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

GB/T 21412.6-2018

**Petroleum and natural gas industries -- Design and operation of
subsea production systems -- Part 6: Subsea production
control systems**

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Foreword

GB/T 21412 "Design and Operation of Underwater Production System for Oil and Gas Industry" is divided into 15 parts.

- Part 1. General requirements and recommended practices;
- Part 2. Unbonded flexible pipe systems for underwater and offshore applications;
- Part 3. Over-the-out pipe (TFL) system;
- Part 4. Underwater wellhead installations and tree equipment;
- Part 5. Underwater umbilical cable;
- Part 6. Underwater production control system;
- Part 7. Completion or workover riser system;
- Part 8. Underwater robot (ROV) interface for underwater production systems;
- Part 9. Remote Operation Tool (ROT) Maintenance System;
- Part 10. Bonding flexible pipe specifications;
- Part 11. Flexible pipe systems for seabed and ocean;
- Part 12. Dynamic production riser;
- Part 13. Remote operation tools and interfaces for underwater production systems;
- Part 14. Underwater high integrity pressure protection system;
- Part 15. Underwater structures and manifolds.

This part is the sixth part of GB/T 21412.

This part is drafted in accordance with the rules given in GB/T 1.1-2009.

This part replaces GB/T 21412.6-2009 "Design and operation of underwater production systems for oil and gas industry - Part 6. Water

Lower Production Control System.

Compared with GB/T 21412.6-2009, the main technical changes in this section are as follows.

- Added normative references (see Chapter 2);
- Added terms and definitions such as "design pressure" (see Chapter 3);
- Added abbreviations such as "AC" (see Chapter 4);
- Removed acronyms such as "cluster-type devices" (see Chapter 4 of the.2009 edition);
- Added "Overview" section (see 5.1);
- Added the relevant section of "Conceptual Design" (see 5.2);
- Added "Production System Functional Requirements" section (see 5.3);
- Added functional description of chemical injection unit, underwater and downhole sensors and flying leads (see 5.4.1);
- Revised a general description of the pressure level (see 5.4.2.2.1, 5.1.2.2.1 of the.2009 edition);
- Added description of electromagnetic compatibility (see 5.4.2.5);
- Increased design requirements for seawater entry and compensation (see 5.4.3.3);
- Increased design requirements for system interlocks (see 5.5.5.2);
- Increased design requirements for SCSSV protection (see 5.5.5.5);
- Added design requirements for SCSSV hydraulic circuit flushing (see 5.5.5.6);
- Increased requirements for control system design analysis (see 5.6.3);
- Added a description of the MCS configuration (see 6.4.1.1);
- Added redundancy requirements for modem units (see 6.4.3);
- Increased the design requirements for HPU (see 6.4.5);
- Increased the design requirements for chemical injection units (see 6.4.6);
- Increased design requirements for hydraulic control fluids and compatibility (see 6.4.7);
- Increased design requirements for multi-function connections (see 7.4.1.2);
- Increased design requirements for valve actuator override (see 7.4.1.5);
- Increased design requirements for underwater accumulators (see 7.4.1.6);

- Increased design requirements for electromagnetic compatibility of underwater equipment (see 7.4.3.3);
- Increased design requirements for underwater instrument connection forms (see 7.4.7);
- Increased design requirements for isolation of subsea wellheads by ESD (see 7.4.9.1);
- Increased design requirements for isolation of subsea wellheads by PSD (see 7.4.9.2);
- Increased the design requirements of the HIPPS system (see 7.4.9.3);
- Added interface description of underwater control system and other underwater equipment (see 8.3);
- Increased intelligent well interface design requirements (see 8.5);
- Revised the referenced welding standard (see Chapter 9, Chapter 9 of the.2009 edition);
- Increase electrical and fiber optic equipment qualification test requirements (see 11.2.5);
- Increase the environmental screening test requirements for electrical and fiber optic equipment (see 11.2.5);
- Modified the control system type and selection description (see Appendix A, Appendix A of the.2009 edition);
- Modified control fluid properties and test requirements, modified some test procedures and acceptance criteria (see Appendix E, Appendix for.2009 edition)

C);

- Revised operational precautions regarding sea pipe pressure exposure (see Appendix E, Appendix C of the.2009 edition);
- Increased intelligent well interface (see Appendix F);
- Increase the definition of underwater electromagnetic environment and guidelines for testing, limit, and strength selection to make electromagnetic compatibility assumptions for underwater equipment (see attached

Record F).

This section uses the translation method equivalent to ISO 13628-6:2006 "Design and operation of the underwater production system of the oil and gas industry"

Part 6. Underwater Production Control System.

The documents of our country that have a consistent correspondence with the international documents referenced in this part are as follows.

- GB/T 24598-2009 Aluminum and aluminum alloy fusion welding welder skill assessment (ISO 9606-2:2004, MOD)

For ease of use, the following editorial changes have been made to this section.

--- In order to facilitate the search and reading, the order of the appendix is adjusted according to the order in which the appendix appears in the text. Original ISO 13628-6

Appendix C, Appendix D, Appendix E, and Appendix F are adjusted to Appendix E, Appendix C, Appendix F, and Appendix D of GB/T 21412.6.

This part is proposed and managed by the National Oil and Gas Standardization Technical Committee (SAC/TC355).

This section drafted by. CNOOC Research Institute.

1 Scope

This part of GB/T 21412 applies to the design, manufacture, testing, installation and operation of underwater production control systems, covering installation in water

Surface and underwater control system equipment, control fluids. These devices are used to control underwater oil and gas production and underwater water injection and gas injection operations.

This document also applies to the control of multi-well system equipment.

This section establishes design standards for systems, subsystems, components, and control fluids to provide safe and effective underwater production equipment.

Control function.

This section includes information on various types of underwater production control systems, as follows.

--- Informational data for the purpose of introduction and data, providing an overview of the overall structure of the control system and general functions;

--- Basic descriptive information that all control systems follow;

--- Selective data that is sensitive to the type of control system (only selected when relevant);

--- Optional data and requirements that are adopted by the user or manufacturer as deemed necessary.

In view of the variety of data types, it is recommended that users and manufacturers of control systems select the requirements for practical applications from this section.

Failure to adopt the provisions of this document may result in exceeding specifications and higher purchase costs.

Downhole intelligent drilling downhole control equipment is not covered by this section.