CBRN Survivability Toolkit

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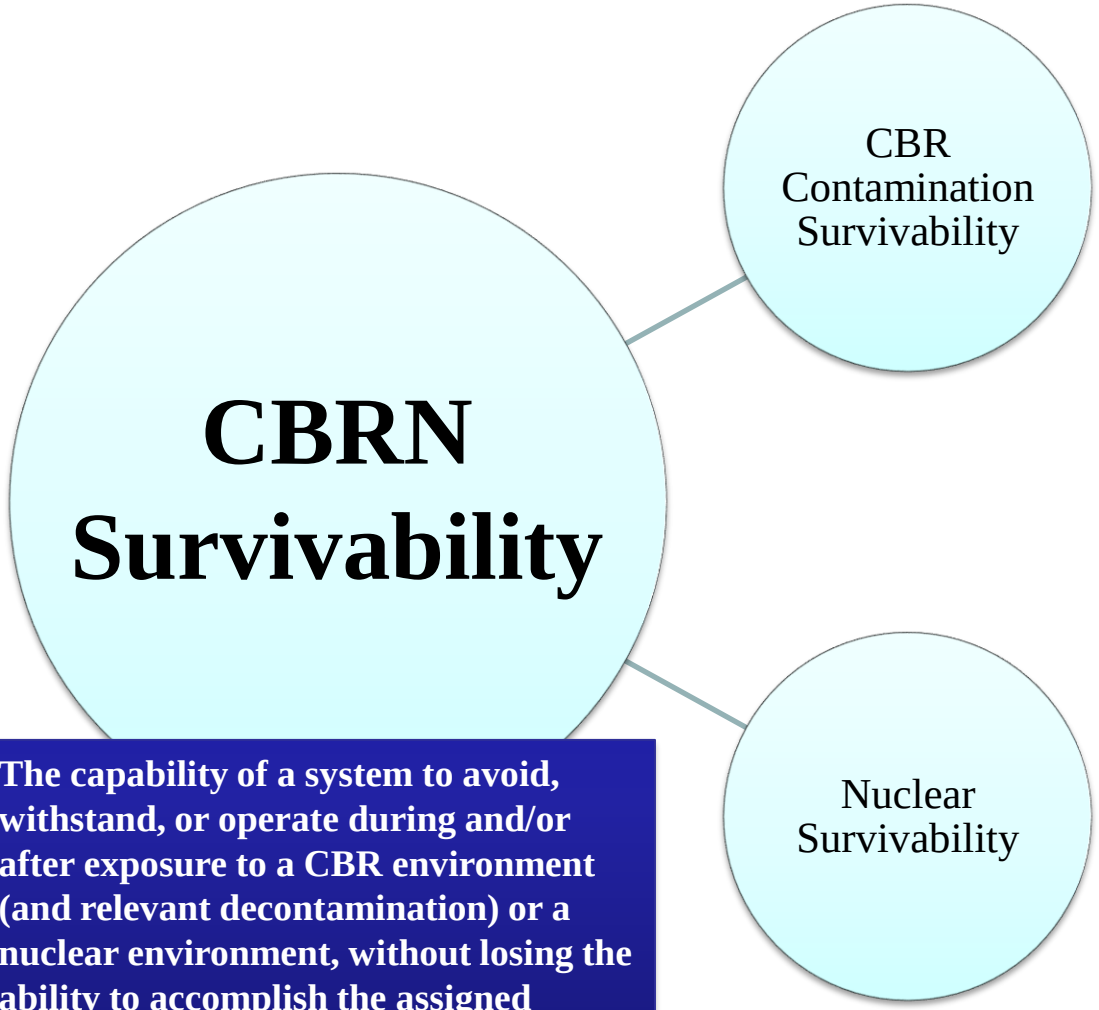
Agenda

- CBRN Survivability Overview
- CBRN Survivability Toolbox
- CBRN Survivability Conference
- Take Away Information

CBRN Survivability from DoDI 3150.09



The capability of a system to avoid, withstand, or operate during and/or after exposure to a CBR environment (and relevant decontamination) or a nuclear environment, without losing the ability to accomplish the assigned mission.

- Focused on effects from CBR contamination including fallout
- Capability of a system to withstand chemical, biological, or radiological contaminated environments, decontaminants, and decontamination processes

- Focused on prompt effects from nuclear weapon events
- Capability of a system to withstand exposure to a nuclear environment without suffering loss of ability to accomplish its designated mission throughout its life-cycle

"CBR" vs "N" Survivability

Technique	Description
Chemical, Biological, Radiological Contamination Survivability	
Hardness	Capability of materiel or systems to withstand the damaging effects of CBR contamination and decontaminants and procedures required to decontaminate
Decontaminability	The ability of a system to be cleaned to a level which reduces the hazard to personnel operating, maintaining, or re-supplying the system
Compatibility	Warfighter's ability to conduct mission-essential tasks in order to complete the designated mission, while wearing IPE

Technique	Description
Nuclear Survivability	
Hardening	Capability of a system to withstand exposure to nuclear environments without suffering loss of ability to accomplish its designated mission throughout its life cycle
Timely Resupply	The ability of a system to provide replacement parts or equipment that is damaged or destroyed
Redundancy	Having equivalent systems that can accomplish the mission or having multiple subsystems that can compensate for the loss of one
Mitigation techniques (including operational techniques)	The ability to operate in a manner to avoid maximum exposure to people or systems

CBRN Survivability Policy Development

- GAO issued report GAO-03-325C, *Chemical and Biological Defense: Sustained Leadership Attention Needed to Resolve Operational and System Survivability Concerns,* May 2003
  - DATSD(CBD) tasked PAIO to provide a comprehensive Joint Service CB Contamination Survivability program plan
- Ronald W. Reagan National Defense Authorization Act for FY05
  - SEC 1053 Survivability of Critical Systems Exposed to C/B Contamination
- USD(AT&L) memoranda
  - August 31, 2005 Interim Policy designated ACAT 1D systems as "Defense Critical Systems" and directed program managers to tailor and implement a strategy that addressed CB CS throughout the programs' development, documenting processes used and decisions made
  - May 9, 2006 replaced Interim Policy and included a process for identifying defense critical systems, instructions on how CB CS should be addressed by the Services, and a process for DoD oversight
- GAO issued another report, GAO-06-592, *CBD: DoD Needs Consistent Policies and Clear Processes to Address the Survivability of Weapon Systems Against CB Threats,* April 2006
- DoD Directive S-5210.81, *United States Nuclear Weapons Command and Control, Safety, and Security (U),* August 8, 2005
- National Security Presidential Directive 51 and Homeland Security Presidential Directive 30, National Continuity Policy, May 9, 2007
  - The Secretary of Defense in coordination with the Secretary of Homeland Security shall provide secure, integrated, Continuity of Government communications to the President, Vice President, and at a minimum Category I executive departments and agencies
- **DoDI 3150.09, The CBRN Survivability Policy, first issued September 2008**

CBRN Survivability Toolkit
DoDI 3150.09, April 2015

- It is DoD policy that
  - The force will be equipped to survive and operate in CBR or nuclear environments as a deterrent to adversary use of weapons of mass destruction.
  - All Acquisition Category 1 programs expected to operate in C/B/R/N environments are designated CBRN MCS and must be CBRN survivable IAW with the applicable Key Performance Parameter.
  - CBRN MCS are survivable IAW the CBRN survivability requirements identified in their requirements documents.
  - As directed by the Defense Acquisition Board, all CBRN MCS under development as DoD acquisition programs must include in the SEP how the design incorporates the CBRN survivability requirements.
  - Mission-critical NC2, National Leadership Command Capability systems, and nuclear- and EMP-survivable MCS must be nuclear hardened, have a hardness assurance program, and have a continuing HM/HS program.

DoDI 3150.09 is currently under revision and is expected to be published in 2020.

CBRN Survivability Toolkit
Implementation of DoDI 3150.09

Office of the Secretary of Defense

- USD(A&S) engagement through review of SEPs and requirements documents such as ICDs and CDDs
- CSOG
  - DD Form 2931, CBRN MCR
- Security Classification Guide
  - DoD SCG for CBRN Survivability, February 2017
- Defense Acquisition University Continuous Learning Module – Engineering 079, CBRN Survivability

System Survivability KPP Guide

- The SS KPP is intended to promote the development of critical warfighter capability that can survive kinetic (i.e., traditional, non-traditional, and CBRN) and non-kinetic (cyber and EMS threats) threats across domains and applicable environments including space.
- 2.5.1.1. CBRN Considerations. The sponsor will state whether the system has been designated mission critical. If the system is mission critical and must survive and/or operate in CBRN environments, the sponsor will designate the system as "CBRN Mission Critical" per DoDI 3150.09. The sponsor must include a brief rationale justifying this designation or its absence for all systems. If designated CBRN Mission Critical, the system must consider all relevant CBRN environments, as well as operational and maintenance requirements. **For CBRN Mission Critical systems, CBRN survivability attributes should not be addressed as Other System Attributes, but included within the System Survivability KPP, as a KSA, or as an APA.**

CBRN Survivability Toolkit
Defense Acquisition Guidebook

Defense Acquisition Guidebook, Chapter 3

- **CH 3–4.3.23 Survivability and Susceptibility**
- Program Manager should address:
  - CBRN survivability for CBRN mission-critical system
  - Document in Service-specific CBRN MCR
- Unless waived by the Milestone Decision Authority:
  - Should be survivable to platform-specific VOLT
- Systems Engineering Plan should describe:
  - How the design incorporates susceptibility and vulnerability reduction and CBRN survivability requirements.
  - How progress toward these are tracked over the acquisition life cycle.

CBRN Survivability Toolkit
CBRN System Survivability Guidebook

Purpose:

- Assist requirement stakeholders in considering the CBRN aspects of the SS KPP early enough in the system requirements process to ensure system survivability and cost savings.
- Provides a process for identifying the system attributes required to achieve CBRN survivability.

Goal:

1. Ensure proper consideration of CBRN threats, vulnerabilities, and potential operational environments in which systems and equipment are intended to operate prior to making design considerations and specifying CBRN (or no CBRN) requirements.
2. Ensure CBRN-related issues are properly addressed during the requirements development process.

The CBRN System Survivability Guidebook is located on the intelshare SharePoint @ https://intelshare.intelink.gov/sites/systemsurvivability

CBRN Survivability Toolkit
DAU CLM – CBRN Survivability

CLE079 Chemical, Biological, Radiological, and Nuclear (CBRN) Survivability DAU Continuous Learning Module

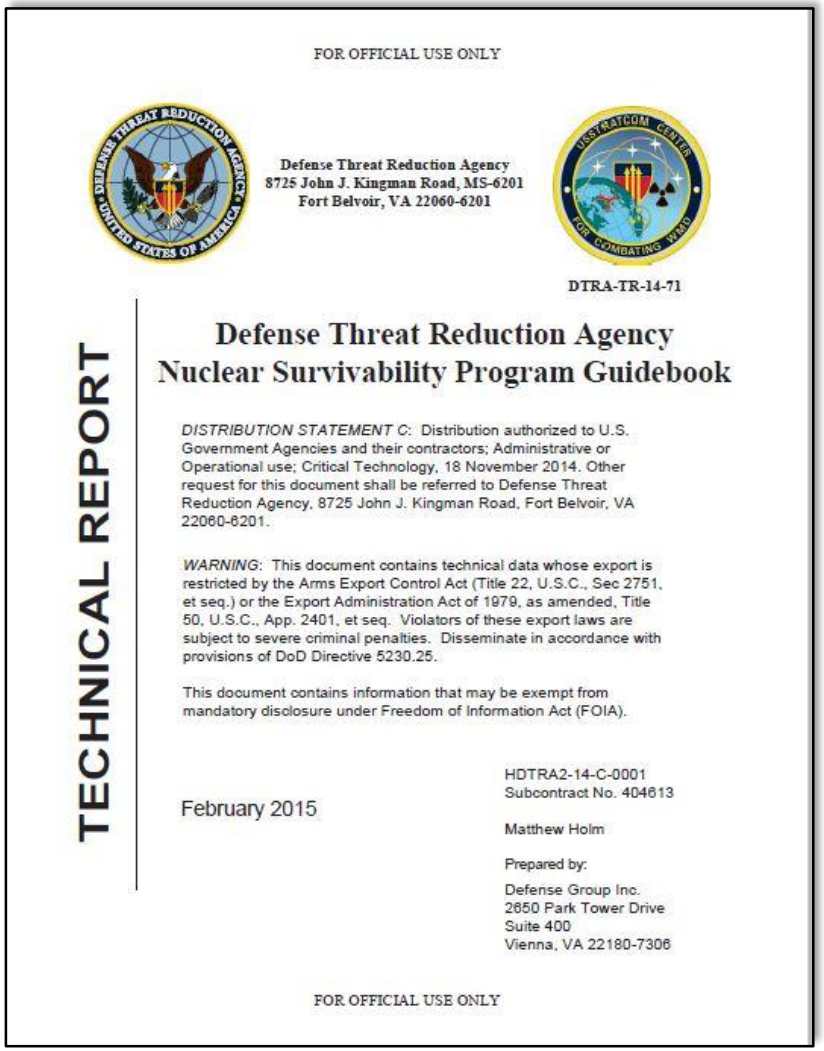
- Foundational course on policy, testing, design, and acquisition
- Enhance Engineering workforce understanding of CBRN survivability
- Learn how to ensure CBRN survivability is "baked in" to materials, systems, and infrastructure in support of DoD missions
- Based on DoDI 3150.09, The CBRN Survivability Policy, DoDD 5000.01 / DoDI 5000.02, The Defense Acquisition System
- Target Attendees: Level I and II acquisition professionals in the ENG, PM, and T&E career fields.
- The module has six objectives. Upon completion, student should be able to:
  - Identify the major principles of the DoD CBRN Survivability Policy, DoDI 3150.09
  - Describe the fundamentals of operations in CBRN environments
  - Ensure that DoD acquisitions include plans for CBRN survivability
  - Apply the DoD CBRN Survivability Policy, DoDI 3150.09 to JCIDS, DoDI 5000.02, and Systems Engineering Processes
  - Identify the operational effects of CBR contaminants and nuclear weapons
  - Categorize a system in the CBRN MCR

CBRN Survivability Toolkit
DD Form 2931, The CBRN MCR

- **CBRN MCR**:
  - Identifies which systems and infrastructure are MC.
  - Which MCS must operate and survive in CBR environments or nuclear environments.
- MCRs are intended to help:
  - Manage CBRN Survivability Programs.
  - Enable senior-level oversight of the CBRN Survivability posture across the DoD.
- In MCRs, Services and the Missile Defense Agency
  - Evaluate MC systems and infrastructure for the ability to survive and operate when exposed to CBRN threats.

CBRN Survivability Toolkit
DTRA Nuclear Survivability Program Guidebook

- **DTRA Nuclear Survivability Program Guidebook**
  - Provides guidelines and best practices
  - Informed by the latest DoD policy guidance documents
  - Part I – Setting Requirements
    - Effects, Survivability, Roles
  - Part II – Developing, Validating, and Maintaining Systems
    - Acquisition, Best Practices, T&E, M&S, Hardness Assurance & Maintenance



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Fort Belvoir, VA 22060-6201

DTRA-TR-14-71

TECHNICAL REPORT

Defense Threat Reduction Agency
Nuclear Survivability Program Guidebook

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CBRN Survivability Toolkit
CBR CS MIL-STD

- MIL-STD-3056, a Department of Defense Design Criteria Standard, "Design Criteria for Chemical, Biological, and Radiological System Contamination Survivability," dated 23 November 2016.
  - The ability of military systems and infrastructure to survive and operate in an enemy threat environment depends on their design and the emphasis placed on survivability throughout their life cycle.
  - The MIL STD addresses CBR contamination survivability considerations for the design of military systems expected to survive and operate in CBR-contaminated environments. References for infrastructure considerations are also included.

CBRN Survivability Toolkit
Nuclear MIL-STDs

- The DTRA develops and maintains nuclear survivability MIL-STDs for nuclear survivability, including both unclassified and classified volumes.

- Includes standards for:
  - Environment
  - Protection
  - Testing

- A listing is in the backup slides

CBRN Survivability Toolkit TOPs

PL 108-375 requires the DoD to develop specific testing procedures to be used during the design and development of MCS. Test Operations Procedures (TOP) define test procedures to be used during government developmental tests of R&D materiel/systems.

- **TOP 8-2-510, CBR CS, Large Item Exteriors**, provides basic information to facilitate planning, conducting, and reporting and to standardize CBCS testing of external surfaces of military materiel such as combat vehicles, vans, shelters, and large items of packaged materiel. This TOP was approved on 23 March 2011 by the CBRN Defense T&E Executive.
- **TOP 8-2-502, CBR CS Material Effects Testing**, provides basic information to facilitate planning, conducting, and reporting of material effects testing. This TOP provides standard methods for CBR CS coupon testing of materials for use in military systems. It was approved on 27 July 2012 by the CBRN Defense T&E Executive.
- **TOP 8-2-111A, CBR CS, Small Items of Equipment**, provides basic information to facilitate test planning, conducting, and reporting and to achieve standardized CBR CS testing of small items of ME Army materiel. This TOP is to be used primarily for the testing of small items of equipment that are decontaminated by the individual Warfighter or by two-person or three-person teams operating portable and handheld decontaminating devices. It was approved on 27 July 2012 by the CBRN Defense T&E Executive.
- **TOP 8-2-509, CBR CS, Large Item Interiors**, provides basic information to facilitate planning, conducting, and reporting of large item interiors testing such as tactical vehicles, fixed and rotor wing tactical aircraft, vans, shelters, building interiors, shipboard interiors, and cargo aircraft interiors. This TOP provides standard methods for CBR CS testing of interior surfaces of military materiel. It is designed to provide results to determine if large items of ME equipment have met applicable CBR CS requirements. It was approved on 27 July 2012 by the CBRN Defense T&E Executive.
- **TOP 8-2-065, Developmental Testing of Liquid and Gaseous/Vapors Decontaminants on Bacterial Spores and Other Bio-Warfare Agents on Hard or Porous Surfaces**, provides basic information necessary to plan, conduct, and report biological decontamination testing and discuss required facilities, equipment, procedures, test and experimental parameters, and data obtained using these test methods.

CBRN Survivability Toolkit
Chemical Biological Material Effects Database

- The CBME Database contains information on the effects of chemical and biological agents, simulants, and decontaminants on the materials used in mission-critical systems. The database is used by personnel with responsibilities to ensure the survivability of mission-critical systems.
- CBME Database Features:
  - CAC access
  - Search function using Microsoft Full Text Searching technology, allowing users to search nearly all the major citation fields (e.g., title, authors, report number, abstract, keywords, etc.) along with the PDF documents themselves
  - Tiered access: Users see the test entries and documents at or below their current level of system access
  - Over 150,000 test entries

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CBRN SURVIVABILITY CONFERENCE

14-15 Jan 2020

- **What:** DoD Chemical, Biological, Radiological, and Nuclear (CBRN) Survivability Conference
- **When:** 14-15 Jan 2020
- **Where:** Embassy Suites by Hilton San Diego Bay Downtown, San Diego, CA
- **Registration fee:** None
- **Purpose:** The CBRN Survivability Conference presents a unique opportunity for subject matter experts, program offices, project managers, and systems engineers to gain understanding of CBRN survivability regulations, requirements, procedures, resources, and approaches for addressing CBRN survivability requirements in accordance with military standards.
- **Additional Information**:
  - https://eventmanagement.cvent.com/CBRNSurvivability2020
  - A shipboard tour at Naval Base Coronado or Naval Base San Diego will be held in conjunction with the conference.

Take Away Information

- **DoDI 3150.09, *The Chemical, Biological, Radiological, and Nuclear (CBRN) Survivability Policy***
  - https://www.esd.whs.mil/Directives/issuances/dodi/
- **DD Form 2931, *The Chemical, Biological, Radiological, and Nuclear (CBRN) Mission-Critical Report (MCR)* (blank)**
  - https://www.esd.whs.mil/Directives/forms/
- **079 CBRN Survivability DAU CLM**
  - https://www.dau.edu/
- **JCIDS Manual**
  - https://www.jcs.mil/
- **Defense Acquisition Guidebook**
  - https://www.dau.edu/tools/dag
- **CBRN Survivability Conference**
  - https://eventmanagement.cvent.com/CBRNSurvivability2020

For copies of the below documents, please contact Ms. Leslie Custer at leslie.s.custer.ctr@mail.mil.

- **CBRN Survivability Security Classification Guide**
- **Defense Threat Reduction Agency Nuclear Survivability Program Guidebook**
- **CBR CS Military Standard**
- **Nuclear Military Standards**
- **CBRN System Survivability Guidebook**
- **Test Operating Procedures**
- **Chemical Biological Materials Effects Database User Guide**
- **CBRN Survivability Points of Contact**

Open Discussion

Questions?

Acronym List

AT&L	Acquisition, Technology, and Logistics	CAC	common access card
CBME	Chemical Biological Material Effects	CBR	chemical, biological, and radiological
CBRN	chemical, biological, radiological, and nuclear	CDD	capabilities development document
CS	contamination survivability	CSOG	CBRN Survivability Oversight Group
DAU	Defense Acquisition University	DD	Department of Defense
DoD	Department of Defense	DoDD	Department of Defense Directive
DoDI	Department of Defense Instruction	DTRA	Defense Threat Reduction Agency
EMP	electromagnetic pulse	ENG	Engineering
IAW	in accordance with	ICD	initial capabilities document
JCIDS	Joint Capabilities Integration and Development System	HM/HS	hardness maintenance/hardness surveillance
KPP	Key performance parameter	MC	Mission-critical
MCR	Mission-Critical Report	MCS	mission-critical system
MIL STD	military standard	M&S	Modeling and simulation
NC2	nuclear command and control	PAIO	Program Analysis and Integration Office
PL	Public Law	PM	Program Manager
R&D	Research and development	SCG	security classification guide
SEP	Systems Engineering Plan	T&E	Test and evaluation
TOP	Test operating procedures	VOLT	Validated online lifecycle threat

CBRN Survivability Toolkit
Nuclear MIL-STDs

Military Standards for Nuclear Survivability

The Defense Threat Reduction Agency (DTRA) develops and maintains nuclear survivability MIL-STDs for nuclear survivability, including both unclassified and classified volumes.

MIL-STD	Title	Date
MIL-STD-188-124B Notice 4	Department of Defense Interface Standard Grounding, Bonding, and Shielding	Apr 4, 2013
MIL-STD-188-125-1 Notice 1	High-Altitude Electromagnetic Pulse (HEMP) Protection for Ground-Based C4I Facilities Performing Critical, Time-Urgent Missions Part 1 Fixed Facilities	Apr 7, 2005
MIL-STD-188-125-2 MIL-STD-188-125-2 Notice 1	High-Altitude Electromagnetic Pulse (HEMP) Protection for Ground-Based C4I Facilities Performing Critical, Time-Urgent Missions Part 2 Transportable Systems	Mar 3, 1999 Apr 7, 2005
MIL-STD-331C, Notice 1	Fuze and Fuze Components, Environmental and Performance Tests	May 10, 2016
MIL-STD-461G	Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment	Dec 11, 2015
MIL-STD-464C	Electromagnetic Environmental Effects Requirements for Systems	Dec 1, 2010

CBRN Survivability Toolkit
Nuclear MIL-STDs

Military Standards for Nuclear Survivability

MIL-STD	Title	Date
MIL-STD-750-1, Revision A, Change 2	Test Method Standard Environmental Test Methods for Semiconductor Devices Part 1: Test Methods 1000 Through 1999	Aug 12, 2016
MIL-STD-750/2, Revision A, Change 2	Test Method Standard Mechanical Test Methods for Semiconductor Devices Part 2: Test Methods 2001 Through 2999	Aug 19, 2016
MIL-STD-750/3	Test Method Standard Transistor Electrical Test Methods for Semiconductor Devices Part 3: Test Methods 3000 Through 3999	Jan 3, 2012
MIL-STD-750/4, Change 1	Test Method Standard Diode Electrical Test Methods for Semiconductor Devices Part 4: Test Methods 4000 Through 4999	Aug 15, 2014
MIL-STD-750/5	Test Method Standard High Reliability Space Application Test Methods for Semiconductor Devices Part 5: Test Methods 5000 Through 5999	Jan 3, 2012
MIL-STD-750F w/Change 1	Test Method Standard Test Methods for Semiconductor Devices	Apr 29, 2013

CBRN Survivability Toolkit
Nuclear MIL-STDs

Military Standards for Nuclear Survivability

MIL-STD	Title	Date
MIL-STD-810G w/Change 1	Test Method Standard Environmental Engineering Considerations and Laboratory Tests	Apr 15, 2014
MIL-STD-881C	Work Breakdown Structures for Defense Material Items	Oct 3, 2011
MIL-STD-883JK, Change 1	Test Method Standard Microcircuits	Jul 20, 2016
MIL-STD-901D (NAVY)	Shock Tests, H. I. (High-Impact) Shipboard Machinery, Equipment, and Systems, Requirements for	Mar 17, 1989
MIL-STD-961E, Change 3	Defense and Program-Unique Specifications Format and Content	Oct 27, 2015
MIL-STD-962D w/Change 2	Defense Standards Format and Content	Jan 9, 2014
MIL-STD-963C	Data Item Descriptions (DIDs)	Sep 24, 2014
MIL-STD-1310H (NAVY)	Shipboard Bonding, Grounding, and Other Techniques for Electromagnetic Compatibility, Electromagnetic Pulse (EMP) Mitigation, and Safety	Sep 17, 2009
MIL-STD-1310H Notice 1	Shipboard Bonding, Grounding, and Other Techniques for Electromagnetic Compatibility, Electromagnetic Pulse (EMP) Mitigation, and Safety	Aug 12, 2014

CBRN Survivability Toolkit
Nuclear MIL-STDs

Military Standards for Nuclear Survivability

MIL-STD	Title	Date
MIL-STD-1472G	Human Engineering	Jan 11, 2012
MIL-STD-1316E, Notice 1	Fuze Design, Safety Criteria	Jan 14, 1999
MIL-STD-1546B (USAF)	Parts, Materials, and Processes Control Program for Space and Launch Vehicles	Jul 27, 1992
MIL-STD-1546B Notice 2	Parts, Materials, and Processes Control Program for Space and Launch Vehicles	Oct 20, 2008
MIL-STD-1766B (USAF)	Nuclear Hardness and Survivability Program Requirements for ICBM Weapons Systems	Sep 9, 1994
MIL-STD-1809 (USAF)	Space Environment for USAF Space Vehicles	Feb 15, 1991
MIL-STD-1822A (USAF)	Nuclear Compatibility Certification of Nuclear Weapon Systems, Subsystems, and Support Equipment	Feb 1, 2013
MIL-STD-2169C	High-Altitude Electromagnetic Pulse (HEMP) Environment (S)	Jan 19, 2012
MIL-STD-3022 w/Change 1	Documentation of Verification, Validation, and Accreditation (VV&A) for Models and Simulations	Apr 5, 2012
MIL-STD-3023	High-Altitude Electromagnetic Pulse (HEMP) Protection for Military Aircraft	Nov 21, 2011

CBRN Survivability Toolkit
Nuclear MIL-STDs

Military Standards for Nuclear Survivability

MIL-STD	Title	Date
MIL-STD-3053	Satellite Systems Natural and Nuclear Environment Standard (SSNS)	Nov 19, 2015
MIL-STD-3054	Comprehensive Atmospheric Nuclear Environment Standard (CANES)	Mar 14, 2016
MIL-STD-4023	High-Altitude Electromagnetic Pulse (HEMP) Protection for Military Surface Ships	Jan 25, 2016
MIL-STD-31000A	Technical Data Packages	Feb 26, 2013