Software Engineering Checklist
For
ANSI/UL 1998 -2004 Standard for
Software in Programmable Components
Revision 1

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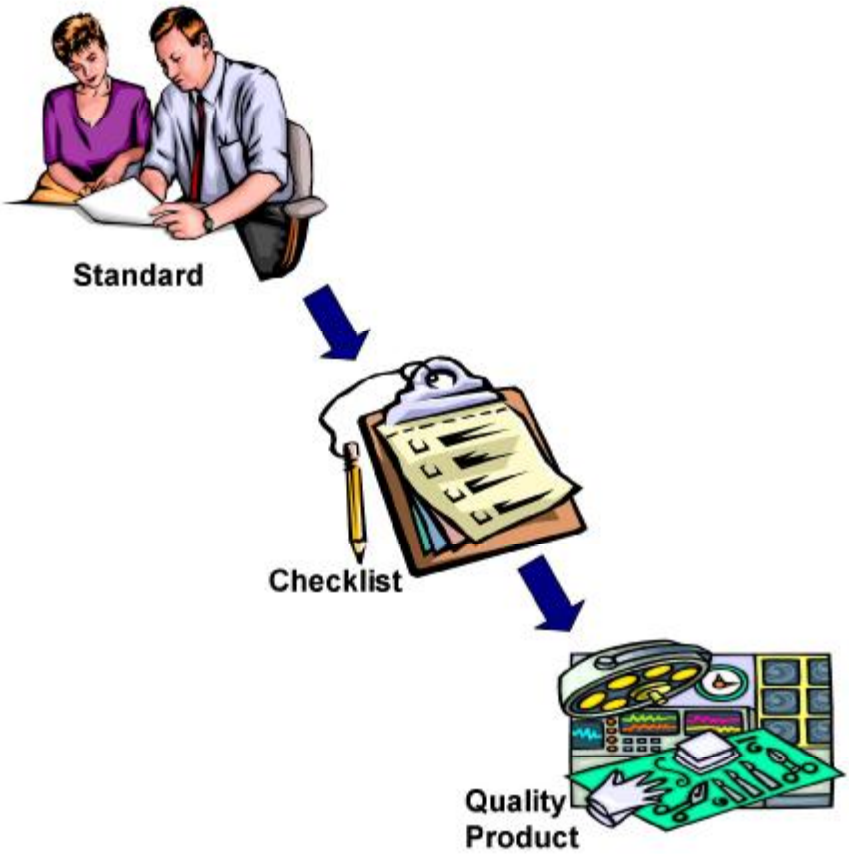

SEPT Product 32

Produced by Software Engineering Process Technology (SEPT)
2725 NW Pine Cone Drive
Issaquah, WA. 98027
E-mail: Stanmagee@smartwire.net
Web Site: www.12207.com
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Evidence Product Checklist

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Sample

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Author: Stan Magee, CCP
E-mail: Stanmagee@smartwire.net

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SEPT Product 32

Produced by Software Engineering Process Technology (SEPT)
2725 NW Pine Cone Drive
Issaquah, WA. 98027
Tel. 425-391-2344
E-mail: Stanmagee@smartwire.net
Web Site: www.12207.com

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ANSI/UL 1998 Checklist Revision Page

Changes to the Standard	Date	Description of Change	Change to the Checklist
Revision 1	May 2004	The revision updates the Title Page of the standard to indicate the latest approval date as an American National Standard. The changes the document name from UL 1998 to ANSI/UL 1998-2004.	No changes to any artifacts called out by the checklist. Only the document name is changed.

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Evidence Product Checklist for ANSI/UL 1998-2004 Standard Software in Programmable Components,
Revision 1

Introduction
The ANSI/UL 1998 standard is focused toward application-specific, non-networked software in a programmable component that is embedded in a product for which a failure may result in injury to persons. In addition, ANSI/UL 1998 is a reference software standard intended to be used in conjunction with any product specific safety standards that address safety requirements for the identified programmable component and the product hardware. A software configuration of a microprocessor based programmable component typically includes the operating system or executive software, communication software, micro-controller, input/output hardware, and any generic software libraries, database management or user interface software.

The process of defining what is necessary for compliance with a software engineering process standard such as "ANSI/UL 1998 Standard for Software in Programmable Components" is often confusing and laborious because the directions contained in the standards are unclear or ambiguous. To aid in determining what is actually "required" by the document in the way of physical evidence of compliance, the experts at SEPT have produced this checklist. This checklist is constructed around a classification scheme of physical evidence comprised of policies, procedures, plans, records, documents, audits, and reviews. There must be an accompanying record of some type when an audit or review has been accomplished. This record would define the findings of the review or audit and any corrective action to be taken. **For the sake of brevity this checklist does not call out a separate record for each review or audit. All procedures should be reviewed but the checklist does not call out a review for each procedure, unless the standard calls out the procedure review. In this checklist "manuals, reports, scripts and specifications" are included in the document category. When the subject standard references another standard for physical evidence, the checklist does not call out the requirements of the referenced standard.**

The Author has carefully reviewed the document "ANSI/UL 1998 Standard for Software in Programmable Components" and defined the physical evidence required based upon this classification scheme. SEPT has conducted a second review of the complete list to ensure that the documents' producers did not leave out a physical piece of evidence that a "reasonable person" would expect to find. It could certainly be argued that if the document did not call it out then it is not required; however if the standard was used by an organization to improve its process, then it would make sense to recognize missing documents. Therefore, there are documents specified in this checklist that are implied by the standard, though not specifically called out in the document, and they are designated by an asterisk (*) throughout this checklist. If a document is called out more than one time, only the first reference is stipulated. There are occasional situations in which a procedure or document is not necessarily separate and could be contained within another

Sample

document. For example, the “Verification Plan" could be a part of the "Design and Development Plan". The Author has called out these individual items separately to ensure that the organization does not overlook any facet of physical evidence. If the organization does not require a separate document, and an item can be a subset of another document or record, then this fact should be denoted in the detail section of the checklist for that item. This should be done in the form of a statement reflecting that the information for this document may be found in section XX of Document XYZ. If the organizational requirements do not call for this physical evidence for a particular project, this should also be denoted with a statement reflecting that this physical evidence is not required and why. The reasons for the evidence not being required should be clearly presented in this statement. Further details on this step are provided in the Detail Steps section of the introduction. The size of these documents could vary from paragraphs to volumes depending upon the size and complexity of the project or business requirements.

General Principles of the “ANSI/UL 1998 Standard for Software in Programmable Components” Checklist

This checklist was prepared by analyzing each clause of this document for the key words that signify a:

- Policy
- Procedure
- Plan
- Records
- Document (Including Manuals, Reports, Scripts and Specifications)
- Audit
- Review

This checklist specifies evidence that is unique. After reviewing the completed document, the second review was conducted from a common sense “reasonable man” approach. If a document or other piece of evidence appeared to be required, but was not called out in the document, then it is added with an asterisk (*) after its notation in the checklist. The information was transferred into checklist tables, based on the type of product or evidence. In order to conserve space, in Section 2, “Policies and Procedures” are denoted in the same column; however, “Policies” are bolded. Also in Section 2, “Audits” and “Reviews” are in the same column with “Audits” in bold type. In Section 2, if a clause has no stated requirement, the line is blank.

Using the Checklist

When a company is planning to use ""“ANSI/UL 1998 Standard for Software in Programmable Components” standard, the company should review the evidence checklist. If the company’s present process does not address an ANSI/UL 1998 standard product, then this question should be asked: Is the evidence product required for the type of business of the company? If in the view of the company the evidence is not required, the rationale should be documented and inserted in the checklist and quality manual. This rationale should pass “*the reasonable person rule*.” If the evidence is required, plans should be prepared to address the missing item(s).

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Detail Steps

An organization should compare the proposed output of their organization against the checklist. In doing this, they will find one of five conditions that exist for each item listed in the checklist. The following five conditions and the actions required by these conditions are listed in the table below.

Condition	Action Required
1. The title of the documented evidence specified by the checklist (document, plan, etc) *agrees* with the title of the evidence being planned by the organization.	Record in checklist that the organization is compliant.
2. The title of the documented evidence specified by the checklist (document, etc) *disagrees* with the title of the evidence planned by the organization but the content is the same.	Record in the checklist the evidence title the organization uses and record that the organization is compliant, and the evidence is the same although the title is different.
3. The title of the documented evidence specified by the checklist (document, etc) is *combined* with another piece of evidence.	Record in the checklist the title of the evidence (document, etc) in which this information is contained.
4. The title of the documented evidence specified by the checklist (document, etc) *is not planned* by the organization because it is not required.	Record in the checklist that the evidence is not required and the rationale for this decision.
5. The title of the documented evidence called out by the checklist (document, etc*) is not planned* by the organization and *should be* planned by it.	Record in the checklist when this evidence will be planned and reference a plan for accomplishing the task.

Components of the Checklist

This checklist is composed of 9 sections:

- Checklist revision page
- Section 1. Introduction
- Section 2. Composites of all required and suggested "ANSI/UL 1998 Standard for Software in Programmable Components" evidence products.
- Sections 3-8. Individual checklists for each evidence type.
- Section 9. "About the Author"

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Product Support
All reasonable questions concerning this checklist or its use will be addressed free of charge for 60 days from time of purchase, up to a maximum of 4 hours consultation time.

Warranties and Liability
Software Engineering Process Technology (SEPT) makes no warranties implied or stated with respect to this checklist, and it is provided on an "*as is*" basis. SEPT will have no liability for any indirect, incidental, special or consequential damages or any loss of revenue or profits arising under, or with respect to the use of this document.

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Section 2
ANSI/UL 1998 Evidence Products Checklist By Clause

ANSI/UL 1998 CLAUSE NUMBER and NAME		**POLICIES** and PROCEDURES	PLANS	RECORDS	DOCUMENTS	**AUDITS** and REVIEWS
3	**Risk Analysis**					
3.1						
3.2						
3.3						
3.4						
4	**Process Definition**					
4.1						
4.2						
4.3						
4.4						
4.5						
4.6						
4.7				• Requirements Traceability Matrix Report Records		
4.8						
5	**Qualification of Design, Implementation and Verification Tools**					
5.1				• Tool Qualification Records		
5.2				• Tool Bug List Records		
6	**Software Design**					
6.1						
6.2						

Sample

* Suggested item