AIAA S-113A-2016

Standard

Criteria for Explosive Systems and Devices on Space and Launch Vehicles

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Criteria for Explosive Systems and Devices on Space and Launch Vehicles

Sponsored by

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Abstract

This standard establishes criteria for design, manufacture, and performance certification of explosive systems and explosive devices commonly used on launch, upper stage, and space vehicle systems. The requirements contained in this specification are intended to serve as a universal set of tools for use by explosive system manufacturers and users during all phases of development and certification. This information may also be used for guidance during preparation of acquisition contracts and program specific documents, and may be used for explosive system applications unrelated to space vehicles.

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Foreword

The purpose of this standard, developed by the AIAA Ordnance Committee on Standards, is to clearly define technical requirements, practices and expectations associated with ordnance systems and components to be used on launch, upper stage, and space vehicles. It is to be applied by Space and Missile Center as part of the technical baseline for acquisition, contracting and program management. To the greatest extent possible, requirements from past and existing government and military specifications and standards have been incorporated herein. In addition, the requirements herein include those generated as a result of lessons learned from launch and space vehicle programs as well as from other military and aerospace programs.

This standard will be updated and revised as appropriate to incorporate technological advances and innovations as well as lessons learned.

This standard may be tailored by the contractor, in consultation with the procuring authority, or may be replaced by another document from the government, industry, technical society, international community, or contractor provided the new document is comparable in rigor and effectiveness. Tailoring must be relevant and hold members of the government/industrial partnership appropriately accountable to sound technical principles.

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Introduction

Explosive systems include initiation devices/mechanisms, explosive trains, and end effector ordnance devices that use explosive energy to do work. These systems consist of a series of explosive devices which are electrical or mechanical components or assemblies containing or operated by explosive materials. These are, by design, “one-shot” components that cannot be tested completely before use. Performance confidence of “one-shot” components can only be obtained by destructive tests of like samples from common production lots. This document describes criteria to certify safe and reliable performance of explosive systems and their “one-shot” components.

The criteria outlined in this standard are a composite of those verified by previous use in space and launch vehicle applications. Described are essential design characteristics, manufacturing controls, and methods for certifying performance, acceptance, qualification, and useful life.

1 Scope

This standard establishes criteria for design, manufacture, and performance certification of explosive systems and explosive devices commonly used on launch, upper stage, and space vehicle systems. The requirements contained in this specification are intended to serve as a universal set of tools for use by explosive system manufacturers and users during all phases of development and certification to assure safe application and high quality products. This information may also be used for guidance during preparation of acquisition contracts and program-specific documents, and may be used for explosive system applications unrelated to space vehicles.

2 Tailoring

For a specific program or project, the requirements defined in this standard may be tailored to match the actual requirements of the particular program or project. Tailoring of requirements shall be undertaken in agreement with the procuring authority where applicable.

Tailoring is a process by which individual requirements or specifications, standards, and related documents are evaluated and made applicable to a specific program or project by selection, and in some cases, modification and addition (e.g., for manned spaceflight) of requirements in the standards.

The criteria offered here are generic in nature; therefore, users are encouraged to consider tailoring these criteria to best fit individual applications. However, the tailored requirements shall achieve a level of verification equivalent to the baseline described herein. Rationale for each tailored requirement shall be established. If the requirements in this specification are not tailored by a contract, they stand as written.

3 Applicable Documents

The following applicable documents contain provisions that, through reference in this text, constitute provisions of this standard.

In the event of conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

AIAA-2005-4039	*Advanced Applications of Statistical Methods in Testing of Energetic Components and Systems*
AIAA-2007-5135	*Practical Problems and Solutions in Age Trend-Line Analyses for Energetic Components*
AIAA-2007-5138	*Correlation Between the Accelerated Aging Test (AAT) and Real World Storage Temperature*
AIAA S-114	*Moving Mechanical Assemblies for Space and Launch Vehicles*
CFR, Title 49	*Code of Federal Regulations, Transportation*
MIL-D-23615	*Design and Evaluation of Cartridge Actuated Devices*
MIL-STD-810	*Environmental Engineering Considerations and Laboratory Tests*
RCC 319-14	*Flight Termination Systems Commonality Standard*

4 Vocabulary

4.1 Acronyms and Abbreviated Terms

CAD	Cartridge Actuated Device
CDC	Confined Detonating Cord