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

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**Remote handling devices for radioactive materials - Part 5:
Remote handling tongs**

放射性物质远程操作装置 第5部分：剑式机械手

(English Translation)

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References

Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

This document is part 5 of GB/T 45523 "Remote Operation Devices for Radioactive Material". GB/T 45523 has been published for the following part.

- Part 1: General requirements;
- Part 2: Mechanical master-slave manipulators;
- Part 3: Electric follow-up master-slave manipulator;
- Part 4: Power manipulator;
- Part 5: Sword-type manipulator.

Introduction

The remote operation device of radioactive materials plays a key role in the fields of nuclear energy and nuclear technology, and has a profound impact on the safe operation and environmental protection of the nuclear industry.

Its core function is to perform maintenance, dismantling, and operation tasks in a high-radiation environment, effectively isolating operators from radioactive materials.

This type of device not only ensures the safety and health of workers, but also improves work efficiency and reduces it reduces production and operation costs and is an important tool that is indispensable for the safe and efficient operation of the nuclear industry.

GB/T 45523 "Remote Operation Device for Radioactive Materials" focuses on mechanical

master-slave manipulators, electric follow-up master-slave manipulators, power machinery these types of manipulators meet various needs with their respective control flexibility, load capacity and applicable scenarios.

The scientific and reasonable selection, deployment and continuous maintenance of these remote operation devices can effectively reduce the operator's Radiation exposure level, effectively control production and operation costs, and improve operating efficiency and overall system safety. This is not only a technological advancement it is an important contribution to human health, environmental protection and sustainable development. Therefore, we continue to optimize the design of the device and improve the automation level.

The key to promoting the sustainable development of remote operation technology of radioactive materials is to strengthen personnel training and management.

GB/T 45523 "Remote Operation Devices for Radioactive Materials" is planned to consist of five parts.

--- Part 1: General requirements. The purpose is to specify the requirements that need to be met by the design, manufacture and application of remote operation devices for radioactive materials.

General requirements.

--- Part 2: Mechanical master-slave manipulators. The purpose is to specify the design, manufacture and application of mechanical master-slave manipulators that need to meet Specific requirements on structure and function, technical indicators, inspection, etc.

--- Part 3: Electric follower master-slave manipulator. The purpose is to specify the design, manufacture and application of electric follower master-slave manipulators that need to meet Specific requirements on structure and function, technical indicators, inspection, etc.

--- Part 4: Power manipulator. The purpose is to specify the structure and function of the power manipulator that needs to be designed, manufactured and applied.

Specific requirements in terms of performance, technical indicators, inspection, etc.

--- Part 5: Sword-type manipulator. The purpose is to specify the structure and function of the sword-type manipulator that needs to be designed, manufactured and applied.

Specific requirements in terms of performance, technical indicators, inspection, etc.

Radioactive Material Remote Control Device Part 5: Sword-type manipulator

1 Scope

This document specifies the structure and functions, technical requirements and inspection of a remotely operated sword-type manipulator.

This document applies to the design, manufacture and application of tele-operated sword-type manipulators for use in ionizing radiation environments.

2 Normative references

The contents of the following documents constitute essential clauses of this document through normative references in this document.

For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to this document.

GB/T 45523.1 Remote control devices for radioactive materials Part 1: General requirements
GB/T 45523.2 Remote control device for radioactive material Part 2: Mechanical master-slave manipulator
EJ/T 1096 Classification and inspection methods of airtightness of sealed chambers
EJ/T 1175.1 Sealed chamber components Part 1: Glove receiving trays, bag receiving trays, glove hole covers, bag hole covers, sealing rings and interchangeable Replacement
EJ/T 1175.2 Sealed chamber components Part 2: Gloves, welding bags, sword-type manipulator sheaths and master-slave manipulator sheaths

3 Terms and definitions

The terms and definitions defined in GB/T 45523.1 and GB/T 45523.2 and the following apply to this document.

leak-tight connector an intermediate device installed between the clamp and the straight bar.

Note: Used to maintain the continuity of the seal and transmit the clamping movement in the sealed state.

4 Structure and function

4.1

The sword-shaped manipulator is mainly composed of an end effector, a tubular straight rod and a handle. The transmission element in the straight rod realizes the connection between the end effector and the handle.

The sword-type manipulator is usually installed on a shielded wall or a sealed box, or it can be installed on a carrier or operated directly by an operator.

Take over and hold.

4.2

The sword-type manipulator can directly transmit the operator's actions from the handle to the end effector. The sword-type manipulator is installed on a shielded wall or a closed