endosperm, and epicotyl above the soil surface.
(4) Root system: A primary root, with secondary roots usually developing within the test period.
(b) Abnormal seedling description.
(1) Cotyledons:
(i) Less than half of the original cotyledon tissue remaining attached.
(ii) Less than half of the original cotyledon tissue free of necrosis or decay.
(2) Endosperm:
(i) Missing.
(ii) [Reserved]
(3) Epicotyl:
(i) Missing.
(ii) Damaged or missing terminal bud.
(4) Hypocotyl:
(i) Deep open cracks extending into the conducting tissue.
(ii) Malformed, such as markedly shortened, curled, or thickened.
(5) Root:
(i) None.
(ii) Weak, stubby, or missing primary root with weak secondary or adventitious roots.
(6) Seedling:
(i) One or more essential structures impaired as a result of decay from primary infection.
(ii) Albino.

§ 201.56–12 Miscellaneous plant families.
Kinds of seed by family:
Carrot family, Apiaceae (Umbelliferae)—carrot, celery, celeriac, dill, parsley, parsnip;
Hemp family, Cannabaceae—hemp;
Dichondra family, Dichondraceae—dichondra;
Geranium family, Geraniaceae—alfilaria;
Mint family, Lamiaceae (Labiatae)—sage, summer savory; benne family, Pedaliaceae—sesame;
Rose family, Rosaceae—little burnet;
Nightshade family, Solanaceae—eggplant, tomato, husk tomato, pepper, tobacco; and
Valerian family, Valerianaceae—cornsalad.
(a) General description.
(1) Germination habit: Epigeal dicot.
(2) Food reserves: Cotyledons, starchy endosperm.
(3) Shoot system: The hypocotyl elongates carrying the cotyledons above the soil surface. The epicotyl usually does not show any development within the test period.
(4) Root system: A primary root; secondary roots developing within the test period for some kinds.
(b) Abnormal seedling description.
(1) Cotyledons:
(i) Less than half of the original cotyledon tissue remaining attached.
(ii) Less than half of the original cotyledon tissue free of necrosis or decay.
(2) Epicotyl:
(i) Missing. (May be assumed to be present if cotyledons are intact.)
(ii) [Reserved]
(3) Hypocotyl:
(i) Deep open cracks or grainy lesions extending into the conducting tissue.
(ii) Malformed, such as markedly shortened, curled, or thickened.
(iii) Watery.
(4) Root:
(i) None.
(ii) Weak, stubby, or missing primary root with weak secondary or adventitious roots.
(5) Seedling:
(i) One or more essential structures impaired as a result of decay from primary infection.
(ii) Albino.
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(ii) Less than half of the original cotyledon tissue free of necrosis or decay.

(2) Epicotyl:
(i) Missing. (May be assumed to be present if the cotyledons are intact.)
(ii) [Reserved]

(3) Hypocotyl:
(i) Malformed, such as markedly shortened, curled, or thickened.
(ii) Deep open cracks extending into the conducting tissue.
(iii) Watery.

(4) Root:
(i) None.
(ii) Missing or stubby primary root with weak secondary or adventitious roots.

(5) Seedling:
(i) One or more essential structures impaired as a result of decay from primary infection.
(ii) Albino.

§ 201.57 Hard seeds.

Seeds which remain hard at the end of the prescribed test because they have not absorbed water, due to an impermeable seed coat, are to be counted as “hard seed.” If at the end of the germination period provided for legumes, okra, cotton and dichondra in these rules and regulations there are still present swollen seeds or seeds of these kinds which have just started to germinate, all seeds or seedlings except the above-stated shall be removed and the test continued for 5 additional days and the normal seedlings included in the percentage of germination. For flatpea, continue the swollen seed in test for 14 days when germinating at 15–25 °C or for 10 days when germinating at 20 °C.

§ 201.57a Dormant seeds.

Dormant seeds are viable seeds, other than hard seeds, which fail to germinate when provided the specified germination conditions for the kind of seed in question.

(a) Viability of ungerminated seeds shall be determined by any of the following methods or combinations of methods: a cutting test, tetrazolium test, scarification, or application of germination promoting chemicals.

(b) The percentage of dormant seed, if present, shall be determined in addition to the percentage of germination for the following kinds: Bahiagrass, basin wildrye, big bluestem, little bluestem, sand bluestem, yellow bluestem, bottlebrush-squirreltail, buffalograss, buffelgrass, galletagrass, forage kochia, blue grama, side-oats grama, Indian ricegrass, johnsongrass, sand lovegrass, weeping lovegrass, mountain rye, sand dropseed, smilo, switchgrass, veldtgrass, western wheatgrass, and yellow indiangrass.

(c) For green needlegrass, if the test result of method 2 is less than the result of method 1, subtract the result of method 2 from method 1 and report the difference as the percentage of dormant seed. Refer to §201.58(b)(7).

§ 201.58 Substrata, temperature, duration of test, and certain other specific directions for testing for germination and hard seed.

Specific germination requirements are set forth in table 2 to which the following paragraphs (a), (b), and (c) are applicable.

(a) Definitions and explanations applicable to table 2—(1) Duration of tests. The following deviations are permitted from the specified duration of tests: Any test may be terminated prior to the number of days listed under “Final count” if the maximum germination of the sample has then been determined. The number of days stated for the first count is approximate and a deviation of 1 to 3 days is permitted. If at the time of the prescribed test period the seedlings are not sufficiently developed for positive evaluation, it is possible to extend the time of the test period two additional days. (Also, see paragraph (a)(5) of this section and 201.57.)

(2) Light. Cool white fluorescent light shall be provided where light is required in table 2. The light intensity shall be 75 to 125 foot-candles (750–1,250 lux). (The light intensity for nondormant seed and during seedling development may be as low as 25 foot-candles to enable the essential structures to be evaluated with greater certainty.)