

Document Title	AUTOSAR CTA Accreditation - application rules for ISO 17025
Document Owner	AUTOSAR GbR
Document Responsibility	AUTOSAR GbR
Document Identification No	244
Document Classification	Standard

Document Version	1.0.1
Document Status	Final
Part of Release	3.1
Revision	0001

Document Change History			
Date	Version	Changed by	Change Description
23.06.2008	1.0.1	AUTOSAR Administration	Legal disclaimer revised
05.12.2007	1.0.0	AUTOSAR Administration	Initial Release

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1 Introduction

This document sets out the specific application rules when applying ISO 17025 to the assessment of a candidate organization applying for the role of a first party CTA (see [1] for the role definition). In addition, the requirements of ISO 17025 (which is mainly targeted at the test execution) are extended according to the tasks of a first party CTA, in particular with respect to development of a CTS.

Interpretation and applicability of all references to test activities, test equipment, test tools and calibration in this document and all referenced documents therein (section 1.1.2) are limited in scope to the AUTOSAR Conformance Test System (see [1]).

In consequence this document can be used as a cross-reference for the assessor during the assessment of a first party CTA candidate.

The objective of this document is to set the application rules for first party CTAs. Being accredited to these rules entitles a first party CTA to pursue the same scope of business that applies to third party CTAs.

The assessment is the core part of the AUTOSAR accreditation process, which is fully detailed in [3].

1.1 Related Documentation

1.1.1 Input documents

- [1] Conformance Test Process Definition Path A-C
[https://svn2.autosar.org/repos2/22_Releases/AUTOSAR_DS_CT Path A-C.pdf](https://svn2.autosar.org/repos2/22_Releases/AUTOSAR_DS_CT_Path_A-C.pdf)
- [2] Conformance Test Process Definition Path D
[https://svn2.autosar.org/repos2/22_Releases/AUTOSAR_DS_CT Path D.pdf](https://svn2.autosar.org/repos2/22_Releases/AUTOSAR_DS_CT_Path_D.pdf)
- [3] AUTOSAR Conformance Test Agency Accreditation
https://svn2.autosar.org/repos2/22_Releases/AUTOSAR_DS_Accreditation.pdf
- [4] AUTOSAR CTA Accreditation - application rules for ISO/IEC Guide 65
[https://svn2.autosar.org/repos2/22_Releases/AUTOSAR_DS_Accreditation - application of ISO Guide 65.doc](https://svn2.autosar.org/repos2/22_Releases/AUTOSAR_DS_Accreditation_-_application_of_ISO_Guide_65.doc)
- [5] AUTOSAR Glossary
https://svn2.autosar.org/repos2/22_Releases/AUTOSAR_Glossary.pdf

1.1.2 Related standards and norms

- [6] ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories
- [7] ISO/IEC 17000:2004 Conformity assessment – Vocabulary and general principles
- [8] ISO/IEC 17011:2004 Conformity assessment – General requirements for accreditation bodies accrediting conformity assessment bodies
- [9] ISO/IEC GUIDE 65:1996 General requirements for bodies operating product certification systems

2 AUTOSAR application rules for ISO/IEC 17025

The specific requirements are listed below with direct reference to the individual clauses of ISO/IEC 17025 [6].

<i>Requirements in ISO/IEC 17025 AUTOSAR interpretation</i>	<i>Guidance</i>
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1 Scope

Clause 1 of ISO/IEC 17025 (including all sub-clauses) applies with the following general exceptions and comments:

- The scope of these AUTOSAR application rules comprises the competence of the assessed organization to fulfill the tasks of a CTA according to [1], in order to be capable to declare conformance".

- Aspects with reference to calibration services are in general not applicable.

All sections and requirements that are specific to calibration services only shall be ignored. Nevertheless sections and requirements dealing with the calibration of test equipment are valid.

For the purposes of this document, calibration is defined as "the act of checking or adjusting (by comparison with a standard) the accuracy of a measuring instrument" (<http://dict.die.net/calibration/>). This differs from other usages of the term calibration within AUTOSAR.

- All aspects with reference to sampling are out of scope.

All sections and requirements that are specific to sampling only shall be ignored.

- The term laboratory shall be understood in a generic way, i.e. denoting the test operations (processes and resources) of the assessed organization. There shall be no restrictions to the organizational structure of these test operations as long as the requirements on impartiality specified elsewhere in this document (including the applicable sections of ISO/IEC 17025) are satisfied.

For example, the distribution of testing activities across legal entities of the assessed organization must not be taken as a blocking point to deny accreditation.

Requirements in ISO/IEC 17025 AUTOSAR interpretation	Guidance
<ul style="list-style-type: none"> - This document is intended as the basis for assessing the relevant competences of the organization in focus. 	<p>An AUTOSAR accreditation body shall utilize this document for assessing a candidate for the first party CTA role. Note: there shall be no restriction to use this document for other purposes, such as the assessment of a third party CTA that intends to offer accredited test execution services</p>
<ul style="list-style-type: none"> - The notion of the ‘customer’, referred to as product supplier in the AUTOSAR context, is applicable to external as well as internal customers. 	<p>In most cases, this document will be used to assess first party CTAs. In this case the customer will be part of the same organization.</p>

2 Normative references

Clause 2 of ISO/IEC 17025 applies without change.

3 Terms and definition

Clause 3 of ISO/IEC 17025 applies with the following addition:

In addition, the definitions of some AUTOSAR specific terms are indispensable for understanding this document. These terms are defined in detail in the AUTOSAR glossary [5].

The following terms are most important throughout this document:

- CTA – Conformance Test Agency
- CTS – Conformance Test Suite

4 Management Requirements

4.1 Organization

Clause 4.1 of ISO/IEC 17025 (including all sub-clauses) applies without change.

4.2 Management System

Clause 4.2 of ISO/IEC 17025 (including all sub-clauses) applies without change.

4.3 Document control

Clause 4.3 of ISO/IEC 17025 (including all sub-clauses) applies without change.

Requirements in ISO/IEC 17025 AUTOSAR interpretation	Guidance
<p>4.4 Review of requests, tenders and contracts</p> <p>Clause 4.4 of ISO/IEC 17025 (including all sub-clauses) applies with the following comments: In case of a first party CTA the customer (AUTOSAR product supplier) requesting the conformance test execution and/or declaration will be from within the same organization (internal). Hence, transaction activities related to tendering and contracting are not applicable. Nevertheless the internal test requests and subsequent activities shall be well documented.</p>	<p>In case of First Party CTA internal activities are covered only by internal systems and organizations.</p>
<p>4.5 Subcontracting of tests [...]</p> <p>Clause 4.5 of ISO/IEC 17025 (including all sub-clauses) applies with the following comments: In case of employing a subcontractor the CTA must ensure the competency of the subcontracted party, as the responsibility remains with the CTA. This principle also applies to the development of the CTS.</p> <p>All references to the term 'Customer' mean internal customers in this context. (A 'customer' in AUTOSAR terms is a 'product supplier')</p>	
<p>4.6 Purchasing services and supplies</p> <p>Clause 4.6 of ISO/IEC 17025 (including all sub-clauses) applies without change.</p>	<p>In case of a first party CTA applying conformance test path B (see [1]), the CTA has to establish an improvement and feedback loop to the CTS supplier.</p>
<p>4.7 Services to the customer</p> <p>Clause 4.7 of ISO/IEC 17025 (including all sub-clauses) applies without change.</p>	<p>In case of First Party CTA internal activities are covered only by internal systems and organizations.</p>
<p>4.8 Complaints</p>	

Requirements in ISO/IEC 17025 AUTOSAR interpretation	Guidance
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Clause 4.8 of ISO/IEC 17025 applies without change.

In case of First Party CTA internal activities are covered only by internal systems and organizations.

4.9 Control of nonconforming testing [...]

Clause 4.9 of ISO/IEC 17025 (including all sub-clauses) applies without change.

4.10 Improvement

Clause 4.10 of ISO/IEC 17025 applies without change.

4.11 Corrective action

Clause 4.11 of ISO/IEC 17025 (including all sub-clauses) applies without change.

4.12 Preventive action

Clause 4.12 of ISO/IEC 17025 (including all sub-clauses) applies without change.

4.13 Control of records

Clause 4.13 of ISO/IEC 17025 (including all sub-clauses) applies without change.

4.14 Internal audits

Clause 4.14 of ISO/IEC 17025 (including all sub-clauses) applies without change.

4.15 Management reviews

Clause 4.15 of ISO/IEC 17025 (including all sub-clauses) applies without change.

5 Technical requirements

5.1 General

Clause 5.1 of ISO/IEC 17025 (including all sub-clauses) applies with the exception of sampling (which is not applicable).

Some factors such as measurement traceability will most likely be of a minor importance, yet are not completely ignorable (e.g. measurement of timer expiry).

<i>Requirements in ISO/IEC 17025 AUTOSAR interpretation</i>	<i>Guidance</i>
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5.2 Personnel

5.2.1

Clause 5.2.1 of ISO/IEC 17025 applies with AUTOSAR specific amendments

For details please see Appendix B

5.2.2

Clause 5.2.2 of ISO/IEC 17025 applies without changes

5.2.3

Clause 5.2.3 of ISO/IEC 17025 applies without changes

5.2.4

Clause 5.2.4 of ISO/IEC 17025 applies without changes

5.2.5

Clause 5.2.5 of ISO/IEC 17025 applies without changes

5.3 Accommodation and environmental conditions

Clause 5.3 of ISO/IEC 17025 (including all sub-clauses) applies without changes

5.4 Test [...] methods and method validation

5.4.1 General

Clause 5.4.1 of ISO/IEC 17025 applies without changes

The AUTOSAR conformance test process definition [1] and all AUTOSAR specifications of the valid AUTOSAR release have to be applied.

5.4.2 Selection of methods

Clause 5.4.2 of ISO/IEC 17025 applies with the following comments:

The test execution follows in large parts the procedures set by the CTS. Therefore the CTS from an accredited CTA has to be used.

The CTS can be developed within the same company (conformance test path C) or sourced from another CTA (conformance test path B).
 For details, see the conformance test process definition [1].

Requirements in ISO/IEC 17025 AUTOSAR interpretation	Guidance
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5.4.3 Laboratory-developed methods

Clauses 5.4.3 of ISO/IEC 17025 applies with the following comments:

If a CTS is developed in house, the development process of the CTS shall be documented and comply with good engineering practice.

If CTS is purchased from another CTA, responsibility lies with the supplying CTA", which, however, has to fulfill the same requirements.

Good engineering practice would be, for example, the application of an appropriate quality or maturity model to the software development process.

5.4.4 Non-standard methods

Clauses 5.4.4 of ISO/IEC 17025 applies with the following comments:

If a non-standard method is applied instead of using a standard method, there shall be evidence and written statement that the standard method is not applicable.

Normally there will be no need for any deviation from the methods defined by AUTOSAR.

5.4.5 Validation of methods

Clause 5.4.5 of ISO/IEC 17025 applies without changes

Sub-section 5.4.5.3 - Note 1 is not applicable. Requirements and methods as defined by AUTOSAR shall apply.

5.4.6 Estimation of uncertainty of measurement

Clause 5.4.6 of ISO/IEC 17025 (including all sub-clauses) applies without changes.

5.4.7 Control of data

Clause 5.4.7 of ISO/IEC 17025 (including all sub-clauses) applies without changes

5.5 Equipment

Clause 5.5 of ISO/IEC 17025 (including all sub-clauses) applies without changes

Calibration, although needed for proper functioning of target hardware and test equipment, has no relevance for AUTOSAR conformance testing.

<i>Requirements in ISO/IEC 17025 AUTOSAR interpretation</i>	<i>Guidance</i>
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5.6 Measurement traceability

5.6.1 General

Clause 5.6.1 of ISO/IEC 17025 applies without changes

5.6.2 Specific requirements

5.6.2.1 Calibration

Clause 5.6.2.1 of ISO/IEC 17025 is not applicable

Calibration, although needed for proper functioning of target hardware and test equipment, has no relevance for AUTOSAR conformance testing.

5.6.2.2 Testing

Clause 5.6.2.2 of ISO/IEC 17025 (including all sub-clauses) applies without changes

5.6.3 Reference standards and reference materials

Clause 5.6.3 of ISO/IEC 17025 is not applicable

There will be no need for reference standards and material within the context of AUTOSAR conformance testing

5.7 Sampling

Clause 5.7 of ISO/IEC 17025 (including all sub-clauses) is not applicable

Sampling is out of scope for AUTOSAR conformance testing¹.

5.8 Handling of test [...] items

Clause 5.8 of ISO/IEC 17025 (including all sub-clauses) applies without changes

5.9 Assuring the quality of test [...] results

Clause 5.9 of ISO/IEC 17025 (including all sub-clauses) applies without changes

5.10 Reporting the results

5.10.1 General

¹ Sampling is subject to quantity testing of physical goods, but not to AUTOSAR Conformance Testing. In particular, software is built once and thereafter is immutable.

Requirements in ISO/IEC 17025 AUTOSAR interpretation	Guidance
<p>Clause 5.10.1 of ISO/IEC 17025 (including all sub-clauses) applies with the following constraint:</p> <p>The test results shall be documented based on the templates defined within the AUTOSAR Conformance Test process definition [1].</p> <p>5.10.2 Test reports [...]</p> <p>Clause 5.10.2 of ISO/IEC 17025 is not applicable Templates provided by AUTOSAR shall be used for test reports</p> <p>5.10.3 Test reports</p> <p>5.10.3.1</p> <p>Clause 5.10.3.1 of ISO/IEC 17025 applies without changes</p> <p>5.10.3.2</p> <p>Clause 5.10.3.2 of ISO/IEC 17025 is not applicable</p> <p>5.10.4 Calibration certificates</p> <p>Clause 5.10.4 of ISO/IEC 17025 (including all sub-clauses) is not applicable</p> <p>5.10.5 Opinions and interpretations</p> <p>Clause 5.10.5 of ISO/IEC 17025 applies without changes</p> <p>5.10.6 Testing [...] results obtained from subcontractors</p> <p>Clause 5.10.6 of ISO/IEC 17025 applies without changes</p> <p>5.10.7 Electronic transmission of results</p> <p>Clause 5.10.7 of ISO/IEC 17025 applies without changes</p> <p>5.10.8 Format of reports and certificates</p>	<p>The format of the test report shall be recognizable regardless of internal or external customer relation.</p> <p>Instead the template provided by AUTOSAR shall be used for test reports</p> <p>It is necessary to document any deviations and complementary information that helps to understand the test conditions and results (e.g. for reproducibility)</p> <p>Sampling is not applicable w.r.t. AUTOSAR conformance testing</p> <p>Calibration services are out of scope for AUTOSAR conformance testing.</p>

Requirements in ISO/IEC 17025 AUTOSAR interpretation	Guidance
<p>Clause 5.10.8 of ISO/IEC 17025 applies without changes For this purpose an AUTOSAR test report template is available 5.10.9 Amendments to test reports [...] Clause 5.10.9 of ISO/IEC 17025 applies without changes</p>	<p>For this purpose an AUTOSAR test report template is available</p>

Appendix A Acronyms and Abbreviations

CT	Conformance Test(ing)
CTA	Conformance Test Agency
CTS	Conformance Test Suite

Appendix B Personnel requirements

AUTOSAR application rules for ISO/IEC 17025 clause 5.2 "Personnel"	Minimum		Scope				CTA role	
	Know- ledge	Exper- ience	BSW	SW-C	RTE	Tools	First party CTA with CTS	First party CTA without CTS
AUTOSAR basics according to the valid release: - Software architecture - BSW - VFB concept, e.g. Communication paradigms (Client/Server, Sender/Receiver) - AUTOSAR methodology & exchange formats/templates - AUTOSAR RTE interfaces and generation process	2	1	Yes	Yes	Yes	Yes	Yes	Yes
Real-time operating systems (preemption, scheduling)	2	2	Yes	Yes	Yes	Yes	Yes	Yes
Micro Controller and Networking (automotive bus-systems)	2	1	Yes	No	Yes	Yes	Yes	Yes
Formal test notations, in particular TTCN-3	3	1	Yes	No	Yes	Yes	Yes	Yes
XML	2	2	Yes	Yes	Yes	Yes	Yes	No
Software Modeling (e.g. UML2)	2	1	Yes	Yes	Yes	Yes	Yes	No
Embedded Software programming (min C)	2	2	Yes	Yes	Yes	Yes	Yes	Yes
Embedded Software testing	3	3	Yes	Yes	Yes	Yes	Yes	Yes
Build environment for Embedded Systems (make file, cross-compiler, linker, map-file)	2	2	Yes	Yes	Yes	Yes	Yes	Yes

Knowledge low knowledge basic knowledge high knowledge	Tracked experience 1 low experience 2 basic experience 1-3 years 3 high = professional
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