AIAA
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Standard

Moving Mechanical Assemblies for Space and Launch Vehicles

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Moving Mechanical Assemblies for Space and Launch Vehicles

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Abstract

This standard specifies general requirements for the design, manufacture, quality control, testing, and storage of moving mechanical assemblies (MMAs) to be used on space and launch vehicles. This standard is applicable to the mechanical or electromechanical devices that control the movement of a mechanical part of a space or launch vehicle relative to another part. The requirements apply to the overall MMA as well as to the mechanical components and instrumentation that are an integral part of these mechanical assemblies.

The most significant updates in this revision, relative to the previous (2005) version, include a reformatted and rewritten testing section, a new approach to calculating force/torque margin, and the elimination of the “shall, where practical” weighting level of requirements.

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Foreword

This standard is originally based on Military Specification MIL-A-83577B, Moving Mechanical Assemblies (MMA) for Space and Launch Vehicles, which was superseded by AIAA S-114 in 2005.

This standard is the result of contributions received from many individuals, most notably those on the AIAA MMA Committee on Standards (CoS).

At the time of approval, the members of the AIAA MMA CoS were:

Mark Balzer	Jet Propulsion Laboratory
Ed Boesiger	Lockheed Martin Corporation
Brian Gore (Co-chair)	The Aerospace Corporation
Leon Gurevich (Co-chair)	The Aerospace Corporation
Ray McVey	Raytheon Company (retired)
Michael Pollard	Lockheed Martin Corporation
Brandan Robertson	NASA Johnson Space Center
Adam Sexton	Ball Aerospace & Technologies Corporation
Timothy Woodard	The Aerospace Corporation

Introduction

This standard is intended to incorporate the requirements that are common to most Moving Mechanical Assemblies (MMAs) for space and launch vehicles. The requirements stated are a composite of those that have been found to be cost-effective for high reliability space and launch vehicle applications.

Not all provisions stated herein are of equal importance or weight. They have been divided into two categories of importance:

“Shall” designates the mandatory requirements. Unless specifically tailored out or modified by the contract, they constitute the firm contractual compliance requirements. All instances of "***SHALL***" requirements in this standard have been highlighted for ease of recognition.

“Preferred,” “should,” or “may” designate guidelines. Unless required by other contract provisions, deviations from these preferred guidelines do not require approval and do not require documented technical substantiation. Although these guidelines are not requirements, they reflect the preferred principles and lessons learned based on a wealth of industry-wide experience and proven design, analysis, and test approaches.

1 Scope

This standard specifies general requirements for the design, manufacture, quality control, testing, and storage of moving mechanical assemblies (MMAs) to be used on space and launch vehicles. This standard is applicable to the mechanical or electromechanical devices that control the movement of a mechanical part of a space or launch vehicle relative to another part. The requirements apply to the overall MMA as well as to the mechanical components and instrumentation that are an integral part of these mechanical assemblies.

When this standard is used to specify general requirements for MMAs to be used on launch vehicles, injection stages, reentry vehicles, or other vehicles, the term “space vehicle” is to be interpreted as the applicable vehicle.