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

GB 16993-2021

**Safety regulations for avoid working under hazardous condition
of oxygen deficiency in enclosed spaces aboard ships**

防止船舶封闭处所缺氧危险作业安全规程

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009. This standard replaces GB 16993-1997 "Safety Regulations for Preventing Hazardous Operation of Ship Cargo Holds and Enclosed Tanks Due to Hypoxia", and is compatible with GB 16993-1997. Compared with 1997, in addition to editorial changes, the main technical changes are as follows:

- Modified the definition of hypoxia (see 3.1, 3.1 in the 1997 edition);
- Added the terms and definitions of hypoxic dangerous operations, general hypoxic dangerous operations, special hypoxic dangerous operations and enclosed spaces of ships (See 3.3~3.6);
- Modified the air quality requirements (see 4.1, 4.1 in the 1997 edition);
- Revised personnel capabilities and training requirements (see 4.2, 4.7 of the 1997 edition);
- Added safety procedures (see 4.3);
- Modified the basic requirements for safety protection equipment and supplies (see 4.4, 4.4 in the 1997 edition);
- Added requirements for risk assessment, safety disclosure, entry permit and end of operation (see 5.1, 5.2, 5.2 in the 1997 edition);
- Modified the requirements for ventilation and air testing before operation (see

5.3 and 5.4, and

1 Scope

China's mandatory safety regulations for work in oxygen-deficient enclosed spaces aboard ships. Enclosed space entry kills more seafarers than almost any other shipboard hazard, and the pattern of the accidents is always the same: one person enters a tank or a hold, collapses, and two or three more die trying to pull them out. Ships are full of spaces that deplete themselves of oxygen without anything having gone wrong - cargo holds carrying steel or timber that oxidises, inerted tanks, chain lockers, cofferdams, void spaces and the paint stores. There is no warning: oxygen deficiency is odourless and unconsciousness comes in seconds. The regulations specify the permit-to-enter system, the testing of the atmosphere before and during entry, the ventilation, the attendant who must remain outside, the rescue equipment that must be in place before anyone goes in, and the training that must precede all of it.

This standard specifies the safety procedures and measures for operators and other relevant personnel to enter the enclosed space of the ship to prevent dangerous operations of hypoxia. Including basic requirements, preventive management and safety protection measures, emergency assistance and drill requirements. This standard is applicable to the operations of ships entering enclosed spaces in the course of navigation, berthing and operations.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this article. For undated reference documents, the latest version (including all amendments) is applicable to this document.

GB 8958 Safety Regulations for Hypoxic Dangerous Work

GB/T 12301 Detection method for harmful gases produced by non-dangerous cargo in ships GBZ

3 Terms and definitions

The following terms and definitions apply to this document.

3.1 Hypoxia oxygen deficiency The state where the oxygen concentration (by volume ratio) in the air in the workplace is lower than 19.5%.

Note. Rewrite GB 8958-2006, definition 3.1.

3.2 Hypoxia symptom of oxygen deficiency Symptoms caused by inhalation of oxygen-deficient air.

3.3 Hazardous workin oxygendeficiencyatmosphere Various operations with potential and obvious hypoxic conditions mainly include general hypoxic dangerous operations and special hypoxic dangerous operations. [GB 8958-2006, definition 3.2]

3.4 General hazardous workin oxygendeficiencyatmosphere Simple hypoxic dangerous work in the workplace. [GB 8958-2006, definition 3.3]

3.5 Toxichazardousworkin oxygendeficiencyatmosphere In the workplace, there are also or may produce other toxic, harmful, and flammable gases in the oxygen-deficient dangerous operation.

Note. Rewrite GB 8958-2006, definition 3.4.

3.6 Ship enclosed spaces enclosedspacesaboardships Ship spaces that meet one of the following conditions.