

more of the test runs, in accordance with the UN Manual of Tests and Criteria, is less than 45 seconds or the rate of burning is more than 2.2 mm/s. Powders of metals or metal alloys must be classified in Division 4.1 when they can be ignited and the reaction spreads over the whole length of the sample in 10 minutes or less.

(2) Packing group criteria for readily combustible materials of Division 4.1 are assigned as follows:

(i) For readily combustible solids (other than metal powders), Packing Group II if the burning time is less than 45 seconds and the flame passes the wetted zone. Packing Group II must be assigned to powders of metal or metal alloys if the zone of reaction spreads over the whole length of the sample in 5 minutes or less.

(ii) For readily combustible solids (other than metal powders), Packing Group III must be assigned if the burning rate time is less than 45 seconds and the wetted zone stops the flame propagation for at least 4 minutes. Packing Group III must be assigned to metal powders if the reaction spreads over the whole length of the sample in more than 5 minutes but not more than 10 minutes.

(c) Packing group criteria for Division 4.2 materials is as follows:

(1) Pyrophoric liquids and solids of Division 4.2 are assigned to Packing Group I.

(2) A self-heating material is assigned to—

(i) Packing Group II, if the material gives a positive test result when tested with a 25 mm cube size sample at 140 °C; or

(ii) Packing Group III, if—

(A) A positive test result is obtained in a test using a 100 mm sample cube at 140 °C and a negative test result is obtained in a test using a 25 mm sample cube at 140 °C and the substance is transported in packagings with a volume of more than 3 cubic meters; or

(B) A positive test result is obtained in a test using a 100 mm sample cube at 120 °C and a negative result is obtained in a test using a 25 mm sample cube at 140 °C and the substance is transported in packagings with a volume of more than 450 L; or

(C) A positive result is obtained in a test using a 100 mm sample cube at 100 °C and a negative result is obtained in a test using a 25 mm sample cube at 140 °C and the substance is transported in packagings with a volume of less than 450 L.

(d) A Division 4.3 dangerous when wet material is assigned to—

(1) Packing Group I, if the material reacts vigorously with water at ambient temperatures and demonstrates a tendency for the gas produced to ignite spontaneously, or which reacts readily with water at ambient temperatures such that the rate of evolution of flammable gases is equal or greater than 10 L per kilogram of material over any one minute;

(2) Packing Group II, if the material reacts readily with water at ambient temperatures such that the maximum rate of evolution of flammable gases is equal to or greater than 20 L per kilogram of material per hour, and which does not meet the criteria for Packing Group I; or

(3) Packing Group III, if the material reacts slowly with water at ambient temperatures such that the maximum rate of evolution of flammable gases is greater than 1 L per kilogram of material per hour, and which does not meet the criteria for Packing Group I or II.

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§ 173.127 Class 5, Division 5.1—Definition and assignment of packing groups.

(a) *Definition.* For the purpose of this subchapter, *oxidizer* (Division 5.1) means a material that may, generally by yielding oxygen, cause or enhance the combustion of other materials.

(1) A solid material, except for solid ammonium nitrate based fertilizer (see paragraph (a)(3) of this section), is classed as a Division 5.1 material if, when tested in accordance with the UN Manual of Tests and Criteria (IBR, see § 171.7 of this subchapter):

(i) If test O.1 is used (UN Manual of Tests and Criteria, sub-section 34.4.1), the mean burning time is less than or

equal to the burning time of a 3:7 potassium bromate/cellulose mixture; or

(ii) If test O.3 is used (UN Manual of Tests and Criteria, sub-section 34.4.3), the mean burning rate is greater than or equal to the burning rate of a 1:2 calcium peroxide/cellulose mixture.

(2) A liquid material is classed as a Division 5.1 material if, when tested in accordance with the UN Manual of Tests and Criteria, it spontaneously ignites or its mean time for a pressure rise from 690 kPa to 2070 kPa gauge is less than the time of a 1:1 nitric acid (65 percent)/cellulose mixture.

(3) Solid ammonium nitrate-based fertilizers must be classified in accordance with the procedure as set out in the UN Manual of Tests and Criteria, Part III, Section 39.

(b) *Assignment of packing groups.* (1) The packing group of a Division 5.1 material which is a solid shall be assigned using the following criteria:

(i) Packing Group I, for any material which, in either concentration tested:

(A) If test O.1 is used (UN Manual of Tests and Criteria, sub-section 34.4.1), the mean burning time is less than the mean burning time of a 3:2 potassium bromate/cellulose mixture; or

(B) If test O.3 is used (UN Manual of Tests and Criteria, sub-section 34.4.3), the mean burning rate is greater than the mean burning rate of a 3:1 calcium peroxide/cellulose mixture.

(ii) Packing Group II, for any material which, in either concentration tested:

(A) If test O.1 is used (UN Manual of Tests and Criteria, sub-section 34.4.1), the mean burning time is less than the mean burning time of a 2:3 potassium bromate/cellulose mixture and the criteria for Packing Group I are not met; or

(B) If test O.3 is used (UN Manual of Tests and Criteria, sub-section 34.4.3), the mean burning rate is greater than the mean burning rate of a 1:1 calcium peroxide/cellulose mixture and the criteria for Packing Group I are not met.

(iii) Packing Group III for any material which, in either concentration tested:

(A) If test O.1 is used (UN Manual of Tests and Criteria, sub-section 34.4.1), the mean burning time is less than the mean burning time of a 3:7 potassium

bromate/cellulose mixture and the criteria for Packing Groups I and II are not met; or

(B) If test O.3 is used (UN Manual of Tests and Criteria, sub-section 34.4.3), the mean burning rate is greater than the mean burning rate of a 1:2 calcium peroxide/cellulose mixture and the criteria for Packing Groups I and II are not met.

(iv) The material is not classified as a Division 5.1 material if, in either concentration tested:

(A) If test O.1 is used (UN Manual of Tests and Criteria, sub-section 34.4.1), the sample tested does not ignite and exhibit burn, or exhibits a mean burning time of greater than or equal to the mean burning time of a 3:7 potassium bromate/cellulose mixture.

(B) If test O.3 is used (UN Manual of Tests and Criteria, sub-section 34.4.3), the sample tested does not ignite and exhibit burn, or exhibits a mean burning rate less than or equal to the mean burning rate of a 1:2 calcium peroxide/cellulose mixture.

(2) The packing group of a Division 5.1 material which is a liquid shall be assigned using the following criteria:

(i) Packing Group I for:

(A) Any material which spontaneously ignites when mixed with cellulose in a 1:1 ratio; or

(B) Any material which exhibits a mean pressure rise time less than the pressure rise time of a 1:1 perchloric acid (50 percent)/cellulose mixture.

(ii) Packing Group II, any material which exhibits a mean pressure rise time less than or equal to the pressure rise time of a 1:1 aqueous sodium chlorate solution (40 percent)/cellulose mixture and the criteria for Packing Group I are not met.

(iii) Packing Group III, any material which exhibits a mean pressure rise time less than or equal to the pressure rise time of a 1:1 nitric acid (65 percent)/cellulose mixture and the criteria for Packing Group I and II are not met.

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