

# Relevant Standards

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## Relevant Standards

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**Lead Authors:** Garry Roedler, Ken Zemrowski, Chuck Calvano, **Contributing Author:** Sanford Friedenthal

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There are a multitude of standards across a number of standards development organizations (SDOs) that are related to systems engineering and systems domains. This topic examines the types of standards and provides a summary of the relevant standards for systems engineering (SE).

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## Standards Taxonomies and Types

# of Standards

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There are many types of standards that focus on different aspects of SE. Thus, it can be helpful to have a taxonomy that classifies the types of standards and the objective of each type. Table 1 provides the types of the current standards and a description of the types. Refer to the Modeling Standards for a list of relevant system modeling standards.

**Table 1. Types of Systems Engineering Standards.**  
(SEBoK Original)

<b>Standard Type</b>	<b>Description of Type</b>
Concepts and Terminology	<ul style="list-style-type: none"><li>• Defines the terminology and describes the concepts of a specific domain.</li></ul>
Process	<ul style="list-style-type: none"><li>• Elaborates a specific process, giving normative requirements for the essential elements of the process. It may give guidance to the requirements.</li></ul>
Requirements	<ul style="list-style-type: none"><li>• Describes the requirements for something.</li><li>• Most often used for actions, activities, or practices and not objects (see specifications).</li></ul>
Procedure (Practice, Activity)	<ul style="list-style-type: none"><li>• A specific procedure. Instructions or requirements on how to do something.</li><li>• Sometimes a description of best practices.</li><li>• Sometimes guidance and sometimes normative.</li></ul>
Guidance	<ul style="list-style-type: none"><li>• Usually an interpretation and guidance of a published standard.</li></ul>
Management System	<ul style="list-style-type: none"><li>• Requirements for management.</li></ul>
Specification	<ul style="list-style-type: none"><li>• Specifies the form, attributes, or properties of a subject artifact.</li><li>• Usually an object and usually normative.</li></ul>
Reference Model	<ul style="list-style-type: none"><li>• A reference model or collection of specifications of which a reference model is composed.</li></ul>
Process Reference Model (PRM)	<ul style="list-style-type: none"><li>• A collection of processes necessary and sufficient to achieve a nominated business outcome.</li></ul>
Process Assessment Model (PAM)	<ul style="list-style-type: none"><li>• Requirements and guidance for assessing attributes of nominated processes or attributes of a nominated collection of processes.</li></ul>
Guide to Body of Knowledge (BOK)	<ul style="list-style-type: none"><li>• Collection and description of the current body of knowledge in a domain, or a guide to the body of knowledge.</li></ul>

# Systems Engineering Related Standards

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## Summary of Systems Engineering Related Standards

Table 2 contains a summary of SE related standards. This table does not include all SE related standards, as there are many are focused on a specific domain, sector, or user group (e.g., it does not include standards from a specific government agenda). The table does include standards that are considered to be widely applicable to systems engineering and systems life cycle management system life cycle processes, such as ISO/IEC/IEEE 15288 (2023). Where available, there is a link to the official abstract for the standard.

**Table 2. Summary of Systems Engineering Standards.**  
(SEBoK Original)

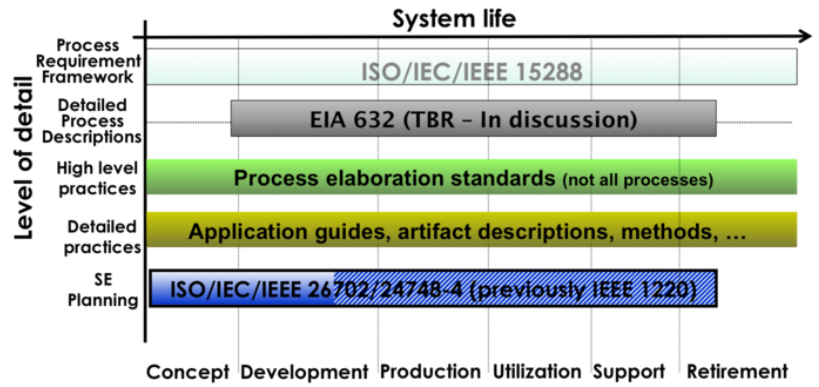
<b>Document ID</b>	<b>Document Title</b>	<b>Organization</b>
ISO/IEC/IEEE 15288	Systems and Software Engineering - System Life Cycle Processes	ISO/IEC/IEEE
ISO/IEC/IEEE 24765	Systems and Software Engineering - Systems and Software Engineering Vocabulary	ISO/IEC/IEEE
ISO/IEC/IEEE 42010	Systems and Software Engineering - Architecture Description	ISO/IEC/IEEE
ISO/IEC 26702 / IEEE 1220	Management of the Systems Engineering Process	ISO/IEC/IEEE
ISO/IEC/IEEE 29148	Systems and Software Engineering - Requirements Engineering	ISO/IEC/IEEE
ISO/IEC/IEEE 16085	Systems and Software Engineering - Risk Management	ISO/IEC/IEEE
ISO/IEC/IEEE 15939	Systems and Software Engineering - Measurement Process	ISO/IEC/IEEE
ISO/IEC/IEEE 16326	Systems and Software Engineering - Project Management	ISO/IEC/IEEE

prEN9277	Programme management - Guide for the management of Systems Engineering	CEN
EIA 632	Engineering of a System	TechAmerica
ISO 9001:2008	Quality Management Systems - Requirements	ISO TC 176
EIA-649-B	National Consensus Standard for Configuration Management	TechAmerica
ISO/IEC/IEEE TR 24748-1	Systems and Software Engineering - Guide to Life Cycle Management	ISO/IEC/IEEE
ISO/IEC/IEEE TR 24748-2	Systems and Software Engineering - Guide To The Application of ISO/IEC 15288:2008	ISO/IEC/IEEE
ISO/IEC/IEEE CD 24748-4	Systems and Software Engineering - Application and management of the systems engineering process	ISO/IEC/IEEE
ISO/IEC DTR 16337	Systems Engineering Handbook (INCOSE)	ISO/IEC/INCOSE
ISO/IEC/IEEE 15289:2011	Systems and Software Engineering - Content of Life-Cycle Information Products (Documentation)	ISO/IEC/IEEE
ISO/IEC/IEEE 15026-1:2010	Systems and Software Engineering - System and Software Assurance - Part 1: Concepts And Vocabulary	ISO/IEC/IEEE
ISO/IEC/IEEE 15026-2:2011	Systems and Software Engineering - System and Software Assurance - Part 2: Assurance Case	ISO/IEC/IEEE
ISO/IEC/IEEE 15026-3:2011	Systems and Software Engineering - System and Software Assurance - Part 3: Integrity Levels	ISO/IEC/IEEE
ISO/IEC/IEEE 15026-4:2012	Systems and Software Engineering - System And Software Assurance - Part 4: Assurance in the Life Cycle	ISO/IEC/IEEE JTC 1

ISO/IEC TR 90005:2008	Guidelines for the Application of ISO 9001 to Systems Life Cycle Processes	ISO/IEC JTC 1
ISO 10303-233:2012	Systems Engineering Data Interchange Standard	ISO TC 184
ECSS-E-ST-10C	Systems Engineering General Requirements	ECSS
ECSS-E-ST-10-02	Space Engineering - Verification {Note - standard is canceled}	ECSS
ECSS-E-ST-10-06	Space Engineering - Technical Requirements Specification	ECSS
ECSS-E-ST-10-24	Space Engineering - Interface Control	ECSS
ECSS-M-ST-10	Space Project Management - Project Planning and Implementation	ECSS
ECSS-M-ST-40	Space Project Management - Configuration and Information Management	ECSS
ECSS-M-00-03	Space Project Management - Risk Management	ECSS
ISO 31000:2009	Risk Management - Principles and Guidelines	ISO
ISO 31010:2009	Risk Management - Risk Assessment Techniques	ISO
ISO 19439:2006	Enterprise Integration - Framework for Enterprise Modeling	ISO
ISO 15704:2000	Requirements for Enterprise - Reference Architectures and Methodologies	ISO
EIA 748	Earned Value Management System	TechAmerica

## **Breadth and Level of Detail of Key Systems Engineering Related Standards**

Figure 1 shows the level of detail and the coverage of the life cycle for some key standards or groups of standards.



**Figure 1. Breadth and Depth of Key SE Related Standards (Adapted from Roedler 2011).** Reprinted with permission of Garry Roedler. All other rights are reserved by the copyright owner.

## Practical Considerations

Key pitfalls and good practices related to systems engineering standards are described in the next two sections.

### Pitfalls

Some of the key pitfalls encountered in the selection and use of SE standards are provided in Table 3.

**Table 3. Pitfalls in Using Systems Engineering Standards.** (SEBoK Original)

Pitfall Name	Pitfall Description
Turnkey Process Provision	<ul style="list-style-type: none"> <li>Expecting the standard to fully provide your SE processes without any elaboration or tailoring.</li> </ul>
No Need for Knowledge	<ul style="list-style-type: none"> <li>Expecting that the standard can be used without any functional or domain knowledge since the standard is the product of collective industry knowledge.</li> </ul>
No Process Integration	<ul style="list-style-type: none"> <li>Lack of integrating the standards requirements with the organization or project processes.</li> </ul>

### Good Practices

Some good practices as gathered from the references are provided in Table 4.

**Table 4. Good Practices in Using Systems Engineering Standards.** (SEBoK Original)

Good Practice Name	Good Practice Description
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Tailor for Business Needs	<ul style="list-style-type: none"> <li>• Tailor the standard within conformance requirements to best meet business needs.</li> </ul>
Integration into Project	<ul style="list-style-type: none"> <li>• Requirements of the standard should be integrated into the project via processes or product/service requirements.</li> </ul>

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