



Add value.
Inspire trust.

Report

on the

Certificate

Z10 084282 0013 Rev. 02

of the

Software Tool

IAR Embedded Workbench for Arm

Applicant

IAR Systems AB
Strandbodgatan 1
Uppsala
Sweden

Report No.: IU84911C

Version 5.6.1 of 2025-05-22

Testing Laboratory for Safety Components

TÜV SÜD Rail GmbH
Rail Automation
Westendstr. 199
D-80686 München

Certification Body

TÜV SÜD Product Service GmbH
Ridlerstraße 65
D-80339 München

(Page 1 of 18)

This report may be represented only in full wording. The use for promotion needs written permission. This report contains the result of a unique investigation of the product being tested and places no generally valid judgment about characteristics out of the running fabrication. Official translations of this technical report are to be authorised by the test and certification body.

Template: TR_RA_F_04.07 Rev. 19



Table of Contents

page

1	Target of Evaluation (ToE)	4
2	Scope of Testing	6
2.1	Test Specimen	6
2.2	Nomenclature and Identification of IAR Embedded Workbench for Arm	7
3	Certification Requirements	10
3.1	Certification Documentation	11
4	Standards and Guidelines	12
4.1	Functional Safety	12
4.2	Quality Management System	13
5	Results	14
5.1	Tool qualification and classification	14
5.2	Functional Safety	16
6	Implementation Conditions and Restrictions	17
7	Certificate Number	18

List of Tables

page

Table 1:	Modification history.....	3
Table 2:	Identification EWARMFS.....	9
Table 3:	Technical Report.....	11
Table 4:	Basic safety standards.....	12
Table 5:	Associated safety standards.....	12
Table 6:	Other product related standards.....	12
Table 7:	Quality Management System.....	13

Modification History

Rev.	Status	Date	Author	Modification / Description
1.0	-	2013-04-08	S. Waldhausen	Initial
2.0	-	2014-12-16	K. Seibold / S. Waldhausen	Release update
3.0	-	2015-10-27	W. Schlögl / S. Waldhausen	Re-Certification of new version
3.1	-	2017-01-30	W. Schlögl	Release 7.40.6, Service Pack 1
3.2	-	2017-06-08	W. Schlögl	Release 6.50.4 SP2
4.0	-	2018-03-22	W. Schlögl	Release 8.22.3
4.1	-	2018-06-29	W. Schlögl	Release 8.22.3 SP1
4.2	-	2018-12-07	W. Schlögl	Release 8.23.2 EWARM-SYN
4.2.1	-	2018-12-10	W. Schlögl	Typo
4.3	-	2019-03-21	W. Schlögl	Inclusion of ISO 26262:2018 and EN 50657:2017
4.4	-	2018-11-11	W. Schlögl	Release 8.40.3
4.4.1	-	2019-11-12	W. Schlögl	Version number of IU84909T changed to 4.4.1
4.5	-	2020-05-19	W. Schlögl	Support of Ubuntu 64-bit as host operating system
4.6	-	2020-09-23	W. Schlögl	Release 8.40.3 SP1
5.0	-	2021-02-16	Walter Schlögl	Release 8.50.10, Inclusion of IEC 60730-1, EN ISO 13849-1, IEC 62061, IEC 61511-1, ISO 25119 New report format
5.1	-	2022-02-07	Walter Schlögl	Release 9.20.3, IAR Build Tools for Windows
5.2	-	2022-09-20	Walter Schlögl	Release 8.22.3 SP2, clarification on IAR ELF Tool
5.3	-	2023-05-04	Walter Schlögl	Releases 8.50.10 SP1 and 9.20.3 SP1
5.4	-	2024-02-16	Walter Schlögl	Release 9.50.3, Inclusion of C-STAT in the certification, report template v19
5.5	-	2024-11-04	Walter Schlögl	Release 8.50.10 SP2, report template v21 considered
5.6	-	2025-05-16	Walter Schlögl	Release 8.50.10 SP3, report template v23 considered EN 50128 and EN 50657 replaced by EN 50716
5.6.1	Active	2025-05-22	Walter Schlögl	Fixed typo in Table 2, report template v24 considered

Table 1: Modification history



1 Target of Evaluation (ToE)

On 26.04.2011 IAR Systems AB requested TÜV SÜD Rail GmbH to test and certify the Software Tool of the IAR Embedded Workbench for Arm by IAR Systems AB.

The testing comprised the requirements for tools according to IEC 61508:2010 and ISO 26262:2011. The TÜV SÜD project number is 717504671.

On 10.10.2014 TÜV SÜD Rail was requested to test and certify the EWARM service pack SP1, based on the already certified EWARM version. The TÜV SÜD project number was 717509978.

On 09.09.2015 TÜV SÜD Rail was requested to test and certify a new version: EWARM 7.40. This version is based on the already certified EWARM 6.50 but contains bug fixes and several new features. The TÜV SÜD project number was 717511655.

In January 2017 TÜV SÜD Rail was requested to test and certify the EWARM Service Pack 1, based on the already certified EWARM version 7.40.6 The TÜV SÜD project number was 717513767.

In June 2017 TÜV SÜD Rail was requested to test and certify the release EWARMFS-6.50.4 SP2, based on the already certified release EWARM 6.50.4 SP1. The name of the product changed from EWARM to EWARMFS (IAR Embedded Workbench for ARM Functional Safety). The TÜV SÜD project number was 717513767.

In March 2018 TÜV SÜD Rail was requested to test and certify the new release EWARMFS 8.22.3. The certification has been extended to cover also the medical standard IEC 62304. The TÜV SÜD project number was 717516399.

In June 2018 TÜV SÜD Rail was requested to test and certify the new release EWARMFS 8.22.3 SP1. The TÜV SÜD project number was 717516399.

In April 2018 TÜV SÜD Rail was requested to test and certify the release EWARM-SYN-FS 8.23.2. The TÜV SÜD project number was 717516865.

In January 2019 TÜV SÜD Rail was requested to include the railway standard EN 50657:2017 and the second edition of ISO 26262 (ISO 26262:2018) in the certification. The related project number was 717518429.

In September 2019 TÜV SÜD Rail was requested to test and certify the release EWARMFS 8.40.3. The TÜV SÜD project number was 717519793.

In May 2020 TÜV SÜD Rail was requested to reassess EWARMFS 8.40.3 with respect to the support of Ubuntu 64-bit as Operating System. The TÜV SÜD project number was 717520809.

In September 2020 TÜV SÜD Rail was requested to re-certify the release EWARMFS 8.40.3 SP1 (Few problem corrections). The TÜV SÜD project number was 717521633.

In November 2020, TÜV SÜD Rail was requested to re-certify the release EWARMFS 8.50.10. Furthermore, IEC 60730-1, EN ISO 13849-1, IEC 62061, IEC 61511-1 and ISO 25119 were included in the certification scope. The TÜV SÜD project number was 717522040.

In December 2021, TÜV SÜD Rail was requested to re-certify the release EWARMFS 9.20.3. The TÜV SÜD project number was 717524454.

In September 2022, TÜV SÜD Rail was requested to re-certify the release EWARMFS 8.22.3 SP2. The TÜV SÜD project number was 717526181.



In April 2023, TÜV SÜD Rail was requested to re-certify the EWARMFS releases 8.50.10 SP1 and 9.20.3 SP1. The TÜV SÜD project number was 717527435.

In February 2024 the certification has been extended to cover the release EWARMFS 9.50.3. Furthermore, the static analysis tool C-STAT was included in the certification scope. The related project number is 717529257.

In October 2024, TÜV SÜD Rail was requested to re-certify the EWARMFS release 8.50.10 SP2. The TÜV SÜD project number was 717531081.

In March 2025, TÜV SÜD Rail was requested to re-certify the EWARMFS release 8.50.10 SP3. Furthermore, EN 50128 and EN 50657 were replaced by EN 50716. The TÜV SÜD project number was 717531877.

The ToE is the code generation toolchain that is part of the development environment "IAR Embedded Workbench for ARM" (EWARM).

2 Scope of Testing

2.1 Test Specimen

IAR Embedded Workbench for Arm Functional Safety (EWARMFS) is a set of development tools for embedded applications.

It integrates the IAR C/C++ Compiler™, assembler, linker, analysis tools, text editor, project manager, and C-SPY® Debugger in an integrated development environment (IDE).

The IAR Build Tools is a product variant (identical to IAR Embedded Workbench for Arm) and covered by the certification. It contains no IDE components, is mainly used in automatic build environments and can be seen as a subset of IAR Embedded Workbench for Arm. The IAR Embedded Workbench for Arm is especially adapted to support Arm devices.

The testing covered the Software Tool, which consists of compiler, assembler, linker, static analysis tool “IAR C-STAT Static analysis tool” (C-STAT) and the ELF format conversion tool “IAR ELF Tool”. The purpose was to qualify the EWARMFS build tools for the use in safety-related developments according to the standards listed in clause 4.

From release 9.50.3 on, in addition the tool C-STAT was included in the certification scope. C-STAT performs static analysis of C/C++ code and finds potential issues. It proves alignment with standards such as MISRA C:2012 and is completely integrated with EWARMFS.

Standard Library

The Standard C/C++ library contains support routines for the compiler, and the implementation of the C/C++ standard library functions.

The library itself has been outside the assessment scope, because it is provided by a third-party supplier. That means that the use of Standard Library functionality lies in the responsibility of the user.

To support customers, IAR Systems AB provides a statement from the supplier (see in the release notes the „Statement from Dinkumware, Ltd. for Standard C and C++ library“) on the testing of the library routines.

The run-time support functionality of the library is part of the validated functionality. That part of the library is developed and tested by IAR Systems AB following the same standards as the build-chain. The run-time support functionality typically consists of:

- Start-up and exit code
- Low-level I/O interface for managing input and output
- Special compiler support, for instance functions for switch handling or integer arithmetic's.
- Support for hardware features:
 - Direct access to low-level processor operations by means of intrinsic functions
- Peripheral unit registers and interrupt definitions in include files

2.2 Nomenclature and Identification of IAR Embedded Workbench for Arm

The IAR Embedded Workbench for Arm tested is identified by the nomenclature as follows:

Target Platform	Software Component	Release / Build
EWARM 6.50.4		
Windows 32-bit and 64-bit: Windows XP + SP3 Vista + SP2 Windows 7 Windows 8	IAR Embedded Workbench for Arm	6.50.4.4795
	IAR Embedded Workbench for IDE	6.5
	IAR C/C++ Compiler for Arm	6.50.4.4778
	IAR Assembler for Arm	6.50.4.4778
	IAR ILINK linker for Arm	6.50.4.4778
	IAR ELF Tool	9.13.5.79
EWARM 6.50.4 SP1		
Windows 32-bit and 64-bit: Windows XP + SP3 Vista + SP2 Windows 7 Windows 8	IAR Embedded Workbench for Arm	6.50.4.7827
	IAR Embedded Workbench for IDE	6.5 (SP1)
	IAR C/C++ Compiler Frontend	6.50.4.7779
	IAR Assembler frontend	6.50.4.7779
	IAR Linker	6.50.4.7779
	IAR ELF Tool	9.13.100.112
EWARMFS 6.50.4 SP2		
Windows 32-bit and 64-bit: Windows XP + SP3 Vista + SP2 Windows 7 Windows 8	IAR Embedded Workbench for Arm	6.50.4.13510
	IAR Embedded Workbench IDE	6.50.4.7827
	IAR C/C++ Compiler	6.50.4.13341
	IAR Assembler	6.50.4.13341
	IAR Linker	6.50.4.13341
	IAR ELF Tool	9.13.101.1671
EWARM 7.40.6		
Windows 32-bit and 64-bit: Windows XP + SP3 Vista + SP2 Windows 7 Windows 8	IAR Embedded Workbench for Arm	7.40.6.9816
	IAR Embedded Workbench IDE	7.2.8.3932
	IAR C/C++ Compiler	7.40.6.9751
	IAR Assembler	7.40.6.9751
	IAR Linker	7.40.6.9751
	IAR ELF Tool	9.18.8.138
EWARM 7.40.6 SP1		
Windows 32-bit and 64-bit: Windows XP + SP3 Vista + SP2 Windows 7 Windows 8 Windows 10	IAR Embedded Workbench for Arm	7.40.6.12339
	IAR Embedded Workbench IDE	7.2.8.3932
	IAR C/C++ Compiler	7.40.6.12149
	IAR Assembler frontend	7.40.6.12149
	IAR Linker	7.40.6.12149
	IAR ELF Tool	9.18.101.173
EWARMFS 8.22.3		
Windows 32-bit and 64-bit: Windows 7 Windows 8 Windows 10	IAR Embedded Workbench for Arm	8.22.3.15992
	IAR Embedded Workbench IDE	8.0.15.5379
	IAR C/C++ Compiler	8.22.3.15991
	IAR Assembler	8.22.3.15991
	IAR Linker	8.22.3.15991
	IAR ELF Tool	10.2.100.202
EWARMFS 8.22.3 SP1		
Windows 32-bit and 64-bit: Windows 7 Windows 8	IAR Embedded Workbench for Arm	8.22.3.17334
	IAR Embedded Workbench IDE	8.0.15.5379
	IAR C/C++ Compiler	8.22.3.17264

Windows 10	IAR Assembler	8.22.3.17264
	IAR Linker	8.22.3.17264
	IAR ELF Tool	10.2.100.202
EWARMFS 8.22.3 SP2		
Windows 32-bit and 64-bit: Windows 7 Windows 8 Windows 10	IAR Embedded Workbench for Arm	8.22.3.52292
	IAR Embedded Workbench IDE	8.22.3.5379
	IAR C/C++ Compiler	8.22.3.52117
	IAR Assembler	8.22.3.52117
	IAR Linker	8.22.3.52117
	IAR ELF Tool	10.2.100.202
EWARM-SYN-FS 8.23.2		
Windows 32-bit and 64-bit: Windows 7 Windows 8 Windows 10	IAR Embedded Workbench for Arm	8.23.2.17412
	IAR Embedded Workbench IDE	8.100.14.5443
	IAR C/C++ Compiler	8.23.2.17389
	IAR Assembler	8.23.2.17389
	IAR Linker	8.23.2.17389
	IAR ELF Tool	10.2.200.203
EWARMFS 8.40.3		
Windows 32-bit and 64-bit: Windows 7 Windows 8 Windows 10 Linux 64-bit: Ubuntu	IAR Embedded Workbench for Arm	8.40.3.23190
	IAR Embedded Workbench IDE	8.3.4.6127
	IAR C/C++ Compiler	8.40.3.228
	IAR Assembler	8.40.3.228
	IAR Linker	8.40.3.228
	IAR ELF Tool	10.5.6.1205
EWARMFS 8.40.3 SP1		
Windows 32-bit and 64-bit: Windows 7 Windows 8 Windows 10 Linux 64-bit: Ubuntu	IAR Embedded Workbench for Arm	8.40.3.30356
	IAR Embedded Workbench IDE	8.3.4.6127
	IAR C/C++ Compiler	8.40.3.268
	IAR Assembler	8.40.3.268
	IAR Linker	8.40.3.268
	IAR ELF Tool	10.5.60.1271
EWARMFS 8.50.10		
Windows 32-bit and 64-bit: Windows 7 Windows 8 Windows 10 Linux 64-bit: Ubuntu	IAR Embedded Workbench for Arm	8.50.10.35121
	IAR Embedded Workbench for IDE	8.4.11.7094
	IAR C/C++ Compiler for Arm	8.50.10.290
	IAR Assembler for Arm	8.50.10.290
	IAR ILINK linker for Arm	8.50.10.290
	IAR ELF Tool	10.6.14.1303
EWARMFS 9.20.3		
Windows 64-bit: Windows 7 Windows 10 Windows 11 Linux 64-bit: Ubuntu, Red Hat	IAR Embedded Workbench for Arm	9.20.3.45664
	IAR Embedded Workbench for IDE	9.0.10.8697
	IAR C/C++ Compiler for Arm	9.20.3.326
	IAR Assembler for Arm	9.20.3.326
	IAR ILINK linker for Arm	9.20.3.326
	IAR ELF Tool	10.9.2.1382
EWARMFS 8.50.10 SP1		
Windows 64-bit: Windows 7 Windows 10 Windows 11 Linux 64-bit: Ubuntu	IAR Embedded Workbench for Arm	8.50.10.58812
	IAR Embedded Workbench for IDE	8.4.11.7094
	IAR C/C++ Compiler for Arm	8.50.10.352
	IAR Assembler for Arm	8.50.10.352
	IAR ILINK linker for Arm	8.50.10.352

	IAR ELF Tool	10.6.14.1303
EWARMFS 9.20.3 SP1		
Windows 64-bit:	IAR Embedded Workbench for Arm	9.20.3.45664
Windows 7	IAR Embedded Workbench for IDE	9.0.10.8697
Windows 10	IAR C/C++ Compiler for Arm	9.20.3.356
Windows 11	IAR Assembler for Arm	9.20.3.356
Linux 64-bit: Ubuntu, Red Hat	IAR ILINK linker for Arm	9.20.3.356
	IAR ELF Tool	10.9.2.1382
EWARMFS 9.50.3		
Windows 64-bit:	IAR Embedded Workbench for Arm	9.50.3.71392
Windows 10	IAR Embedded Workbench for IDE	9.3.2.391
Windows 11	IAR C/C++ Compiler for Arm	9.50.3.383
Linux 64-bit: Ubuntu, Red Hat	IAR Assembler for Arm	9.50.3.383
	IAR ILINK linker for Arm	9.50.3.383
	IAR ELF Tool	10.16.2.1500
	IAR C-STAT Static Analysis tool	2.6.1.538
EWARMFS 8.50.10 SP2		
Windows 64-bit:	IAR Embedded Workbench for Arm	8.50.10.7280
Windows 7	IAR Embedded Workbench for IDE	8.4.11.7094
Windows 10	IAR C/C++ Compiler for Arm	8.50.10.421
Windows 11	IAR Assembler for Arm	8.50.10.421
Linux 64-bit: Ubuntu	IAR ILINK linker for Arm	8.50.10.421
	IAR ELF Tool	10.6.31.1550
EWARMFS 8.50.10 SP3		
Windows 64-bit:	IAR Embedded Workbench for Arm	8.50.10.11638
Windows 7	IAR Embedded Workbench for IDE	8.4.11.7094
Windows 10	IAR C/C++ Compiler for Arm	8.50.10.443
Windows 11	IAR Assembler for Arm	8.50.10.443
Linux 64-bit: Ubuntu	IAR ILINK linker for Arm	8.50.10.443
	IAR ELF Tool	10.6.32.1666

Table 2: Identification EWARMFS



3 Certification Requirements

The certification of the IAR Embedded Workbench for Arm is according to the regulations and standards listed in clause 4 of this document. This certifies the successful completion of the following test segments.

- I. Functional Safety including
 - Functional safety management (FSM) and assessment
 - Software development process
 - Verification and validation procedures / activities
 - Analysis of failure modes
- II. Configuration, modification and release management
- III. Customer support and bug tracking
- IV. Safety information in the product documentation



3.1 Certification Documentation

The detailed technical evaluation is documented in the most recent version of the Technical Report:

Document No.	Description	Project No.
IU84909T	Technical Report	717531877
Safety related requirements, conditions and restrictions can be found in the following user documentation		
EWARM_SafetyGuide	Safety Manual	-

Table 3: Technical Report

Based on the specified purpose of use of the IAR Embedded Workbench for Arm in development of safety critical process applications, the certification is based on the set of standards listed in clause 4 of this document. The issuance of the certificate states compliance with these references unless specifically noted otherwise.

4 Standards and Guidelines

The regulations and guidelines which form the basis of the type testing are listed below.

4.1 Functional Safety

No.	Reference	Description
/N1/	IEC 61508-3:2010 EN 61508-3:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 3: Software requirements
/N2/	ISO 26262-8:2018	Road vehicles — Functional safety — Part 8: Supporting processes
/N3/	IEC 62061:2005/ AMD2:2015	Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems
/N4/	ISO 13849-1:2015	Safety of machinery - Safety-related parts of control systems Part 1: General principles for design

Table 4: Basic safety standards

No.	Reference	Description
/N5/	ISO 25119-1:2018	Tractors and machinery for agriculture and forestry - Safety-related parts of control systems - Part 1: General principles for design and development
/N6/	ISO 25119-3:2018	Tractors and machinery for agriculture and forestry - Safety-related parts of control systems - Part 3: Series development, hardware and software
/N7/	IEC 61511-1:2016	Functional safety – Safety Instrumented Systems for the process industry sector - Part 1: Framework, definitions, system, hardware and software requirements
/N8/	IEC 60730-1:2013 / A2:2020	Automatic electrical controls - Part 1: General requirements

Table 5: Associated safety standards

No.	Reference	Description
<i>Remark: The following standards were approved by other testing services.</i>		
/N9/	IEC 62304:2006 +A1:2015	Medical device software – Software life cycle processes
/N10/	EN 50716:2023	Railway Applications - Requirements for software development

Table 6: Other product related standards

4.2 Quality Management System

No.	Reference	Description
[M1]	QMS	Quality Management System TÜV SÜD Rail GmbH
	TR_RA_P_04.50	Test Program Functional Safety TR_RA_P_04.51 Definition Scope of testing TR_RA_P_04.52 Concept Phase & Safety Lifecycle TR_RA_P_04.53 Detail Phase Hardware TR_RA_P_04.54 Detail Phase Software TR_RA_P_04.55 Safety Manual TR_RA_P_04.56 Result of Testing
[M2]	D-PL-11190-08-00	DAkkS accreditation according to DIN EN ISO 17025:2018 / EN ISO/IEC 17025:2017

Table 7: Quality Management System

5 Results

5.1 Tool qualification and classification

The aim of the certification is to enable customers to apply IAR Embedded Workbench for Arm for safety-related development without further tool qualification activities when applying to the recommendations and conditions documented in the Safety Manual and in the Report to the Certificate.

ISO 26262:

The ISO 26262 standard classifies software development tools according to their tool impact (TI) and the probability of tool error detection (TD).

Compiler testing can be complete with respect to defined standards like ANSI C, but it cannot be complete with respect to all possible degrees of freedom of input variations (e.g. complexity, combinations of basic constructs). So, the tool error detection always depends – besides the tool provider – also on measures of fault avoidance and error detection on customer side.

Depending on the applied measures of error prevention and error detection in the user's development process, i.e. the applied techniques and intensity of verification and validation activities, the resulting tool error detection can vary between TD1, TD2 and TD3. This yields a TCL (Tool Confidence Level) of TCL3 in the worst case.

In order to achieve tool qualification for all ASIL levels, the measures

- Evaluation of the development process
- Validation of the software tool

have been applied, following the requirements of ISO 26262-8.

The user's development process including complete verification and validation should be conducted according to ISO 26262 in order to achieve the best possible TCL value.

IEC 61508:

IEC 61508-3 addresses the employment of offline support tools (7.4.4.2).

In IEC 61508, software off-line tools, not directly influencing the safety-related system during its run time, are divided into different classes.

IAR Embedded Workbench for Arm is directly involved in the generation of application code and classified (according to the definitions in IEC 61508-4:2010) as T3 off-line tool.

For T3 tools, IEC 61508-3:2010 requires that:

- The tool functionality and behaviour, as well as any instructions or constraints shall be documented.
- A tool validation according to 7.4.4.7.

For T2 as well as for T3 tools, only qualified versions shall be used.

EN 50716:

EN 50716:2023 specifies the process and technical requirements for the development of software for programmable electronic systems for use in: - control, command for signalling applications, - applications on-board of rolling stock. As of December 2023, EN 50716 supersedes EN 50128 and EN 50657.

The requirements for software tools (see clause 6.7 in EN 50716) are directly taken over from EN 50128. (The requirements for software tools in EN 50128 are explicitly derived from the requirements on software tools according to IEC 61508-3.) Due to the equivalences between the standards no separate testing has been performed with respect to EN 50716.

The part of the audit covering the development process, quality assurance measures, verification and validation, modification and bug handling can be taken over.

IEC 62304:

IEC 62304 requires tools to be "suitably validated" (Table C.3). The tool validation according to IEC 61508 is a main aspect of the testing described in this report. Since IEC 62304 does not define how suitable validation is achieved, but refers to IEC 61508 with respect to tools, the validation can be considered suitable also in the sense of IEC 62304. IEC 62304 AMD1:2015 does not contain changes with regard to tools.

ISO 25119:

According to ISO 25119-3 "tools and translators which are proven in use shall be applied, in order to avoid any difficulties due to translator failures which can arise during development". The correctness of such tools shall be demonstrated by specific testing, by an extensive history of satisfactory use, or by independent verification of their output for the applicable safety-related system."

ISO 25119-1 requires for any tool used for development, implementation or testing an assessment or verification of the application of the tool.

IEC 62061:

IEC 62061 is a sector specific (safety-related electrical control systems on machinery) standard derived from IEC 61508. It specifies the requirements for the design, integration and validation of Safety Related Electrical Control Systems for machinery applications. The demands for software development and tool qualification are directly derived from IEC 61508-3 and therefore imply no additional approval activities.

EN ISO 13849-1:

EN ISO 13849-1 is (like IEC 62061) a safety standard for machines and focuses on electrical, electro-mechanical and mechanical (hydraulics) parts. It provides safety requirements for the principle design and integration of safety-related parts of control systems (SRP/CS), including the design of software. Safety related embedded software with PL e has to fulfil the requirements of clause 7 of IEC 61508-3. No special activities for software tools are demanded.

IEC 61511-1:

IEC 61511-1 is considered a sector-specific standard (process industry) derived from IEC 61508. The software requirements of this standard are limited to application software developed using FPL (fixed program language) or LVL (limited variability language). Whereas IEC 61508 needs to be tailored to and interpreted for PLC application developments, IEC 61511-1 is specifically released for this class of applications. When FVL (full variability language) is used for development, then IEC 61511-1 (12.2.3) demands a software development and tool qualification according to IEC 61508.

IEC 60730-1:

IEC 60730-1 applies to automatic electrical controls for use in, on, or in association with equipment for household and similar use. Requirements related to software are extracted from IEC 61508-3 and adapted to the needs of this standard. Tools used for development shall be qualified appropriately (See IEC 60730-1, H.11.12.3.4.1) referencing to IEC 61508.

5.2 Functional Safety

The tests performed and quality assurance measures implemented by the IAR Systems AB have shown that the IAR Embedded Workbench for Arm complies with the testing criteria specified in clause 4 subject to the conditions defined in clause 6 and is suitable for use in safety-related development.

IAR Embedded Workbench for Arm, classified as T3 off-line tool according to IEC 61508-4:2010, is suitable to be used in safety-related development according to IEC 61508:2010 and EN 50716:2023 for any SIL. (IEC 61508 recommends the avoidance of SIL 4 safety functions; it is responsibility of the tool user to check measures like use of diverse tools for the same purpose, other risk reduction measures, etc.)

IAR Embedded Workbench for Arm is qualified to be used in a standard-conform development process according to ISO 26262:2018 for any ASIL.

IAR Embedded Workbench for Arm is suitable to be used in safety-related software development according to IEC 62304:2006+A1:2015 for any software safety class.

IAR Embedded Workbench for Arm is qualified to be used in safety related development according to ISO 25119:2018.

IAR Embedded Workbench for Arm is qualified to be used in safety related development according to IEC 62061:2015, EN ISO 13849-1:2015, IEC 61511-1:2016 and IEC 60730-1:2013/A2:2020.

6 Implementation Conditions and Restrictions

The use of the IAR Embedded Workbench for Arm shall comply with the current version of the safety parts of the user manual, and the following implementation and installation requirements have to be followed if IAR Embedded Workbench for Arm is used in safety-related application development.

- The user documentation shall be carefully read and understood.
- The advice given in the Safety Guide shall be taken into account.
- When using the build tools, special care has to be taken about which options and settings are used:
 - Optimization:
Generally, functional safety standards do not recommend the use of optimizations. If there is a need to use optimization, the user should be aware of its effect on code generation.
Safety-related application programming, testing has to be done on the final application code, if that is not possible, the equivalence of the tested code and the final target code has to be proven.
 - Language extensions, pragma directives:
Non-standard language features are described in detail in the development guide and some special advises are given in the safety guide. The respective sections shall be read and understood, also possible cross influences between options have to be considered.
- Version 7.40.x to 9.20.3:
Support for the tools C-STAT and C-RUN has been introduced. Both tools are not part of the certification, nevertheless their use can be beneficial in Safety Related development.
For C-RUN please be aware that code instrumentation modifies the binaries, and that functional tests have to be repeated with the un-instrumented production code.
 - An actual list of known bugs is available by IAR Systems. It has to be considered in safety-related development.
 - In order to achieve a low TCL value, appropriate measures have to be applied in development and verification. This is in the responsibility of the application programmer.
- Version 9.50.3 and newer:
C-STAT is in the certification scope. The user manual together with the IAR C-STAT Compliance Report shall be carefully read.



7 Certificate Number

This report specifies technical details and implementation conditions required for the application of IAR Embedded Workbench for Arm to the certificate:

Z10 084282 0013 Rev. 02

Technical Certifier