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Voorbeeld

Nederlandse norm

# NEN-EN 4660-004

(en)

Aerospace series - Modular and open avionics architectures - Part 004: Packaging

Vervangt NEN-EN 4660-004:2011

ICS 49.090  
augustus 2019

Als Nederlandse norm is aanvaard:  
 - EN 4660-004:2019, IDT

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 Preview

Normcommissie 345030 'Luchtvaart'



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EUROPEAN STANDARD

**EN 4660-004**

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 2019

ICS 49.090

Supersedes EN 4660-004:2011

English Version

## Aerospace series - Modular and open avionics architectures - Part 004: Packaging

Série aérospatiale - Architectures avioniques  
modulaires et ouvertes - Partie 004 : Packaging

Luft- und Raumfahrt - Modulare und offene  
Avionikarchitekturen - Teil 004: Paketierung

This European Standard was approved by CEN on 2 December 2018.

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Orbeye  
Preview

## European foreword

This document (EN 4660-004:2019) has been prepared by the Aerospace and Defence Industries Association of Europe - Standardization (ASD-STAN).

After enquiries and votes carried out in accordance with the rules of this Association, this Standard has received the approval of the National Associations and the Official Services of the member countries of ASD, prior to its presentation to CEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2020, and conflicting national standards shall be withdrawn at the latest by February 2020.

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## Introduction

The purpose of this MOAA standard is to define a set of open architecture standards, concepts & guidelines for Advanced Avionics Architectures (A3).

The three main goals for the MOAA Standards are:

- reduced life cycle costs;
- improved mission performance;
- improved operational performance.

The MoAA standards are organised as a set of documents including:

- a set of agreed standards that describe, using a top down approach, the Architecture overview to all interfaces required to implement the core within avionics system;
- the guidelines for system implementation through application of the standards.

The document hierarchy is given hereafter: *(in this figure the document is highlighted).*

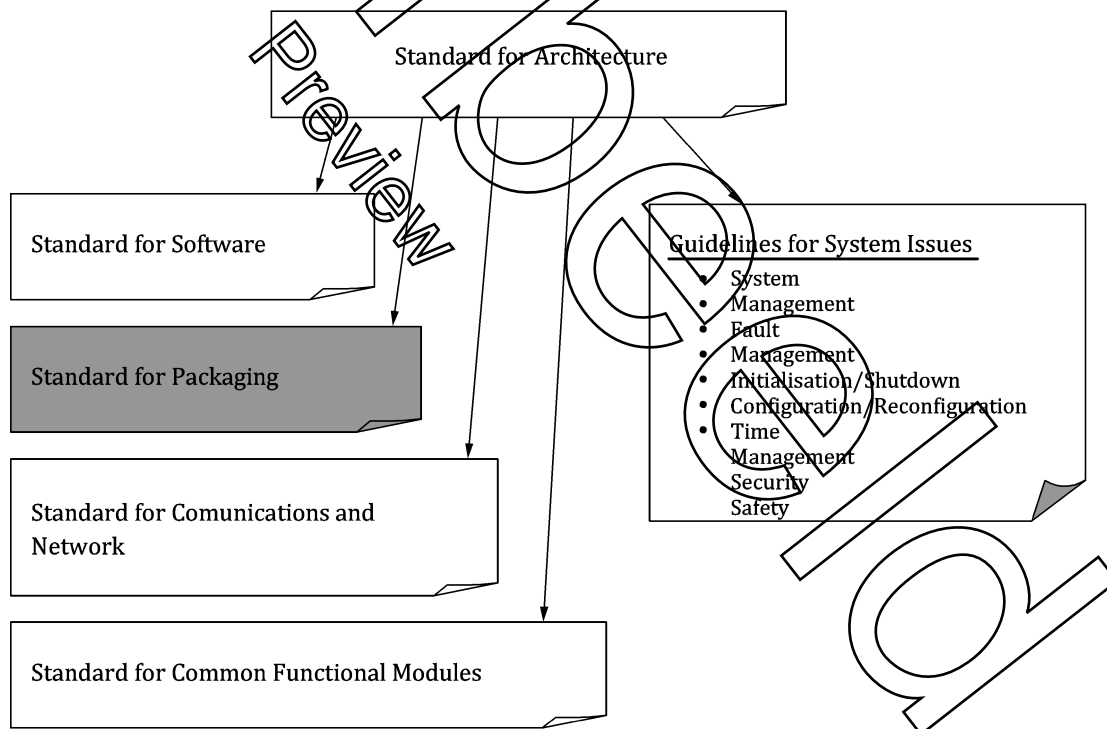


Figure 1 — MOAA Standard Documentation Hierarchy

## 1 Scope

This European standard establishes uniform requirements for Packaging for the Common Functional Modules (CFM) within an Integrated Modular Avionic (IMA) system. It comprises the module physical properties and the Module Physical Interface (MPI) definitions together with guidelines for IMA rack and the operational environment.

The characteristics addressed by the Packaging Standard are:

Interchangeability:

- For a given cooling method all modules conforming to the packaging standard will function correctly when inserted into any rack slot conforming to the standard for the cooling method.
- All modules conforming to the Module Physical Interface (MPI) definitions for connector, IED and cooling interface will function correctly when inserted into any rack slot conforming to the same MPI definition.

Maintainability:

- All modules are easily removable at first line.
- No special tools required at first line.
- No manual adjustment is necessary when installing modules. No tool is required for installation or removal of the modules.
- Mechanical keying is provided that prevents insertion of a module into a rack slot that may cause an unsafe condition.

The Module Physical Interface definition, contained within this standard, does not include the properties of the signalling used in the optical interface (e.g. wavelength). These are covered in EN 4660-003.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 2101, *Aerospace series — Chromic acid anodizing of aluminium and wrought aluminium alloys*

EN 2284, *Aerospace series — Sulphuric acid anodizing of aluminium and wrought aluminium alloys*

EN 2437, *Aerospace series — Chromate conversion coatings (yellow) for aluminium and aluminium alloys*

EN 4165 (all parts), *Aerospace Series — Connectors, electrical, rectangular, modular — Operating temperature 175 °C continuous*

EN 4660-001, *Aerospace series — Modular and Open Avionics Architectures — Part 001: Architecture*

EN 4660-002, *Aerospace series — Modular and Open Avionics Architectures — Part 002: Common Functional Modules*

**EN 4660-004:2019 (E)**

EN 4660-003, *Aerospace series — Modular and Open Avionics Architectures — Part 003: Communications/Network*

EN 4660-005, *Aerospace series — Modular and Open Avionics Architectures — Part 005: Software*

ASAAC2-GUI-32450-001-CPG Issue 01, *Final Draft of Guidelines for System Issues*<sup>1</sup>

- *Volume 1 — System Management.*
- *Volume 2 — Fault Management.*
- *Volume 3 — Initialisation and Shutdown.*
- *Volume 4 — Configuration / Reconfiguration.*
- *Volume 5 — Time Management.*
- *Volume 6 — Security.*
- *Volume 7 — Safety.*

ARINC 600, *Air transport avionics — Equipment interfaces*<sup>2</sup>

ARINC 650, *Integrated Modular Avionics Packaging and Interfaces*<sup>2</sup>

ARINC 836, *Cabin Standard Enclosures — Modular Rack Principle (MRP)*<sup>2</sup>

VITA 46, *VPX: Baseline*<sup>3</sup>

Def Stan 03-18, *Chromate Conversion Coatings (Chromate Filming Treatments) Grades: Standard and Brushing for Aluminium and Aluminium Alloys*<sup>4</sup>

Def Stan 03-24, *Chromic Acid Anodizing of Aluminium and Aluminium Alloys*<sup>4</sup>

Def Stan 03-25, *Sulphuric Acid Anodizing of Aluminium and Aluminium Alloy*<sup>4</sup>

BS 5599, *Specification for hard anodic oxidation coatings on aluminium and its alloys for engineering purposes*<sup>5</sup>

MIL-C-26074E, *Coatings, Electroless Nickel Requirements*<sup>6</sup>

MIL-A-8625E, *Anodic Coatings for Aluminium and Aluminium Alloys*<sup>6</sup>

MIL-C-81706, *Chemical Conversion Materials for Coating Aluminium and Aluminium Alloys*<sup>6</sup>

MIL-C-5541, *Chemical Conversion Coatings on Aluminium and Aluminium Alloys*<sup>6</sup>

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1 In preparation at the date of publication of this European standard.

2 Published by: ARINC, [www.aviation-ia.com/product-categories](http://www.aviation-ia.com/product-categories).

3 Published by: VMEbus International Trade Association (VITA), [www.vita.com/Standards](http://www.vita.com/Standards).

4 Published by: UK Ministry of Defence, [www.dstan.mod.uk](http://www.dstan.mod.uk).

5 Published by: British Standards Institution (BSI), [www.bsigroup.com](http://www.bsigroup.com).

6 Published by: DoD National (US) Mil. Department of Defense <http://www.defenselink.mil/>.



### 3 Terms and definitions and abbreviations

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <http://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

#### 3.1 General

Use of “shall”, “should” and “may” within the standards observe the following rules:

- The word **SHALL** in the text express a mandatory requirement of the standard.
- The word **SHOULD** in the text expresses a recommendation or advice on implementing such a requirement of the standard. It is expected that such recommendations or advice will be followed unless good reasons are stated for not doing so.
- The word **MAY** in the text expresses a permissible practice or action. It does not express a requirement of the standard.

#### 3.2 Abbreviations

AFA	Air Flow Around
AFT	Air Flow Through
ARINC	Aeronautical Radio Inc
ASAAC	Allied Standard Avionics Architecture Council
CC	Conduction Cooled
CFM	Common Functional Module
DAF	Direct Air Flow
EMC	ElectroMagnetic Compatibility
IED	Insertion Extraction Device
IMA	Integrated Modular Avionics
MBU	Multiple Bit Upset
MPI	Module Physical Interface
MT	Mechanical Transfer
NBC	Nuclear, Biological and Chemical
PSD	Power Spectral Density
SEU	Single Event Upset

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