



Standard Guide for Materials Handling Equipment for Hot Cells¹

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1. Scope

1.1 Intent:

1.1.1 This guide covers materials handling equipment used in hot cells (shielded cells) for the processing and handling of nuclear and radioactive materials. The intent of this guide is to aid in the selection and design of materials handling equipment for hot cells in order to minimize equipment failures and maximize the equipment utility.

1.1.2 It is intended that this guide record the principles and caveats that experience has shown to be essential to the design, fabrication, installation, maintenance, repair, replacement, and decontamination and decommissioning of materials handling equipment capable of meeting the stringent demands of operating, dependably and safely, in a hot cell environment where operator visibility is limited due to the radiation exposure hazards.

1.1.3 This guide may apply to materials handling equipment in other radioactive remotely operated facilities such as suited entry repair areas and canyons, but does not apply to materials handling equipment used in commercial power reactors.

1.1.4 This guide covers mechanical master-slave manipulators and electro-mechanical manipulators, but does not cover electro-hydraulic manipulators.

1.2 Applicability:

1.2.1 This guide is intended to be applicable to equipment used under one or more of the following conditions:

1.2.1.1 The materials handled or processed constitute a significant radiation hazard to man or to the environment.

1.2.1.2 The equipment will generally be used over a long-term life cycle (for example, in excess of two years), but equipment intended for use over a shorter life cycle is not excluded.

1.2.1.3 The equipment can neither be accessed directly for purposes of operation or maintenance, nor can the equipment be viewed directly, e.g., without shielded viewing windows, periscopes, or a video monitoring system.

1.3 User Caveats:

1.3.1 This standard is not a substitute for applied engineering skills, proven practices and experience. Its purpose is to provide guidance.

1.3.1.1 The guidance set forth in this standard relating to design of equipment is intended only to alert designers and engineers to those features, conditions, and procedures that have been found necessary or highly desirable to the design, selection, operation and maintenance of reliable materials handling equipment for the subject service conditions.

1.3.1.2 The guidance set forth results from discoveries of conditions, practices, features, or lack of features that were found to be sources of operational or maintenance problems, or causes of failure.

1.3.2 This standard does not supersede federal and/or state regulations, or codes applicable to equipment under any conditions.

1.3.3 This standard does not cover design features of the hot cell, e.g., windows, drains, and shield plugs. This standard does not cover pneumatic or hydraulic systems. Refer to Guides C 1533, C 1217, and ANS Design Guides for Radioactive Material Handling Facilities & Equipment for information and references to design features of the hot cell and other hot cell equipment.

1.3.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices, and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *Industry and National Consensus Standards*—Nationally recognized industry and consensus standards applicable in whole or in part to the design, fabrication, and installation of equipment are referenced throughout this guide and include, but are not limited to, the following:

2.2 ASTM Standards:²

C 859 Terminology Relating to Nuclear Materials³

C 1217 Guide for Design of Equipment for Processing Nuclear and Radioactive Materials³

C 1533 Guide for General Design Considerations for Hot Cell Equipment³

2.3 Other Standards:

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ *Annual Book of ASTM Standards*, Vol 12.01.

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