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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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**Dangerous goods - Test method for detonation of self-reactive
substances and organic peroxides**

危险货物 自反应物质和有机过氧化物引爆试验方法

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0 Warning

Warning - persons using this document should have practical experience of work in a formal laboratory. Particular attention is drawn to the fact that the test procedure involves the use of explosives, so that the relevant qualifications and site conditions are required, or the work is to be entrusted to a body that has them. This document does not purport to address all of the safety problems that may arise. It is the responsibility of the user to take appropriate safety and health measures and to ensure that the laboratory complies with the conditions laid down in the relevant national regulations.

1 Scope

This document describes the test method for the detonation test on self-reactive substances and organic peroxides, and specifies the test principle, the apparatus and materials, the test procedure and the criteria for the result.

This document applies to the assessment of the ability of self-reactive substances and organic peroxides to propagate a detonation.

2 Normative references

The contents of the following documents constitute indispensable provisions of this document through normative reference in the text. For dated references, only the edition corresponding to that date applies to this document; for undated references, the latest edition (including all amendments) applies to this document.

GB/T 700 Carbon structural steels; GB/T 3639 Cold-drawn or cold-rolled precision seamless steel tubes; GB 8031 Industrial electric detonators; GB/T 21535 Hazardous chemicals - Terminology for explosives; GB 30000.9-2013 Rules for classification and labelling of chemicals - Part 9: Self-reactive substances and mixtures; GB 30000.16-2013 Rules for classification and labelling of chemicals - Part 16: Organic peroxides.

3 Terms and definitions

The terms and definitions given in GB/T 21535, GB 30000.9-2013 and GB 30000.16-2013, together with the following, apply to this document.

3.1 self-reactive substances or mixtures. Thermally unstable liquid or solid substances or mixtures liable to undergo a strongly exothermic decomposition even in the absence of oxygen (air). [SOURCE: GB 30000.9-2013, 3.1, modified]

3.2 organic peroxide. Liquid or solid organic substances containing the bivalent -O-O- structure, which may be regarded as derivatives of hydrogen peroxide in which one or both of the hydrogen atoms have been replaced by organic radicals. Note: this includes organic peroxide formulations (mixtures). Organic peroxides are thermally unstable substances or mixtures that may undergo exothermic self-accelerating decomposition. [SOURCE: GB 30000.16-2013, 3.1, modified]

4 Test principle

A booster charge is detonated and it is observed whether the self-reactive substance or mixture or the organic peroxide is able to propagate the detonation under the confinement of a closed steel tube, so as to assess its detonation propagation behaviour and its safety risk.

5.1 Sample tube

Grade 20 cold-drawn precision seamless steel tube complying with GB/T 3639. The outside diameter is 48 mm $\pm$ 2 mm, the wall thickness is 4 mm $\pm$ 0.1 mm and the length is 400 mm $\pm$ 5 mm.

5.2 Booster charge

Either phlegmatised RDX (RDX to phlegmatizer 95:5) or pentolite (PETN to TNT 50:50) may be used. The surface of the booster charge carries no packaging material of any kind; its mass is 160 g, its diameter is 50 mm $\pm$ 1 mm and its density is 1.60 g/cm³ $\pm$ 0.05 g/cm³. The surface of the charge shall be flat, smooth and free from cracks.

5.3 Witness plate

Carbon structural steel complying with GB/T 700. Dimensions: side length 150 mm $\pm$ 10 mm, thickness 3.0 mm $\pm$ 0.2 mm.

5.4 Detonator

A No. 8 industrial electric detonator complying with GB 8031.

5.5 Electronic balance

The measuring range is not less than 1000 g and the scale division is not greater than 0.1 g.

5.6 Steel tape

The measuring range is not less than 1000 mm and the scale division is not greater than 1 mm.

5.7 Exploder

It has a continuity-checking function and is used to fire the No. 8 industrial electric detonator.

5.8 Detonator base

Made of wood, 40 mm in diameter and 20 mm high, with a through hole 8.5 mm in diameter along the central axis.

6.1 Test preparation

6.1.1 Test items. Two sample tubes of closely matching mass are selected and marked with an identifying number.

Their outer appearance is inspected visually for cracks, blowholes and the like, and their inner wall is then checked for smoothness and evenness; where necessary a cotton cloth is used to wipe and polish it. If the test sample reacts with steel, the inside of the steel tube may be coated with a fluorocarbon resin.

A polyethylene film or a polytetrafluoroethylene film is wrapped tightly around one end of the sample tube and fixed there.

6.1.2 Booster charge. The booster charge is inspected and shall show no visible defects.

6.1.3 Test sample. The test number of the sample, its physical state and other such information are recorded, and photographs are taken and kept on file.

6.1.4 Firing items. The charging and discharging functions of the exploder are checked. The No. 8 industrial electric detonator is checked for continuity.

6.2 Test steps

6.2.1 The test sample is loaded until the top of the sample column is flush with the mouth of the sample tube, a wooden rod being used to tap the outside wall of the sample tube until no further settling of the sample can be observed; the mass of the sample is weighed on the electronic balance and recorded. A solid sample may be loaded into the sample tube in three portions so as to keep the loading density uniform; the loading density shall be close to the density at which the substance is transported.

6.2.2 The sample tube is stood upright on the witness plate, and the booster charge, with the detonator base fitted to one end, is placed on top of the sample tube, coaxial with it and fixed in that position, as shown in Figure 1.

The key to Figure 1 identifies A, a washer; B, the witness plate; C, the sample tube; D, the sample; E, the booster charge; F, the detonator base; G, the detonator; and H, the polyethylene film.

6.2.3 The assembled sample tube is taken to a dedicated test site and set upright.

6.2.4 The No. 8 industrial electric detonator is inserted into the detonator base, so that the detonator is in close contact with the surface of the booster charge.

6.2.5 The alarm is sounded and, once it has been confirmed that all personnel taking part in the test have withdrawn to a safe position, the charge is fired.

6.2.6 After the test, at least 10 min shall elapse before anyone may enter the site to deal with it.

6.2.7 Where the sample tube has ruptured completely, only one test needs to be carried