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Report

on the

Certificate

Z10 128834 0001 Rev. 00

of the

Software Tool Codebeamer

Applicant

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Testing Laboratory for Safety Components

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(Page 1 of 8)

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Table of Contents

page

1	Target of Evaluation (ToE)	3
2	Scope of Testing	3
2.1	Test Specimen	3
2.2	Nomenclature and Identification of Codebeamer	3
3	Certification Requirements	4
3.1	Certification Documentation	4
4	Standards and Guidelines	5
4.1	Functional Safety.....	5
4.2	Quality Management System	5
5	Tool Classification and Qualification	5
5.1	ISO 26262.....	5
5.2	IEC 61508	6
6	Results	6
6.1	Functional Safety.....	6
6.2	Configuration, modification and release management	6
6.3	Verification and validation.....	6
6.4	Customer support and bug tracking.....	7
6.5	Safety information in the product documentation	7
7	Summary	7
8	General Conditions and Restrictions	7
9	Certificate Number	8

List of Tables

page

Table 1:	Modification history.....	2
Table 2:	Identification of Codebeamer.....	3
Table 3:	Technical Report	4
Table 4:	Functional safety standards.....	5
Table 5:	Quality Management System	5

Modification History

Rev.	Status	Date	Author	Modification / Description
1.0	active	2024-10-29	Hermann Mayer	Initial

Table 1: Modification history



1 Target of Evaluation (ToE)

In October 2023 PTC Hungary Kft. requested TÜV SÜD Rail GmbH to test and certify the Codebeamer according to the standard listed in clause 4 of this report. The related project number is 717528860.

The ToE is a software off-line tool used in safety related software developments according to ISO 26262 and IEC 61508.

2 Scope of Testing

2.1 Test Specimen

The Codebeamer is an application lifecycle management (ALM) solution with all-in-one requirements, risk, and test management capabilities. It supports agile software engineering practices and provides a wide range of configurable templates. Codebeamer integrates with a wide range of SCM and DevOps environments for contemporary software engineering. It includes features such as requirements management, test management, issue tracking, document management, version control, and collaboration tools.

The assessed components of the assessment address the following functional areas:

- Project Creation
- Tracker Management
- Data Migration
- Managing Requirements
- Reports
- Baselines and Versions
- Variants Management

Only use cases which are listed and described in the tool safety analysis and in the corresponding safety manual, are included by this assessment.

2.2 Nomenclature and Identification of Codebeamer

The Codebeamer tested is identified by software version as follows:

Name	Release	Date (released)
Codebeamer 2.1	2.1.0.0	2023-12-27

Table 2: Identification of Codebeamer



3 Certification Requirements

The certification of Codebeamer 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 safety lifecycle
 - Software Development process
 - Quality assurance measures
 - Analysis of failure modes / proven in use
- II. Configuration, modification and release management
- III. Verification and validation
- IV. Customer support and bug tracking
- V. 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.
PB103777T	Technical Report	717528860
Safety related requirements, conditions and restrictions can be found in the following user documentation		
Safety_Manual_Codebeamer_2.1.pdf	Safety Manual 2.1	717528860
Codebeamer_SW_Tool_Classification_2.1.xlsx	Tool Safety Analysis 2.1	717528860

Table 3: Technical Report

Based on the specified purpose of use of the Codebeamer in 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/	ISO 26262-8:2018	Road vehicles — Functional safety — Part 8: Supporting processes
/N2/	IEC 61508-3:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 3: Software requirements

Table 4: Functional safety 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 5: Quality Management System

5 Tool Classification and Qualification

5.1 ISO 26262

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

The Codebeamer tool, being an ALM tool as described in clause 2.1, cannot introduce errors into the safety product. Nevertheless, the tool impact is TI2, because in the case of a failure it may mask existing errors in the safety product being tested. Depending on the applied measures of error prevention and error detection in the user 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.



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 (Tool Confidence Level) value.

5.2 IEC 61508

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

Codebeamer, classified as T2 tool, supports the test or verification of the design or executable code, where errors in the tool can fail to reveal defects but cannot directly create errors in the executable software.

The tool functionality and behaviour, as well as any instructions or constraints shall be documented. A tool validation is not required for T2 tools, but it is suggested as a means to judge correctness of the tool results. For T2 tools, only qualified versions shall be used.

6 Results

6.1 Functional Safety

The tests performed and quality assurance measures implemented by PTC Hungary Kft. have shown that Codebeamer complies with the testing criteria specified in clause 4 subject to the conditions defined in clause 8 and is suitable for safety-related use in application development in accordance to the standards in clause 4.1.

6.2 Configuration, modification and release management

The procedures applied for implementation of changes, test implementation and test execution are adequate to guarantee stability of released versions. Every change to the software undergoes a defined approval procedure.

The modification and release management of PTC Hungary Kft. is suitable to ensure reliability and quality of the released software products.

6.3 Verification and validation

The verification and validation procedures have been assessed regarding planning, execution, result and documentation of tests.

PTC Hungary Kft. maintains a detailed list of external software that is used in the products and during development to support activities related to safety and security for modification of the product and its release.

Codebeamer is tested continuously during the life-cycle phases by a large set of different measures (e.g. automated tests for unit- and integration testing and manual tests).

The verification and validation activities fulfil the requirements for tool qualification according to the standards in clause 4.1.



6.4 Customer support and bug tracking

PTC Hungary Kft. maintains a transparent bug handling policy. Customers can report problems and track the current status of them using the online bug tracking system which also contains fixed / known customer issues.

The implemented support and bug tracking procedure of PTC Hungary Kft. ensures that customers are informed about any known bugs, condition of use and safety-related modifications in time.

6.5 Safety information in the product documentation

The general user documentation is structured and understandable. It is complemented by a safety manual. The Safety Manual of Codebeamer provides the necessary information and underlines aspects that require special care or possible malfunctions which should be considered when applying Codebeamer in safety-related development.

The technical documentation fulfils the requirements in accordance to the standards in clause 4.1.

7 Summary

The test results of clause 6 showed that Codebeamer fulfils the requirements applicable to software verification tools as given by the standards listed in clause 4.1.

The tool Codebeamer is qualified to be used in a standard-compliant development process according to ISO 26262:2018 for any ASIL. The requirements of the “Validation of the software tool in accordance with ISO 26262-8:2018, Chapter 11.4.9” and “Evaluation of the tool development process in accordance with ISO 26262-8, Chapter 11.4.8” are fulfilled.

The Codebeamer classified as T2 off-line tool according to IEC 61508-4:2010, is suitable to be used in safety-related development projects according to IEC 61508:2010 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.).

8 General Conditions and Restrictions

The use of Codebeamer shall comply with the current version of the safety documentation, and the following implementation and installation requirements have to be followed, if Codebeamer is used in safety-related application development.

- The user documentation shall be carefully read and understood.
- The advice given in the safety manual shall be taken into account.



9 Certificate Number

This report specifies technical details and implementation conditions required for the application of Codebeamer to the certificate:

Z10 128834 0001 Rev. 00

Technical Certifier