

HYBRID CORN CERTIFICATION STANDARDS (COMMERCIAL)

I. AMPLIFICATION OF GENERAL CERTIFICATION STANDARDS

The general Seed Certification Standards as given in this publication are basic and together with the following specific standards constitute the standards for certification of corn.

A. Definition of terms:

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

1. A single cross, i.e., a first generation cross between two inbred lines.
2. A double cross, i.e., the first generation of a cross between two single crosses.
3. A three way cross, i.e., the first generation of a cross between a single cross and an inbred line.
4. A top-cross, i.e., 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.

B. Classes and Sources of Certified Seed

1. Only the class "Certified" is recognized in hybrid corn.
2. Hybrid corn must be produced from certified Foundation seed that has been field inspected.
3. A specific hybrid number must always be made with the same combination of inbreds. Post season growing out tests will be made each year a hybrid is certified to assure that genetic purity is being maintained.

C. Land Requirements

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

II. FIELD INSPECTION

At least three field inspections shall be made in a manner approved by the Certifying Agency during the pollinating period.

III. FIELD STANDARDS

A. Unit of Certification:

Portions of an isolation may be treated as separate fields depending upon such things as: maturity differences, boundaries, waterways, roads, etc., if separate field inspection reports are necessary.

B. Isolation

1. The plot must be so located so that the seed of the female parent is not less than 660 feet from fields of sweet, pop, or other colored corn. When the contaminating source is other dent corn, the distance can be modified by the size of the crossing field and by the planting of border rows of pollen or male parent. The planting of pollen rows on the sides and ends of fields not adequately isolated from other corn is called buffering. Buffer rows shall have at least an average stand of plants and should be planted at the same time as the rest of the pollen parent. Natural barriers such as hills, trees, buildings or similar objects shall not be accepted in the place of buffers.

2. All buffer rows or any other adjacent hybrid seed parent will be inspected when necessary, at extra cost, to assure proper isolation.

3. The following table indicates the minimum buffer or border rows required for fields of various sizes when located at different distances from other corn:

Hybrid Corn Isolation Table			
Field Size - Less than 20 acres* Minimum distance from other corn to the first seed parent plant (in feet)	Minimum Number of Border Rows of Male Parent Required	Field Size - 20 acres or more* Minimum Distance from other corn to the first seed parent plant (in feet)	Minimum Number of Border Rows of Male Parent Required
660'	0	660'	0
570'	4	570'	2
490'	6	490'	2
410'	8	410'	4
330'	10	330'	6
270'	12	270'	8
210'	14	210'	10
150'	16	150'	12
90'	18	90'	14
< 90'	24 ¹	< 90'	16 ²

1. Minimum of 60 feet including border rows
2. Minimum of 40 feet including border rows

* The buffering requirements shall be determined on the basis of total acreage of the seed parents within a single isolation using a common pollinator.

4. To illustrate the use of the table - if a crossing field of 20 acres or less is 410 feet from the contaminating corn, then the number of buffer rows required is eight.
 - a. The above requirements for border rows apply to all sides of the crossing field exposed to contamination from another field, whether located directly opposite or diagonally to the sides of the crossing field.
 - b. More than one hybrid may be produced in an isolation, provided only one pollinator is used.
5. Dent sterile popcorn requires no isolation from dent corn.
6. The isolation distance required between a sweet corn pollen source and the seed parent may be administratively modified by the agency based on the size of the sweet corn pollen source, maturity dates, and other factors.

C. Differential Maturity Dates

Differential maturity dates are permitted for modifying isolation distances provided there are no receptive silks in the ear parent at the same time pollen is being shed in the contaminating field.

D. Nicking

If conditions arise in which the nicking of a seed field is questionable, certification of the field shall be subject to approval by the certifying agency.

E. Detasseling

1. Tassels shall be removed thoroughly enough that not more than 1.0 percent of the plants in seed rows on any one inspection, or not more than 2.0 percent as the total of any three inspections shall have shed pollen while more than 5.0 percent of the seed parent plants have receptive silks, such percentage to be determined on the basis of stalks large enough to be in the detasseling stage.
2. The following shall be used in defining a shedding tassel and a receptive silk:
 - a. In fertile fields, a shedding tassel shall be considered as shedding or having shed pollen when there are two inches or more of the exposed center spike and/or panicle branches showing exerted anther sacs. One-fifth of a shedding tassel shall be counted if a total of less than two inches of the center spike and/or panicle branches show exerted anther sacs.

b. In sterile fields, tassels shedding less than 50% pollen shall be counted as 1/10 of a full tassel. The exerted anther sacs on cytoplasmic male sterile seed parents must be shedding if classed as a shedding tassel.

c. Receptive silks shall be regarded as susceptible for fertilization when any fresh turgid silks are showing on the ear. As soon as a silk wilts it is regarded as fertilized, although it may not become brown or dry for one or two days after fertilization.

F. Male Sterile Ear Parent

Cytoplasmic male-sterile commercial hybrid corn seed shall be produced in accordance with the standards for the production of other commercial hybrid corn 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 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.

G. Volunteer Corn and Off-Type Plants

1. Pollen rows - tassels of definitely off-type plants or of volunteer plants shall be removed thoroughly enough so that not more than .1% shall have shed pollen while more than 5% of the seed parent plants have receptive silks.
2. Seed rows - the maximum number of volunteer corn and off-type plants shall not exceed .1% at the time of the last field inspection.

H. Determination of Hybridization and Genetic Purity

Final Determination of hybridization and genetic purity may be determined using one of the following methods.

1. Grow-out testing - One sample each of flats and rounds shall be submitted to the certifying agency for a winter purity test. At least 1,000 kernels per sample are required for testing.
2. Biochemical testing - One sample each of flats and rounds shall be submitted to the certifying agency for an electrophoretic isozyme analysis. At least 250 kernels per sample are required for testing. 100 seeds of each of the parental lines are also required.

IV. SEED STANDARDS

FACTORS

Certified Class

- 1. Genetic Purity Standards -
 Other Varieties* 0.5%

**FOUNDATION SINGLE CROSS HYBRID CORN
CERTIFICATION STANDARDS**

I. AMPLIFICATION OF GENERAL CERTIFICATION STANDARDS

A. The General Seed Certification Standards as given in this publication are basic and together with the following specific standards constitute the Standards for the Certification of Foundation Single Cross Hybrid Corn.

B. The General Standards are amplified as follows to apply specifically to Foundation Single Crosses:

1. Eligibility Requirements

Foundation single crosses to produce double, three-way, or top cross hybrids must be produced from Certified inbred lines whose source assures their identity and is approved by the certifying agency, or under emergency conditions from seed of an inbred line increased by the grower by sib-crossing of the pollinator rows in a certified single crossing field.

2. Classes and Sources of Certified Seed

a. A foundation single cross shall consist of the first generation hybrid between two certified inbred lines to be used in the production of double, three-way or top crosses.

b. 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.

c. A cytoplasmic male sterile line may be substituted for its non-cytoplasmic male sterile counterpart in a foundation single cross provided the cytoplasmic male sterile line is the same in other observable characteristics as its non-cytoplasmic male counterpart.

3. Land Requirements

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

II. FIELD INSPECTION

The single crossing field shall be inspected as many times as deemed necessary by an inspector of the certifying agency. At least four field inspections shall be made without previous notification to the grower. At least three inspections shall be made during the pollination period.

III. FIELD STANDARDS

A. Unit of Certification

Any field or portion of a field failing to meet requirements must be disposed of so that it cannot be used for seed purposes.

B. Isolation of Foundation Single Crosses

1. Single crossing plots must be isolated at least 660 feet from other corn and 1,320 feet from corn of other color or type, including sweet or pop corn.

2. If plots of corn of another color or type, including sweet corn or pop corn, are found within 1,320 feet of a single crossing plot, the grower will be immediately notified and he shall insure that no main plants or suckers are shedding pollen during the silking period.

3. No isolation is required for the production of hand pollinated seed.

4. Differential maturity dates may permit modifying isolation distances provided there are no receptive silks in the seed parent at the time pollen is being shed in the contaminating field.

5. Any other adjacent seed parent will be inspected at extra cost (if necessary) to assure proper isolation.

C. Minimum Population

The number of plants capable of shedding pollen during the silking period shall be equivalent to 1,500 pollen plants per acre. If the number of pollen producing plants is less than this, any seed accepted for certification must be produced on hand pollinated plants or its purity confirmed in subsequent tests by the certifying agency.

D. Detasseling

Tassels shall be removed thoroughly enough so that not more than 0.5 percent of the plants in the seed rows on any one inspection, or not more than .75 percent of the total of any three inspections shall have shed pollen while more than 5.0 percent of the seed parent have receptive silks.

E. Specific Requirements

1. A foundation single cross seed field in which more than 0.1 percent definitely off-type plants in the pollinator have shed pollen shall not be certified.

2. At the time of the last inspection, the seed parent shall not contain in excess of 0.1 percent definitely off-type plants.

IV. Determination of Hybridization and Genetic Purity

Final determination of hybridization and genetic purity may be determined using one of the following methods.

1. Grow-out testing – One sample each of flats and rounds shall be submitted to certifying agency for a winter purity test. At least 1,000 kernels per sample are required for testing.

2. Biochemical testing – One sample each of flats and rounds shall be submitted to the certifying agency for an electrophoretic isozyme analysis. At least 250 kernels per sample are required for testing. 100 seeds of each of the parental lines are required.

INBRED CORN CERTIFICATION STANDARDS

I. AMPLIFICATION OF GENERAL CERTIFICATION STANDARDS

A. The General Seed Certification Standards as given in this publication are basic and together with the following specific standards constitute the standards for the certification of inbred lines of corn.

B. The General Standards are amplified as follows to apply specifically to inbred lines of corn:

1. Eligibility Requirements

An inbred line to be eligible for certification must be from a source such that its identity may be assured and approved by the certification agency.

2. Classes and Sources of Certified Seed

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

a. When a specific genetic factor(s) is added to an inbred line, the line must have been back-crossed to its recurrent parent at least five generations or its equivalent.

b. Information regarding cytoplasm or other genetic factors printed on the certified label will be the responsibility of the applicant.

3. Determination of Genetic Purity

Final determination of genetic purity may be determined using one of the following methods.

1. Grow-out testing – One sample each of flats and rounds shall be submitted to the certifying agency for a winter purity test. At least 1,000 kernels per sample are required for testing.

2. Biochemical testing – One sample each of flats and rounds shall be submitted to the certifying agency for an electrophoretic isozyme analysis. At least 250 kernels per sample are required for testing.

4. Land Requirements

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

II. FIELD INSPECTION

A. Hand-pollinated production will be inspected at least once by an inspector of the certifying agency.

A. For all other methods of inbred production, the plot or field shall be inspected as many times as deemed necessary by an inspector of the certification agency. At least four inspections shall be made without previous notification to the grower.

III. FIELD STANDARDS

A. Unit of Certification

Any field or portion of a field failing to meet requirements shall be disposed of so it cannot be used for seed purposes.

B. Isolation

1. Inbred plots must be isolated at least 660 feet from other corn and 1320 feet from corn of other color or type, including sweet or pop corn.

2. If plots of corn of other color or type, including sweet or pop corn, are found within 1,320 feet of an inbred multiplication plot, the grower will be immediately notified and he shall insure that no main plants or suckers are shedding pollen during the silking period. Failure to comply may be considered as disqualifying the plot for certification.

3. No isolation is required for the production of hand pollinated seed.

4. Differential maturity dates may permit modifying isolation distances provided there are no receptive silks in the seed parent at the time pollen is being shed in the contaminating field.

5. Any other adjacent seed parent will be inspected at extra cost if necessary to assure proper isolation.

C. Minimum Population

The number of plants capable of shedding pollen during the silking period shall be equivalent to 2,000 surviving plants for a given one-half acre if the seed is to be accepted for certification. If the number of plants are found to be less than this, any seed accepted for certification must be produced on hand-pollinated plants or its purity confirmed by subsequent tests by the certifying agency.

(This applies to both single and side-line plots when the stand is reduced through drought, flood, hail, insect damage, or similar circumstances.)

D. Other Varieties and Off-Types

To be acceptable, inbred plots shall show less than 0.1 percent off-type plants.

IV. SEED STANDARDS

Inbred lines shall not contain definitely off-type kernels in excess of 0.1 percent.