant Foundation seed.
 - Monitor ditches and dikes for volunteer wild rice. Treat volunteer wild rice plants prior to heading to prevent pollen shed to prevent seed formation within 660 feet of the field.

8. Certified seed may be produced on land that has never produced wild rice. The following sequence of management is required for growing Certified seed on land previously planted to wild rice:
 - a. In the fall, burn stubble.
 - b. First year:
 - Fallow with the following method:
 1. Flood spring and drain down.
 2. Cultivate to kill germinated seed.
 3. Cultivate with a cultivator that will leave the soil ridged.
 4. Cultivate three or four times during first summer.
 5. Plow field in fall, depth of 7–9 inches.
 - Or produce an alternative crop using practices that will prevent wild rice seed formation.
 - c. Second Year:
 - Fallow with the following method:
 1. Flood and drain down.
 2. Cultivate same as first year, three or four times.
 - Or produce an alternative crop using practices that will prevent wild rice seed formation.
 - d. Third Year:
 - Fallow with the following method:
 1. Flood and drain down.
 2. Cultivate same as first year, three or four times.
 - Or produce an alternative crop using practices that will prevent wild rice seed formation.
 - e. Fourth Year
 - Plant Foundation or Registered Seed
 - Monitor ditches and dikes for volunteer wild rice. Treat volunteer wild rice plants prior to heading to prevent pollen shed to prevent seed formation within 100 feet of the field.
9. The field shall be considered the unit for certification.

Specific Field Standards

Factor	Foundation	Registered	Certified
Isolation Distances	660 feet	660 feet	100 feet ¹
Other Varieties	0.5%	0.5%	4.5%
Shatter Score	Must not exceed 1.5 times the Breeder's score. ²		

¹ A minimum of 100 feet of isolation is required for Certified fields. In addition, a minimum of 25 feet on the sides of seed fields that are between 100 feet and 660 feet from other wild rice must not be harvested as Certified seed. This buffer may not be removed until after flowering.

² One of two methods allowed:

- Male floret test at full flowering: Use post-anthesis loss of the majority of male florets.
- Slap test at hard dough to dark seed stage: Use loss of the majority of seeds of the panicle when slapped gently against the palm.

Seed Standards

No minimum standards will be required for germination or purity other than those required by the Minnesota Seed Law and Rules. To complete certification, the seed producer will submit a sample representative of the entire lot after conditioning to enable MCIA to determine that the seed meets the requirements of the Minnesota Seed Law and Rules.