



中国船级社

CHINA CLASSIFICATION SOCIETY

潜水系统和潜水器  
入级与建造规范

RULES AND REGULATIONS  
FOR THE CONSTRUCTION  
AND CLASSIFICATION  
OF DIVING SYSTEMS  
AND SUBMERSIBLES

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## CHAPTER 1 CLASSIFICATION AND SURVEYS

### Section 1 GENERAL

1.1.1 Diving systems or submersibles intended to be classed with the China Classification Society(hereinafter referred to as "the Society" ) are to comply with the relevant requirements of the "Rules for the Classification and Construction of Diving Systems and Submersibles" (hereinafter referred to as "the Rules" ) equivalent thereto approved by the Society.

1.1.2 Diving systems or submersibles which comply with the requirements specified in 1.1.1 above will be assigned an appropriate class and will maintain the class assigned provided that the technical conditions thereof are found to be satisfactory at the surveys prescribed in Sections 8 to 10 of this Chapter.

1.1.3 Diving systems may be classed as an integral unit, or alternatively, their major components such as surface compression chamber, diving bell, etc. may be classed separately.

1.1.4 While in service, diving systems or submersibles are to be properly handled and maintained, and are not to be operated in environmental conditions more severe than those approved by the Society for design basis.

1.1.5 Any damage or defect which may affect the class assigned is to be reported to the Society without delay and is to be submitted for examination by the Society's surveyors.

## Section 2 CHARACTERS OF CLASSIFICATION AND CLASS NOTATIONS

1.2.1 The diving systems or submersibles classed with the Society will be assigned either of the following characters of classification as applicable:

★ZCA

★ZCA

★ZCA

★ZCA indicating that the diving systems or submersibles have been constructed under the supervision of the Society and are in compliance with the requirements mentioned in 1.1.1 of this Chapter, maintained in good and efficient condition and suitable for services.

★ZCA indicating that the diving systems or submersibles have been constructed under the supervision of a classification society recognized by the Society in accordance with Rules equivalent to those of the Society and that they have been found, after examination and survey, to be in compliance with the classification requirements of the Society.

★ZCA indicating that the diving systems or submersibles have not been constructed under the supervision of the Society, but they have been found to be acceptable to the Society after examination, inspection and testing.

1.2.2 Diving systems or submersibles classed with the Society will, depending on their types, be assigned with appropriate class notations, as described below, to be affixed to the character of classification, such as:

**Diving System**

**Diving Bell**  
**Surface Compression Chamber**  
**Manned Submersible**  
**Submersible with Lock-in/Lock-out**  
**Unmanned Submersible**  
**Submersible Habitat**  
**Diving Simulator**  
**Atmospheric Diving Suit**

1.2.3 The character of classification together with the class notation assigned to a diving system or submersible will be entered in the corresponding certificate of classification in order.

In the case of a diving system under the supervision of the Society, the character of classification and class notation are to be shown in the following order:

**★ZCA Diving System**

**Section 3 WITHDRAWAL OF CLASS**

1.3.1 The class assigned to a diving system or submersible will be withdrawn under any one of the following conditions:

(1) If not submitted to surveys for maintenance of class as prescribed in Sections 8 to 10 of this Chapter at the proper time, nor even within the period of time subsequently specified by the Society in its notification to the owner.

(2) When the owner fails to repair any defects affecting the class in accordance with the Society's requirements.

(3) When requested by the owner.

**Section 4 RECLASSIFICATION**

1.4.1 When reclassification is desired for a div-



ing system or submersible for which the class previously assigned has been withdrawn, a special survey for classification, appropriate to the age and technical condition, is to be carried out. If at such survey the diving system or submersible is found to be in a satisfactory condition, the Society may reinstate its original class or assign such other class as may be deemed necessary.

## Section 5 CERTIFICATES

**1.5.1** Upon completion of the classification survey or reclassification survey of a diving system or submersible, the Society's surveyor is to forward the various survey reports (including recommendations) to the Head Office of the Society for examination. Where it is found that the diving system or submersible complies with the requirements of the Rules, a classification certificate for the diving system or submersible will be issued to the applicant.

**1.5.2** The classification certificate for a diving system or submersible issued by the Society will continue to be valid, provided the diving system or submersible is subjected to the surveys for maintenance of class as prescribed in Sections 8 to 10 of this Chapter with the certificates appropriately endorsed by the Society's surveyor upon satisfactory completion of the surveys.

**1.5.3** Pending the issuance of the classification certificates referred to in 1.5.1 above, where the attending surveyor is satisfied that the diving system or submersible is in a fit and efficient condition, the related local office of the Society may issue a corresponding provisional classification certificate to enable the diving system or submersible to be put into

service at as early a date as possible.

The duration of a provisional classification certificate is not to exceed six months from the date of completion of the survey.

## Section 6 CLASSIFICATION SURVEY DURING CONSTRUCTION

### 1.6.1 Approval of plans and documents

1.6.1.1 When it is intended to build a diving system or submersible for classification with the Society, plans and documents as specified in 1.6.2 of this section are to be submitted in triplicate to the Society for approval. In the case of special purpose diving systems or submersibles, additional plans and documents may be required if considered necessary by the Society.

### 1.6.2 Plans and documents to be submitted for approval

#### 1.6.2.1 General specifications and hull construction

\*(1) General specifications, including service conditions and operational requirements, normal and emergency operational procedures, principal dimensions, maximum permissible operating depth(MPOD), quota of occupants, target surface sea states, etc.

\*(2) General arrangement;

\*(3) Foundation and support arrangements;

\*(4) Buoyancy and stability analyses, including ascent-descent calculations under normal and emergency conditions;

\*(5) Release devices for jettisonable weights;

\*(6) Structural plans;

\*(7) Pressure hull construction;

\*(8) Pressure hull strength calculation;

\*(9) Dimensioned details of viewports, penetrations, hatch details, hatch rings and lugs;

\*(10) Grade of material;

(11) Welding procedures and welding consumables used;

(12) Radiographic inspection of welds of pressure hull;

(13) Fabrication tolerances;

(14) Method and procedure of heat treatment;

(15) Specifications of insulations;

(16) Particulars of paint, coating, decorative facing and floorboard inside pressure hull;

(17) Specifications of buoyancy materials;

(18) Pressure testing schemes;

(19) Test dive and sea trial programmes.

#### 1.6.2.2 Machinery

\*(1) Specifications of propulsion and manoeuvring systems;

\*(2) Arrangement and strength calculations for shafting;

(3) Layout for the installations of hovering, manoeuvring and orientation;

\*(4) Schematic arrangement of piping systems and material specifications;

(5) Calculations of machinery and equipment, pumping and piping systems;

(6) Arrangement of machinery and equipment;

(7) List of the machinery and equipment.

#### 1.6.2.3 Electrical installations

\*(1) Specifications of electrical installations;

\*(2) Electric loading calculations and single line diagrams of the electrical systems;

(3) Arrangement of motors, batteries and circuit diagrams;

(4) List of electrical equipment;

(5) Arrangement of communication and navigation systems;

(6) Arrangement of lighting systems;

(7) Technical information and test reports of electrical equipment permanently installed within the chamber or diving bell;

(8) Emergency electrical power supply system.

#### 1.6.2.4 Life support system

\*(1) Specifications of life support system;

\*(2) Calculations of gas storage, gas supply and breathing gas scrubbing (including normal and emergency conditions);

(3) Schematic arrangement of piping systems and material specifications;

(4) Calculations of heat/cooling consumption for the system under the given environmental temperatures and pressures;

(5) Arrangement of environmental control and monitoring systems;

(6) Hot water supply system;

(7) Arrangement of sanitary water and drainage systems;

(8) Cross-section plans of umbilical;

(9) List of equipment.

#### 1.6.2.5 Handling system

\*(1) Specifications of handling system;

(2) Arrangement of handling system;

\*(3) Design load and structural strength calculation for handling system;

\*(4) Drawings and calculations of compact umbilical and guide rope;

(5) Plans and specifications of structural parts, ropes, blocks, sheaves, winches, etc. for diving bell and mating arrangement;

(6) Plans of the emergency handling system for

diving bell.

#### **1.6.2.6 Fire fighting systems**

**\* (1) Specifications of fire fighting systems;**

**(2) Arrangement of fire protection, detection and extinction equipment.**

Note: Plans and documents of the items marked with \* only are to be submitted for approval when applying for classification survey for first entry.

**1.6.3 Any modification to the approved plans and documents is to be submitted to the Society for approval.**

**1.6.4 Approved plans and documents will remain valid until the Rules according to which they have been approved are superseded by new ones.**

#### **1.6.5 Requirements of classification survey during construction**

**1.6.5.1 Steels, welding consumables, motors, batteries, air compressors, high-pressure gas bottles, pumps, valves, observation and communication apparatus, and other important instruments and equipment may only be used for the construction of or installed on the diving systems and submersibles after they have been submitted to the Society for inspection in accordance with the present "Regulations for Survey of Marine Products" promulgated by the Register of Shipping of the People's Republic of China (hereinafter referred to as "the Register") and certificated by the Society.**

**1.6.5.2 The diving systems or submersibles are to be constructed in accordance with the approved plans, and are to be inspected to the satisfaction of the Society's surveyors.**

**1.6.5.3 During the construction of diving systems**

or submersibles and upon their completion, the pressure hull, various systems, electrical equipment, machinery and equipment, piping systems, ect. are to be subjected to the required inspections and tests in the presence of the Society's surveyors. Test diving and sea trial programmes are to be agreed with the surveyors. The relevant shop test reports are to be countersigned by the attending surveyor(s).

## **Section 7 CLASSIFICATION SURVEY FOR FIRST ENTRY**

### **1.7.1 Approval of plans and documents**

**1.7.1.1** When classification is desired for a diving system or submersible which has not been built under supervision of the Society, one set of plans and documents of the items marked with \* as specified in 1.6.2 of this Chapter are to be submitted to the Society for approval. In case all such plans and documents are not available, the items referred to above may be suitably reduced with the consent of the Society.

**1.7.1.2** In addition, technical information and documents relating to construction and alteration of the diving system or submersible as well as certificates and survey reports issued by another classification society are to be furnished.

### **1.7.2 Surveys**

**1.7.2.1** The Classification Survey for First Entry is to be carried out in accordance with the requirements as specified in Section 9 of this Chapter. The class maintenance surveys for such diving systems or submersibles are the same as for diving systems or submersibles built under supervision of the Society.

1.7.2.2 In the case of diving systems or submersibles holding valid certificates and survey reports issued by a classification society recognized by the Society, special consideration will be given to the scope of the Classification Survey for First Entry.

## Section 8 ANNUAL SURVEYS

1.8.1 Annual surveys are to be carried out within 3 months either way of each annual anniversary date of Classification Certificate or Special Survey.

1.8.2 At each survey, in addition to checking service records, log book and maintenance records, the surveyor is to examine the following items and satisfy himself as to their efficient condition;

(1) Internal and external surfaces of pressure hull, including all appendages, penetrations, hatches, hatch coamings, latching devices, lifting lugs, viewports, plugs, gaskets and support frames. Removal of protective coatings will generally not be required for the inspection of welds unless deterioration is evident or as otherwise may be required by the surveyor for inspection and non-destructive testing;

(2) Life support system, including oxygen bottles, oxygen pipes, valves, gauges, monitoring equipment, gas scrubber system, water supply system and emergency equipment. All such items surveyed are to show continued compliance with relevant requirements of Chapter 7 of the Rules;

(3) Normal and emergency ascent — descent systems;

(4) Operational check of communication and navigation systems;

(5) Electrical systems, including penetrators and

battery systems;

(6) Means of propulsion, including bearings, seals, propellers, shafting, controls, and machinery seating;

(7) Fire fighting systems;

(8) Corrosion control systems including sacrificial anodes and protective coatings;

(9) Proper functioning of monitoring instruments;

(10) Special items which affect safety such as manipulators, umbilical, hoisting rope, and lifting frames.

On completion of the examination and test of the above-mentioned items, a test dive and sea trial, as well as operational tests of various systems are to be carried out. The depth for test dive and sea trial is to be agreed with the surveyors, and the test reports are to be submitted to the surveyor(s) for approval.

## Section 9 SPECIAL SURVEYS

### 1.9.1 Survey intervals

1.9.1.1 Special surveys are to be carried out, in general at 4-yearly intervals, the first one 4 years from the date of Classification Survey, and thereafter 4 years from the date of completion of the previous Special Survey.

1.9.1.2 When a diving system or submersible has satisfactorily passed the Postponement Survey as is provided for in Section 10 of this Chapter, the Special Survey specified in 1.9.1.1 of this Section may be deferred for a period not exceeding 12 months from the due date.

1.9.1.3 Where an examination of any of the



Special Survey items as specified in this section has been made within 6 months prior to the due date of a Special Survey, such work may be credited to the particular Special Survey.

### 1.9.2 Scope of Survey

1.9.2.1 At each survey, in addition to all items as specified in Annual Survey, the following are to be examined;

(1) Ascent—descent systems are to be hydrostatically tested to 1.25 times the maximum permissible operating pressure (MPOP). Ballast tanks are to be cleaned and examined internally, with the tank sounding systems checked;

(2) All life support piping systems are to be pressure-tested for tightness to the MPOP using the fluid normally used in service. Fixed gas bottles are to be hydro-tested to 1.25 times the MPOP;

(3) All gauges and monitoring instruments are to be calibrated within a period of 6 months prior to the Special Survey. Appropriate documentation is to be submitted to the surveyor indicating such calibration has been performed;

(4) A test dive, including sea trial is to be performed in the presence of the surveyor(s);

(5) For diving bells and diver lock-out compartments, a leak test is to be carried out at the MPOP using the breathing mixture normally used in service or a gas with equivalent leakage rate;

(6) Other examinations as deemed necessary by the surveyor.

## Section 10 POSTPONEMENT SURVEYS

1.10.1 When it is impossible for a diving system or submersible to be submitted to a Special Survey at