INTERNATIONAL STANDARD

ISO/IEC 24773-3

First edition
2021-09

Software and systems engineering — Certification of software and systems engineering professionals —

Part 3: Systems engineering

Ingénierie du logiciel — Certification des professionnels de l'ingénierie du logiciel —

Partie 3: Ingénierie des systèmes

Reference number
ISO/IEC 24773-3:2021(E)

© ISO/IEC 2021



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2021

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword ... **iv**
Introduction ... **v**
1 Scope ... **1**
2 Normative reference ... **1**
3 Terms and definitions ... **1**
4 Conformance ... **2**
5 Requirements for certification of systems engineering professionals ... **2**
5.1 General ... 2
5.2 Fundamental components of a conformant scheme ... 2
5.3 Knowledge — Identification of a body of knowledge (BOK) ... 2
5.3.1 General ... 2
5.3.2 Reference body of knowledge ... 3
5.3.3 Alternate body of knowledge ... 3
5.3.4 Other technical knowledge ... 3
5.3.5 Domain knowledge ... 3
5.3.6 Verification of knowledge ... 3
5.4 Skills ... 4
5.4.1 Identification of skills ... 4
5.4.2 Assessment of skills ... 4
5.5 Competence ... 4
5.6 Professional attributes ... 5
5.7 Certification renewal ... 5
Annex A (informative) **Elaboration of SE knowledge areas** ... **6**
Annex B (informative) **Elaboration of skills** ... **7**
Annex C (informative) **Elaboration of competency areas** ... **9**
Annex D (informative) **Exemplar mappings of competencies to skills and knowledge** ... **11**
Bibliography ... **12**

© ISO/IEC 2021 – All rights reserved

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives or www.iec.ch/members_experts/refdocs).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents) or the IEC list of patent declarations received (see patents.iec.ch).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html. In the IEC, see www.iec.ch/understanding-standards.

This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 7, *Software and systems engineering*.

A list of all parts in the ISO/IEC 24773 series can be found on the ISO and IEC websites.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html and www.iec.ch/national-committees.

© ISO/IEC 2021 – All rights reserved

Introduction

The ISO/IEC 24773 series addresses the certification of professionals in software and systems engineering. ISO/IEC 24773-1 contains general requirements for such certification schemes. This document contains requirements specific to certification schemes for systems engineering professionals.

The concepts, and requirements for certification schemes contained in ISO/IEC 24773-1 and ISO/IEC 17024 apply to this document.

© ISO/IEC 2021 – All rights reserved

Software and systems engineering — Certification of software and systems engineering professionals —

Part 3: Systems engineering

1 Scope

This document elaborates requirements and recommendations for certifications schemes based on ISO/IEC 24773-1, which are specific to the domain of systems engineering.

2 Normative reference

The following documents are referred to in the text in such a way that some or all 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.

ISO/IEC 17024, *Conformity assessment — General requirements for bodies operating certification of persons*

ISO/IEC 24773-1:2019, *Software and systems engineering — Certification of software and systems engineering professionals — Part 1: General requirements*

ISO/IEC TS 17027, *Conformity assessment — Vocabulary related to competence of persons used for certification of persons*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 17024, ISO/IEC TS 17027, ISO/IEC 24773-1 and the following apply.

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
system
combination of interacting elements organized to achieve one or more stated purposes

Note 1 to entry: A system is an integrated set of elements, subsystems, or assemblies that accomplish a defined objective. These elements include products (hardware, software, firmware), processes, people, information, techniques, facilities, services, and other support elements in combination organized to achieve one or more stated purposes (see INCOSE Systems Engineering Handbook[2]).

[SOURCE: ISO/IEC/IEEE 15288:2015, 4.1.46, modified — The original notes 1, 2 and 3 to entry have been removed; a new note 1 to entry has been added.]

© ISO/IEC 2021 – All rights reserved

3.2
systems engineering
SE
interdisciplinary approach governing the total technical and managerial effort required to transform a set of stakeholder needs, expectations, and constraints into a solution and to support that solution throughout its life

[SOURCE: ISO/IEC/IEEE 15288:2015, 4.1.49, modified — The abbreviate term "SE" has been added.]

4 Conformance

This document contains requirements for conformant certification schemes which are specific to systems engineering. General requirements for conformant schemes also apply; and these are defined in ISO/IEC 24773-1 and incorporated by reference into this document.

A certification scheme for professionals in systems engineering may claim conformance to this document if it satisfies all requirements contained in this document, ISO/IEC 24773-1; and ISO/IEC 17024.

A conformant certification scheme may be created and owned by one body, and subsequently utilized or applied by a separate certification body. For the purposes of this document, the requirements in Clause 5 apply to the certification scheme itself, unless otherwise noted as specifically applying to a certification body.

5 Requirements for certification of systems engineering professionals

5.1 General

This clause contains requirements and recommendations specific to the certification of systems engineering professionals. The following requirements and associated criteria may also be used to compare certification and qualification schemes.

5.2 Fundamental components of a conformant scheme

5.2.1 A list of skills that the professional to be certified in systems engineering is expected to exhibit shall be mapped by the scheme to the knowledge areas of the reference body of knowledge (BOK), and to the defined competencies.

NOTE An exemplar mapping is shown in Table D.1 and Table D.2 in Annex D.

5.2.2 For baseline education the recommended benchmark is for a formal engineering degree (in any engineering field) recognized under the Washington Accord[4]; or an equivalent technical degree and/or verifiable on-the-job professional training specifically in systems engineering. Equivalences to formal engineering education shall be explicitly declared by the scheme with accompanying rationale.

5.3 Knowledge — Identification of a body of knowledge (BOK)

5.3.1 General

The necessary knowledge areas required by the scheme shall be based on a BOK. The scheme shall document the source and authority of that BOK.

© ISO/IEC 2021 – All rights reserved