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**IEEE Guide for Software Quality
Assurance Planning**

Sponsor
**Software Engineering Standards Subcommittee
of the
Technical Committee on Software Engineering
of the
IEEE Computer Society**

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Foreword

(This Foreword is not a part of IEEE Std 983-1986, IEEE Guide for Software Quality Assurance Planning.)

The purpose of this guide is to recommend approaches to good Software Quality Assurance practices in support of ANSI/IEEE Std 730-1984, IEEE Standard for Software Quality Assurance Plans. This guide is meant to supplement ANSI/IEEE Std 730-1984 by presenting the current consensus of those in the software development community who have expertise or experience in generating, implementing, evaluating, and modifying Software Quality Assurance plans. This guide is not offered as a detailed procedures manual for establishing and operating Software Quality Assurance programs. This guide does not constitute further requirements than those stated in ANSI/IEEE Std 730-1984. An organization can claim compliance with ANSI/IEEE Std 730-1984 without following completely, or in part, this guide. Detailed information regarding specific software quality assurance activities may be found in other IEEE Standards. These are referenced where appropriate. While this guide quotes major portions of ANSI/IEEE Std 730-1984, the standard is not quoted in its entirety. ANSI/IEEE Std 730-1984 users are advised to consult that standard directly.

In accordance with ANSI/IEEE Std 730-1984, the practices herein are directed toward the development and maintenance of critical software, that is, where failure could impair safety or cause large financial losses. Determination of this criticality lies in the "eyes of the beholder." The specific application and situation of each user must be carefully considered. Should there be doubt, it is suggested that the software be considered critical. For software that is definitely noncritical, or software already developed, a subset of the requirements stated in ANSI/IEEE Std 730-1984 is appropriate.

This guide serves the three groups discussed in the Foreword to ANSI/IEEE Std 730-1984: the user, the developer, and the public.

(1) The user, whether external or internal to the developing organization, has a need for the software product that meets its identified requirements. Thus, the user cannot afford to rely solely on the developer's tests at the conclusion of the software development effort. Should the software product fail to meet requirements at that point, the user's need still exists and a major portion of the development time has been lost. The user, therefore, needs to have a reasonable degree of confidence that the product is in the process of acquiring required attributes during software development.

(2) The developer needs a software quality assurance standard which establishes responsibility and accountability. It is unreasonable to expect a complete reorientation from project to project. Not only is it not cost-effective, but unless there exists a stable framework on which to base changes, improvements cannot be made.

(3) The public, which may be affected by the use of the software, has a vested interest in software development. This public includes, for example, depositors at a bank and passengers using a reservation system. The public has a right to expect that software developers have acted in a reasonable and prudent professional manner to provide the required software attributes. At some later date, the user, the developer, or both may be required to show that they did, in fact, act in such a reasonable and prudent professional manner.

This guide is addressed to readers who have professional experience in quality assurance, or in software development, but not necessarily in both. For example, this guide should be useful to the following individuals:

- (1) A quality assurance person with the responsibility for developing or implementing a Software Quality Assurance Plan for a project
- (2) A software development project manager desiring to initiate Software Quality Assurance procedures on a project
- (3) A purchaser or user of a software product who wants to evaluate a seller's Software Quality Assurance Plan or to specify a Software Quality Assurance Plan
- (4) An independent evaluator, such as an EDP auditor
- (5) The person with accountability for the implementation of a Software Quality Assurance Plan

In the body of this guide, the use of “shall” is to be understood as referring to an item or activity that is mandated by ANSI/IEEE Std 730-1984. The use of “should” is to be understood as referring to a recommended item or activity. The use of “may” is to be understood as referring to an item or activity that can be advised under some circumstances, but for which there is not a professional consensus. The use of “could” is to be understood as suggesting the existence of several possibilities, the selection among which will be specific to the project and not driven by specific quality assurance considerations.

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IEEE Guide for Software Quality Assurance Planning

1. Scope and References

1.1 Scope. The purpose of this guide is to explain and clarify the contents of each section of a Software Quality Assurance Plan (SQAP) that satisfies the requirements of ANSI/IEEE Std 730-1984 [2].¹ The guide does not constitute further requirements than those stated in ANSI/IEEE Std 730-1984 [2]. An organization can claim compliance with ANSI/IEEE Std 730-1984 [2] without following completely, or in part, this guide.

This guide presents the current consensus of those in the software development community with expertise or experience in generating, implementing, evaluating, and modifying a SQAP. Section 3 of this guide describes the content of each section in a SQAP that satisfies ANSI/IEEE Std 730-1984 [2]. Each subsection of Section 3 quotes the applicable wording from the standard. Section 4 provides guidance for implementing a SQAP on a software project, or within a software development organization. Section 5 provides guidance for evaluating the contents and the implementation of a SQAP. Section 6 provides guidance for the procedures used to modify an existing SQAP. The Appendix presents a summary of the contents of a SQAP. This guide is applicable to the development and maintenance of all software, recognizing that the application of these recommendations should be tailored to the specific software product item. The user of this guide should be aware that efforts are underway to provide standards and guides that cover many areas. Prior to implementation, a check should be made with the

Secretary, IEEE Standards Board, for further detailed guidance in this area.

1.2 References.

- [1] ANSI/IEEE Std 729-1983, IEEE Standard Glossary of Software Engineering Terminology.
- [2] ANSI/IEEE Std 730-1984, IEEE Standard for Software Quality Assurance Plans.²
- [3] ANSI/IEEE Std 828-1983, IEEE Standard for Software Configuration Management Plans.
- [4] ANSI/IEEE Std 829-1983, IEEE Standard for Software Test Documentation.
- [5] ANSI/IEEE Std 830-1984, IEEE Guide to Software Requirements Specifications.

2. Definitions and Acronyms

2.1 Definitions. The definitions listed below establish meaning in the context of this guide. Other definitions can be found in ANSI/IEEE Std 729-1983 [1] and ANSI/IEEE Std 730-1984 [2].

conventions. Requirements employed to prescribe a disciplined, uniform approach to providing consistency in a software *product*, that is, uniform patterns or forms for arranging data.

practices. Requirements employed to prescribe a disciplined, uniform approach to the software development *process*.

standards. Mandatory requirements employed and *enforced* to prescribe a disciplined, uniform

¹ The numbers in brackets correspond to those of the references listed in Section 1.2.

² ANSI/IEEE publications are available from the Sales Department, American National Standards Institute, 1430 Broadway, New York, NY 10018, and the Institute of Electrical and Electronics Engineers, Service Center, 445 Hoes Lane, Piscataway, NJ 08854.

approach to software development, that is, mandatory conventions and practices are in fact standards.

techniques. Technical and managerial procedures that aid in the evaluation and improvement of the software development process.

2.2 Acronyms. The following alphabetical contractions appear within the text of this guide:

CCB	Change control board (in this document refers to change control board for a SQAP)
CDR	Critical design review
CI	Configuration item
PDR	Preliminary design review
SCM	Software configuration management
SCMP	Software configuration management plan
SDD	Software design description
SDP	Software development plan
SPM	Standards and procedures manual
SQA	Software quality assurance
SQAP	Software quality assurance plan
SRR	Software requirements review
SRS	Software requirements specification
SVVP	Software verification and validation plan
SVVPR	Software verification and validation plan review
SVVR	Software verification and validation report
UDR	User documentation review

3. Contents of a Software Quality Assurance Plan

"The organization responsible for Software Quality Assurance shall prepare a Software Quality Assurance Plan (also referred to as the Plan) that includes the sections listed below. The sections should be ordered in the described sequence. If there is no information pertinent to a section, the following statement shall appear below the section heading. *This section is not applicable to this plan*, together with the appropriate reasons for the exclusion.

- (1) Purpose
- (2) Reference Documents
- (3) Management

- (4) Documentation
- (5) Standards, Practices, and Conventions
- (6) Reviews and Audits
- (7) Software Configuration Management
- (8) Problem Reporting and Corrective Action
- (9) Tools, Techniques, and Methodologies
- (10) Code Control
- (11) Media Control
- (12) Supplier Control
- (13) Records Collection, Maintenance, and Retention

"Additional sections may be added at the end, as required. Some of the material may appear in other documents. If so, then reference to those documents should be made in the body of the plan." [2]⁴

For example, portions of the required information may be contained in a separate Software Configuration Management Plan (SCMP) or in a Software Development Plan (SDP). These sections should reference those particular plans. Those plans should be reviewed to ensure that they provide all the required information.

3.1 Purpose. "This section shall delineate the specific purpose and scope of the particular Software Quality Assurance Plan (SQAP). It shall list the name(s) of the software product items covered by the SQAP and the intended use of the software." [2]

The following questions should be addressed in this section:

(1) *Which software products are covered by this SQAP?* Specific names and abbreviations should be supplied for these products.

(2) *What is the intended use of the software covered by this SQAP?* How is the software to be utilized? How critical is this software? Is it part of a larger system; if so, how is it related to the system?

(3) *Why is this SQAP being written?* Is this Plan being written in response to an internal or external requirement? Why is this SQAP needed?

(4) *What documents form the basis of this SQAP?* Describe the extent to which this SQAP is based on ANSI/IEEE Std 730-1984 [2]. Identify any other documents on which this SQAP is based, eg, military or corporate quality assurance standards and guidelines.

⁴ The quoted material appearing in this standard has been extracted from ANSI/IEEE Std 730-1984 [2].