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LAH.893.909.D

Special Characteristics in Software and/or Dealing with Non-commissioned Software Content

Development, General Project-Independent Performance Specification:
LAH.893.909.D

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Version	3.0

Contents

INTERNAL

[I: BM_86]

Revision record for changes to the Performance Specification:

Version	Description of change(s) in the Performance Specification:	Author/editor (Name, OU)				
12.07.2018	First issue of the Process Performance Specification based on agreed-upon version LAH.893.909.C	Ehlers I/EA-F4				
27.09.2018	Feedback from GR5 team (I/SO-21 M. Kirchner; I/EZ-P Dr. Speck) integrated	Ehlers I/EA-F4				
06.12.2018	Feedback from I/SO-21 Kirchner, I/EF Zweck, I/EA-C Aranyi, I/EE Hasse, I/GG-11 Heere integrated	Ehlers I/EA-F4				
07.12.2018	BM_244 revised	Ehlers I/EA-F4				
20.02.2019	Revised to implement Volkswagen/Audi workshop results (2019-01-14, 2019-01-23, & 2019-02-06) and to take into account feedback from K-ILX-1	Ehlers I/EA-I11				
21.02.2019	Feedback from I/EA-C incorporated into sections 4.1 & 4.2	Ehlers I/EA-I11				
01.10.2019	Feedback from I/EE, I/EA, & E/Z incorporated into section 1 (BM_248), section 3.2.1 (BM_288 & BM_291), section 5.1 (BM_193 & BM243 deleted), and section 6.2 (BM_145); the scope of validity is expanded and also covers motor/engine control modules and transmission control modules as of 2019-12-01.	Ehlers I/EA-I11				
20.10.2019	Feedback from I/EF incorporated into section 3.2.1 (BM_288 & BM_291) incl. expansion of appendix by the definition of production software releaseversion	Ehlers I/EA-I11				
04.11.2019	As part of veto clarification with EE-34, EE-Z, GC-P, and EEMZ, the reactivation of BM_190/BM_191 and BM_192 was determined: Better clarification for which content the handling of non-commissioned software content described in section 3 is required.	Ehlers I/EA-I11				
10.02.2020	Rewording of BM_190/BM_191/BM_293; specification of approach for non-commissioned software content for development and production software versions in BM_293/BM_294/BM_295/BM_296; inclusion of the document templates for the individual non-commissioned software content messages in BM_297/BM_298; correction of BM_171	Ehlers I/EA-I11				
25.03.2020	Rewording of BM_248 and BM_293 to facilitate understanding with regard to the individual aspects of the Performance Specification and their obligatory use	Ehlers I/EA-I11				
07.08.2020	Rewording of BM_297, BM_298, and BM_299 plus addition of BM_300, BM_301, and BM_302 on feedback from the contractor regarding non-commissioned software content Author change Volkswagen Correction of contractor in BM_175	Ehlers I/GQ-61				
29.09.2020	Rewording of BM_252 and BM_279 from supplier discussions BM_241 and BM_307 deleted	Ehlers I/GQ-61				
30.10.2020	BM_176: Conversion to requirement and rewording to clarify the feedback path supplemented by BM_308, BM_74, BM_110, and BM_304;formulation added for clarification	Ehlers I/GQ-61				
30.07.2021	Incorporating the comments of Audi legal department (I/FL-11 Skerlanitz) to improve structure and understanding - summarising and deleting for simplification - moving the requirements on non-commissioned software (formerly chapter 3.2) to a new chapter 6 - cancellation of the department-specific treatment of non-commissioned software Deleted:BM_279, BM_153, BM_265, BM_158, BM_157, BM_254, BM_259 revisedt: BM_240, BM_74, BM_110, BM_191, BM_126, BM_293, BM_116, BM_258 new: BM_309, BM_311, BM_312 moved: BM_161, BM_139, BM_140, BM_253 and Chapter 3.2 (is now Chapter 6)	Ehlers I/GQ-61				
Comments: - **Referencing** for the projects is conducted **based on the ID**; this is also output in the PDF file. - **Changes compared to previous editions** must be filtered using the respective baselines; the above list contains only the most important changes.						

1 Scope

[I: BM_248]

This Requirement Specification applies to software to be used in components that will be installed in vehicles. The requirements documented in this Performance Specification serve to validate the software for introduction into production. It describes two sets of issues to be considered in conjunction with the development of software for the purpose described above.
Firstly, it covers the handling of special characteristics described in section 5. And secondly, it deals with the handling of non-commissioned software described in section 6.

INTERNAL

2   Introduction / Foreword

[I: BM_74]

This Requirement Specification will consider two aspects of software development. First, it involves the identification and handling of non-commissioned software. Second, it involves the identification and consideration of special characteristics.

The motivation for and handling of special characteristics can be understood very well from the German Association of the Automotive Industry (VDA) volume on special characteristics:

All characteristics of a product represent the specific properties of the product at the characteristics level. This full set of product characteristics contains a relevant subset which are designated as special characteristics (SC) as per the German Association of the Automotive Industry (VDA).

The VDA distinguishes between:

SC S: special characteristics related to safety
SC Z: special characteristics related to legal and regulatory requirements
SC F: special characteristics related to functions and requirements

Source: VDA, Joint Quality Management in the Supply Chain – Product Creation: a process description covering special characteristics (SC), 2nd edition 2020

The monitoring, tracking, and documentation of the product characteristics support the entire development process in order to develop the product with the defined properties and to meet the legal requirements and/or the purchaser's specific requirements.

The following regulations are aligned with the basic principles of the VDA guideline and transfer the special characteristics to the development processes and scopes of supply for software to be used in components, parts, or modules that will be installed in vehicles.

The reference to the VDA volume serves solely as an explanatory example. It has no binding effect on the contractor and is not used for interpretation purposes. The key factors for "special characteristics in software and/or handling non-commissioned software content" are solely the following regulations of this Performance Specification. Adherence to the aforementioned VDA volume for other scopes of development is ensured in section 5.5 of Volkswagen standard VW 99000.

3 General Part

[I: BM_110]

The purchaser is responsible for the requirements of the type-approval processes. In particular, it makes sure that the vehicles it produces comply with all legal requirements of the respective target markets and that all homologation rules and regulations are fulfilled. The purchaser will create, by itself and under its own responsibility, the homologation documents that are required in the respective target market.

In this context, Performance Specification LAH.893.909.D tracks the following objectives:

- avoiding software content that does not comply with legal requirements based on active analysis in the development process
- ensuring complete software documentation and the necessary information for the proper use of the software
- ensuring the contractor's support for the purchaser in evaluating the software

The evaluation of the software by the purchaser must not be replaced by a self-evaluation by the contractor concerning the interaction of the contractor's scope of supply with
the other components of the control software and/or the whole vehicle.

For this purpose, the contractor analyzes the software as part of the scope of requirements and responsibility for the respective project and this Process Performance
Specification and documents the results of this analysis as per the specifications of this Process Performance Specification. The purchaser requires the documentation, including
relevant information on the system architecture also regarding the special characteristics, in particular for the homologation of vehicles and/or components in which the software
is to be used.

[I: BM_111]

This Performance Specification is part of the specification of services in the framework of projects for new software developments and changes to existing software, regardless of whether the scope of development and supply consists of only software or a combination of software and hardware. The special characteristics to be taken into consideration during the development will be defined, and the requirements for their documentation and the processes to be implemented will be described.

[I: BM_161]

The contractor's obligations described in this Requirements Specification refer to

(i) the parts of its scope of supply that the contractor changed or developed as new parts in order to fulfill the contract, and
(ii) the parts of the software that are relevant to the scope of supply and that the contractor develops or changes exclusively and under its sole responsibility and without a contract with the purchaser and that the contractor now integrates into the scope of supply, including non-commissioned software content.

Deviations from this requirement apply only if these are agreed upon in writing in an additional agreement between the contractor and purchaser.
The contractor notifies the purchaser which parts of the scope of supply are new developments. If the purchaser also wants an evaluation in terms of special characteristics with respect to components of the scope of supply that were not new developments, the purchaser will notify the contractor of this requirement. In this case, the purchaser and contractor will agree upon a time frame and will reach an agreement with respect to individual contractual specifications to handle the issue. The

evaluation will be aligned with the contents of this Performance Specification, unless otherwise agreed.

[A: BM_139]

In addition to the performance obligations under i) BM_161, it is also part of the Contractor's performance obligations to analyse the software to be developed independently of Volkswagen Group companies' requirements (pursuant to ii) BM_161) in accordance with the statutory criteria and requirements described this Requirements Specification pursuant to chapter 5 with regard to the special characteristics and to evaluate the identified special characteristics and inform the purchaser accordingly.

[I: BM_140]

As part of this analysis (as per BM_139), potential non-commissioned software content may be found.

[A: BM_190]

If the electronic control unit (ECU) is an ECU with software content or appropriate software for ECUs for emissions control (ECM) – characterized by a marking with emission-related special characteristics (as per section 4) – then the contractor must fully take into account and fulfill the requirements listed in this Performance Specification.

[I: BM_191]

If the ECU is a different ECU with software content or appropriate software for other ECUs without functions for emissions control – identifiable in that there is no marking with emission-related special characteristics (as per section 4) – then the contractor does not have to take into account or implement the requirements described in chapter **6 "Non-commissioned software content"** with regards to non-commissioned software content.

[A: BM_192]

If the contractor is unsure about the relevance of its scope of supply to the ECM category as per BM_191, then the contractor must clarify this issue with the purchaser's appropriate contacts.

3.1   Documentation of the delivered Software

[A: BM_112]

The contractor must deliver complete, comprehensible, and technically accurate documentation (technical customer documentation) for the relevant ECU software (code) and special characteristics belonging to the scope of development (see BM_87, BM_33).

[I: BM_249]

Documentation of the contractor's operational and business secrets is excluded from the documentation specified in BM_112.

[A: BM_253]

The contractor must indicate the presence of operational and business secrets.

[A: BM_250]

For the contractor's operational and business secrets, the documentation must also include the information that the purchaser requires in order to meet its obligations as part of the regulatory approval process.

[A: BM_113]

The technical customer documentation as per BM_112 must include, in particular, complete function documentation with block circuit diagrams, calibration information, and a function description in text form.

[A: BM_114]

If there are updates, upgrades, or other changes to the software (code) for components, modules, or parts as per BM_248 after initial delivery, the contractor must update the technical customer documentation. This requirement relates to the obligation of the contractor to update and mark special characteristics at least on the changed part(s) of the software (code).

[A: BM_115]

The software (code) and the technical customer documentation delivered by the contractor must match.

[A: BM_251]

In particular, the ECU software must not include any functions that are not listed in the technical customer documentation.

[I: BM_252]

This does not include the core functions of the platform software or the contractor's operational and business secrets, unless they are deemed to be relevant to documentation, on-board diagnostics, and/or safety.

3.2 Sales market-dependent Legal Requirements

[I: BM_256]

The purchaser will define the markets of use at the start of the project and inform the contractor about these markets.

[A: BM_120]

In implementing the project, the contractor must comply with the legal requirements applicable to each market where the contractor's product will be used.

[I: BM_257]

The purchaser is responsible for the compliance of the whole vehicle with the respective applicable legal regulations and for the whole vehicle undergoing the proper, mandatory certification process.

[A: BM_121]

The delivered software and all functions of the software must not violate the applicable legislation in the respective sales markets, including changes to legislation already adopted at the time of delivery.

[I: BM_258]

During the course of the project, if the contractor has questions on

(1.) whether the commissioned scope of supply and/or
(2.) interactions of components of the scope of supply
    (a.) with each other or
    (b.) with other parts of the software originating from the contractor

comply with the legal requirements of the target market, the contractor must clear up this question with the purchaser. The purchaser will answer the questions stated by the
contractor and accept delays associated with the testing without financial or other form of compensation. The contractor and purchaser will work together to ensure that the
scope of supply complies with legal requirements.The purchaser will take into account notifications from the contractor. Notifications and actions of the contractor do not release the purchaser from the separate testing of the legal situation under its own responsibility and from its duty to ensure that its vehicles comply with the respective applicable regulations. If the purchaser would like to deviate from the contractor's notifications, the purchaser will inform the contractor about this condition for each individual case. If questions cannot be answered at the level of the personnel involved, the questions will be escalated to the responsible personnel with the contractor and the purchaser. The contractor is authorized to inform official agencies or authorities, if the purchaser requests a scope of supply even after the escalation process about which the contractor has expressed concerns or

if the purchaser refuses to take into account notifications by the contractor on possible violations of legal requirements. The contractor is further authorized to refuse to accept the requirement if the purchaser cannot demonstrate that the requirement will be used in compliance with legal regulations. If additional obligations are agreed upon based on agreements with respect to individual markets, these obligations remain unaffected by this agreement.

[I: BM_122]

Applicable legislation includes, in particular but not limited to, all legal approval regulations as well as the applicable safety requirements, testing regulations, environmental regulations, and marking regulations, if these are applicable to the software at the time that the contract was concluded.

[A: BM_124]

The contractor also undertakes to inform the purchaser about possible violations which result from changes to legislation after delivery.

[I: BM_125]

The contractor bases the review as per BM_124 on the calibration that the contractor knows.

[A: BM_126]

With delivery of each program version, the contractor declares that it has developed, tested, evaluated, and documented the supplied software while taking into account the available specifications. The contractor also declares that the disclosed special characteristics have been determined and that the respective program version corresponds to the available specifications. Exceptions to this requirement are function samples and rapid prototyping versions that are provided only for testing purposes and not for introduction into production. These must be provided with separate marking (nomenclature) to distinguish them from production versions.

[I: BM_127]

In as far as the respective program version contains scopes which are provided by the purchaser, the contractor has implemented the compliance of the processes regarding the special characteristics in its own processes and decision-making committees.

4   Definition of the Special Characteristics and Deparmental Application

[I: BM_194]

This section describes the special characteristics used in Volkswagen Group companies (in distinction to the special characteristics defined in the VDA volume) in more detail and provides examples for the preparation of the decision on whether special characteristics might be affected. The examples make no claim of liability and/or completeness. In no way do they anticipate the evaluation by the contractor.

[I: BM_313]

The specification of the special characteristics described in BM_194 with examples for the preparation of the decision has been outsourced. These decision-making aids can the contractor obtain from the purchaser's contact responsible for the project.

5 Requirements for the Evaluation of Software Implementations for Special Characteristics

5.1 Assessment of Special Characteristics in Software Deliveries

[I: BM_15]

Evaluating the implementation of vehicle functions in the form of software is required for the applicable code as well as for the associated calibration. In the first step, this evaluation (requirements evaluation) is based on the requirements description and the self-assessment made by the purchaser regarding the special characteristics. When these requirements have been implemented into software code, the initial assessment regarding the special characteristics can be verified and, if necessary, updated, with knowledge of the implementation into program code (implementation evaluation). A final evaluation (calibration evaluation) is then required under consideration of the calibration if the software has corresponding parameters for implementing the stated requirements. If this is not the case, the consideration and evaluation during the requirements and implementation phases are sufficient.

[I: BM_88]

The following figure shows the process sequence from the requirement to the software creation, including the subsequent calibration if an calibration is provided for in the solution (implementation design), taking into account the special characteristics. The process can be structured into 3 phases: the requirements evaluation, the implementation evaluation, and the calibration evaluation. In all 3 phases, the systematic evaluation and documentation with respect to the special characteristics serves to ensure legally compliant software at the end of the process. The process must be completed both for new software developments as well as for changes to existing software:
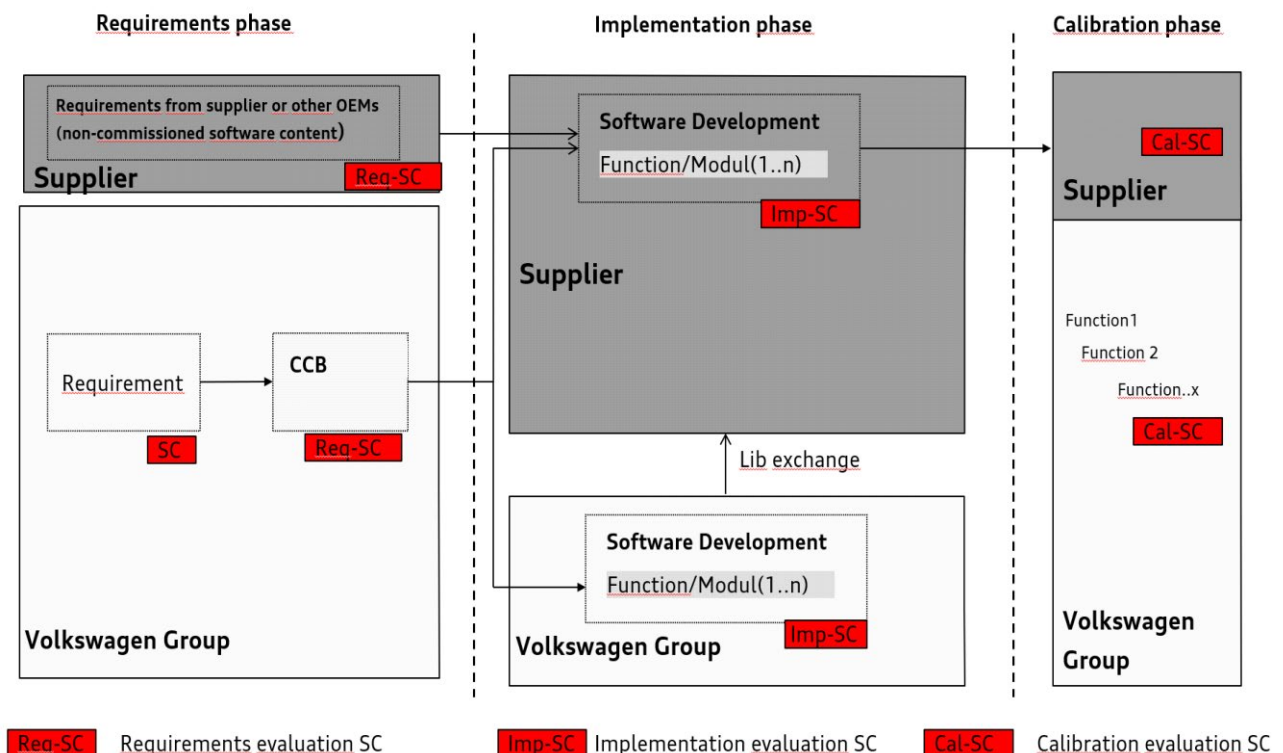
[I: BM_138]

Change Control Boards (CCBs) that the purchaser has established for this purpose evaluate the Volkswagen Group requirements during the **Req SC** phase using the described special characteristics.

[I: BM_213]

The requirements of the Volkswagen Group on the quality of software in the vehicle are defined in General Project-Independent Performance Specification LAH.893.909 (Group Basic Requirements for Software). The present Performance Specification also defines the additional technical validations that must be performed to comply with the increased obligation to exercise due care in the implementation of "special-characteristics-relevant" requirements.

[A: BM_214]

The contractor must perform the handling of special characteristics in software of parts, modules, or components described in this section for the types of special characteristics explicitly required in the Performance Specifications (e.g., Component Performance Specification, System Performance Specification) forming the basis of the contract.

[A: BM_87]

The contractor must conduct all evaluations of the special characteristics listed below based on the criteria described in section 4.

[I: BM_260]

The contractor is authorized to use its own evaluation criteria in addition to the criteria described in section 4. The contractor may use its own evaluation designations if these are essentially comparable to the criteria described here and the contractor and purchaser have agreed upon their use in advance.

[A: BM_33]

If the contractor would like to use its own evaluation designations or its own evaluation criteria instead of or in addition to the evaluation criteria described in section 4, the contractor and the purchaser must reach an agreement on their use in advance.

[A: BM_37]

The contractor must document the results of the agreement on the contractor's own criteria as per BM_33.

5.1.1 Assessment on the Basis of Requirements

[I: BM_18]

The purchaser will deliver the self-assessment associated with its requirements for the special characteristics as per section 4 to the contractor.

[I: BM_211]

The special characteristics attribute for each type of special characteristics is included in the ReqIF of the Performance Specification describing the contract (e.g., Component Performance Specification or Feature Performance Specification).

[I: BM_210]

The special characteristics attributes can be filled out, among other things, as described in the table below:

Special characteristics attribute value	Meaning
No	**The requirement is not special-characteristics-relevant.**
	The contractor does not have to handle this requirement as per the requirements described in section 5.
Yes	**The requirement is special-characteristics-relevant.**
	The contractor must handle this requirement as per the requirements described in section 5.

[A: BM_31]

The contractor must store the purchaser's self-assessment delivered with the requirements in its requirements management tool.

[I: BM_261]

The contractor is authorized (but not obligated) to evaluate a requirement deviating from the purchaser's self-assessment.

[A: BM_91]

The contractor must clearly allocate the evaluation results to the triggering requirement in its requirements management tool.

5.1.2   Assessment on the Basis of implemented Requirements

[I: BM_39]

Rough description of the process steps in the implementation phase: if not agreed upon otherwise, after receiving the requirements documents and the purchaser's respective self-assessment, the contractor creates an implementation solution (e.g., software design, software architecture specification). The contractor evaluates its implementation solution with respect to special characteristics as per the criteria specified in section 4 and/or as per deviating criteria in the sense of BM_33 under consideration of the self-assessment received from the purchaser. If the purchaser requests to review the implementation solution, the contractor must send the implementation solution together with the evaluation of the special characteristics to the purchaser for review. The purchaser reviews the documents provided by the contractor for the issuing of the implementation release. Otherwise, the contractor implements the requirement without further exchange of the implementation solution. After the requirement has been implemented, the contractor must conduct a final implementation evaluation if there is deviation between the implementation solution and the final code.

[A: BM_95]

Based on its implementation solution for the requirement, the contractor must conduct an evaluation for the special characteristics as per the criteria specified in section 4 and/or as per deviating criteria in the sense of BM_33.

[A: BM_96]

If the contractor's evaluation results in a "yes" for one of the special characteristics or if it differs from the purchaser's assessment, the contractor must explicitly show the evaluation results in the implementation solution.

[A: BM_106]

If the purchaser has requested a specification, i.e., a representation of the implementation solution, then the contractor must provide the implementation solution including the results of the special characteristics evaluation (see BM_96).

[I: BM_97]

After the purchaser has approved the implementation solution (see BM_106), the contractor can implement the solution.

[A: BM_98]

The contractor must evaluate the completed software with respect to special characteristics as per the criteria specified in section 4 and/or as per deviating criteria in the sense of BM_33 (implementation evaluation) if this software deviates from the implementation solution.

[A: BM_34]

The contractor must document the results of the evaluation as per BM_98.

[I: BM_229]

The purchaser is responsible for identifying special-characteristics-relevant requirements in the requirements gathering phase. In individual cases, however, relevance to special characteristics can be added by the system and software architecture specification.
Example: implementation of a component safety feature as an emission strategy with an obligation to report (Auxiliary Emission Control Device (AECD), auxiliary emission strategy (AES), base emission strategy (BES)). This added relevance to special characteristics must be disclosed to the purchaser, so that the purchaser can decide on how to proceed.

[A: BM_230]

For the system and software architecture specification (see KGAS_3272 ff.), the contractor must evaluate the relevance to special characteristics for system and software elements as per the decision aids listed in section 4.

[A: BM_231]

If the contractor identifies special characteristics relevance for system and software elements that concern requirements for which the purchaser had denied relevance to special characteristics or for which the contractor evaluated a requirement and obtained a result deviating from the self-assessment of the purchaser, the contractor must report these system and software elements or differently evaluated requirements to the purchaser.

[A: BM_232]

In its report on the deviation of special characteristics relevance to the purchaser, the contractor must list the ID(s) of the purchaser's affected requirement(s).

[A: BM_233]

In its report on the deviation of special characteristics relevance to the purchaser, the contractor must show which type of special characteristics was additionally identified.

[A: BM_234]

In its report on the deviation of relevance to special characteristics to the purchaser, the contractor must indicate the reason for the deviating evaluation of the special characteristics relevance.

[A: BM_235]

In its report on the deviation of special characteristics relevance to the purchaser, the contractor must provide evaluation findings for the question of whether the special characteristics relevance can be avoided by adapting the system and software architecture specification.

[A: BM_236]

The contractor must send the report on the deviation of special characteristics relevance to the purchaser in electronic form.

[A: BM_237]

If change management is established between the contractor and purchaser by means of a workflow-based tool (e.g., JIRA), the report on the deviation of special characteristics relevance must be realized as a change request in the tool.

[A: BM_216]

The contractor must mark all software elements in the software architecture specification as per KGAS_3537 that are required for implementing a "special-characteristics-relevant" requirement as "special-characteristics-relevant."

[A: BM_217]

The contractor must mark all information exchanged at the interfaces of the software elements (logical as well as physical data description) as per KGAS_3538 ff. that are required for implementing a "special-characteristics-relevant" requirement as "special-characteristics-relevant."

[A: BM_218]

The contractor must mark the validity test (as per KGAS_3682 ff.) of the interfaces marked as "special-characteristics-relevant" as "special-characteristics-relevant."

5.1.2.1 Additional Requirements for Software Testing According to KGAS

[A: BM_220]

The contractor must mark the tests for validation of an element classified as "special-characteristics-relevant" from the software architecture specification in the test plan as per KGAS_3556 ff. as "special-characteristics-relevant."

[A: BM_221]

For testing software (as per the KGAS "Test" section) for software versions with "production release" release level (see KGAS_3214), the contractor must perform all tests marked as "special-characteristics-relevant" in the test plan.

[A: BM_222]

If special-characteristics-relevant software components would not be tested in creating a regression testing strategy as per KGAS_3343 ff., the contractor may conduct this regression testing strategy only after consultation with and approval from the purchaser's contracting department.

[A: BM_223]

The contractor must ensure that software versions with the "production release" release level are delivered to the purchaser only after all tests marked as "special-characteristics-relevant" in the test plan have been completed with passing results.

5.1.3 Assessment on the Basis of the Calibration carried out

[I: BM_35]

The impact discernible to the outside with regard to special characteristics for the delivered software is given from the interplay of the programmed function and the associated data. For this reason, a final evaluation for the special characteristics is required after calibration has been completed.

[A: BM_36]

If the contractor is responsible for the calibration, the contractor must evaluate the calibrated function as per the criteria from section 4 and/or as per deviating criteria in BM_33.

[I: BM_262]

If the contractor is responsible for the calibration with regard to a function that the contractor did not code, the obligation for evaluation applies only to the extent that the contractor has the necessary knowledge for this testing based on information in the software documentation.

[A: BM_6]

The contractor must document the results of the evaluation for the calibrated function as per BM_36.

5.1.4 Scope of Delivery

[I: BM_160]

This part of the Performance Specification describes only the requirements for the scope of delivery, meaning the content that the contractor must deliver.

[A: BM_22]

If the purchaser has accepted evaluation criteria that deviate from those in section 4 (see BM_33 above), the contractor must supply the agreement results with each delivery of the software, in a form suitable for electronic processing, e.g., XML file.

[A: BM_42]

In the function description, the contractor must indicate the function section which is relevant with regard to evaluation of special characteristics.

[A: BM_93]

The contractor must supply the results of the implementation evaluation with each delivery of the software in a form suitable for electronic processing, e.g., XML file.

[I: BM_152]

Through the delivery of an initial calibration evaluation (BM_151) for functions calibrated by the contractor, the purchaser should be able to start any necessary validation measures for new special characteristics identified in the calibration process as per section 4. The criteria for dimensioning the calibration evaluation will be defined between the contractor and purchaser as part of the project kick off meeting.

[A: BM_151]

The contractor must supply the evaluation results of the functions calibrated by the contractor with regard to special characteristics in a form suitable for electronic processing, e.g., XML file, if the contractor processes the application package and a degree of maturity of 50% has been reached.

[A: BM_7]

The contractor must again supply the evaluation results of the functions calibrated by the contractor with regard to special characteristics in a form suitable for electronic processing, e.g.,XML file, if the contractor processes the application package and a degree of maturity of greater than or equal to 75% has been reached.

[A: BM_263]

The contractor must reach an agreement with the purchaser on the exchange format suitable for electronic processing as per BM_7 at the start of the project (as part of the project kick off meeting).

[A: BM_158]

The contractor must send the proof of the implemented validation measure and the associated results to the purchaser.

[A: BM_225]

The contractor must mark the tests classified as special-characteristics-relevant from the test plan in the documentation of the tests and test results as per KGAS_3216 and KGAS_3217 as "special-characteristics-relevant."

[A: BM_226]

If, after the compiling and linking of the software, the behavior of the elements classified as "special-characteristics-relevant" from the software architecture specification can be influenced by parameters (e.g., coding, adaptation, data set), the contractor must mark these parameters as "special-characteristics-relevant" in the documentation of the delivery.

5.1.5 Data Exchange between Contractor and Purchaser

[I: BM_94]

The requirements for the transmission of information between the contractor and purchaser will be described in the following requirements of section 5.1.5. How must the information be transmitted? Sections 5.1.1 to 5.1.4 form the basis for gathering the desired information, for evaluating the special characteristics, and for transmitting the information.
The following statements apply only to the extent that the purchaser and contractor have not made other deviating agreements (see BM_22).

The purchaser transmits the requirements evaluation for the special characteristics with the Performance Specification or a change request. If the contractor transmits evaluations on non-commissioned software content, this is done using the contractor's ID. The contractor transmits the evaluation of the special characteristics based on the implementation solution (e.g., software design, software architecture specification) with the planning data of the feature/release planning (e.g., program version planning).

[A: BM_264]

The contractor must reach an agreement with the purchaser on the exchange format that will be suitable for electronic processing for the information to be delivered (as per section 5.1.4 "Scope of delivery") at the start of the project (as part of the project kick off meeting).

# 6 Non-Commissioned Software Content (Beifang)

[I: BM_165]

"Non-commissioned software content" is all software created by the contractor in connection with a requirement of a Volkswagen Group company, which was neither commissioned by a Volkswagen Group company or in a third-party contract nor used for the implementation of this requirement.
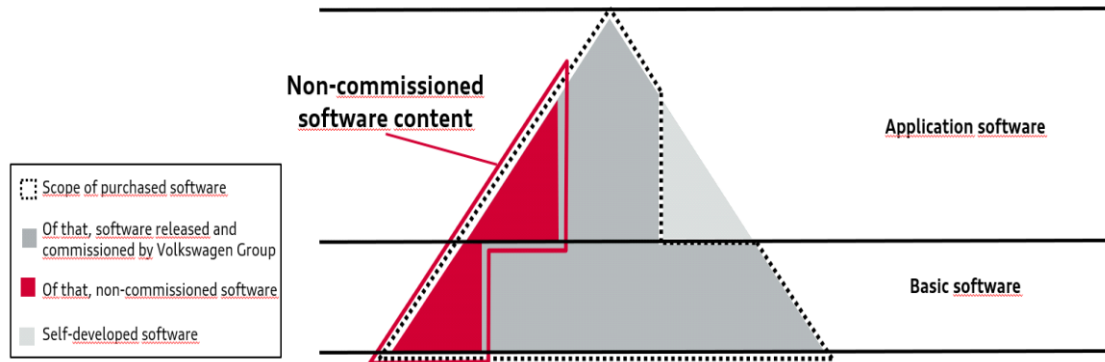
[I: BM_166]

Based on the software architecture, e.g., the AUTOSAR architecture shown below, for parts, modules, or components, the software can be divided logically into Basic Software (core functions, e.g., communication interfaces, diagnostics, memory management, service layer, etc.) and independent application software. In a joint "software build" (compiling, linking, arrangement in memory), the application software is linked with the operating system, so that only an executable program, containing both the operating system kernel and the application software, runs on the part, module, or component.

Both the basic software and the application software can contain non-commissioned software content, therefore both components must be analyzed.
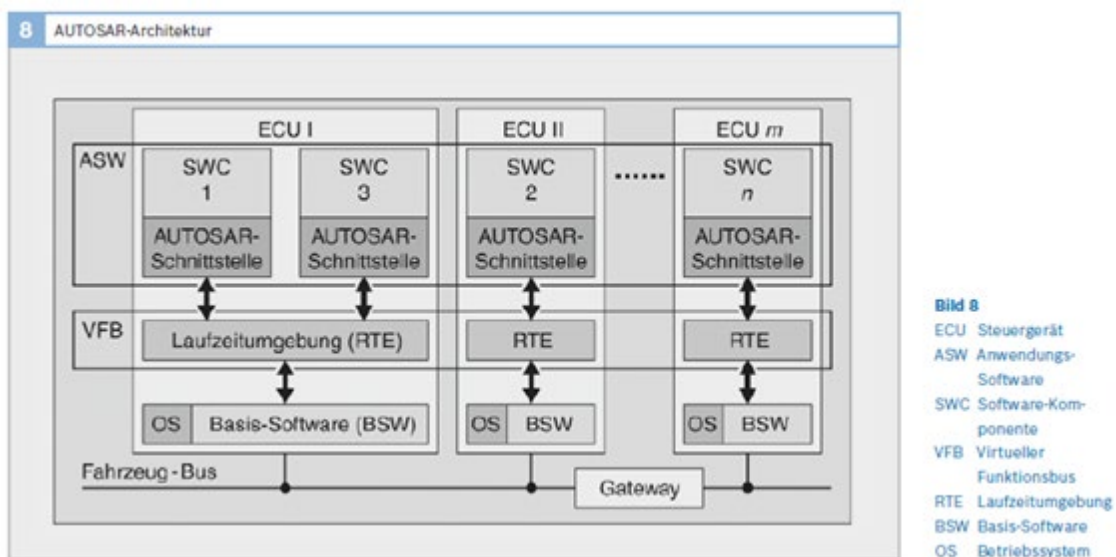
INTERNAL

AUTOSAR-Architektur	AUTOSAR architecture
AUTOSAR-Schnittstelle	AUTOSAR interface
Fahrzeug.Bus	Vehicle bus
Gateway	Gateway
Bild 8	Figure 8
ECU	ECU
Steuergerät	Electronic control unit
ASW	ASW
Anwendungs-Software	Application software
SWC	SWC
Software-Komponente	Software component
VFB	VFB
Virtueller Funktionsbus	Virtual function bus
RTE	RTE
Laufzeitumgebung	Run time environment
BSW	BSW
Basis-Software	Basic Software
OS	OS
Betriebssystem	Operating system

Figure: AUTOSAR architecture (source: Bosch Autoelektrik und Autoelektronik (Automotive Electrics and Automotive Electronics), Konrad Reif, 6th edition)

6.1   Reporting of Non-Commissioned Software Content (Beifang)

[I: BM_293]

Information and preliminary considerations for dealing with software that is bycatch:
Some of the information given here will be taken up in the further course in passages marked as requirement and may be repeated.
The testing of software for potential non-commissioned software content is mandatory for all software deliveries of the series production development phase according to section 1 "Scope of validity" or BM_190. This does not apply to software versions that are to be used in Group Research, for pre-development, or during concept development. These software versions do not need to be checked for potential non-commissioned software content. However, if solutions arise from the investigations of Group Research, for pre-development, or during concept development that are to be transferred into a production solution, then the requirements of this Performance Specification and in particular BM_116 and BM_185 from section 6.1 must be applied.

[A: BM_116]

If the scope of supply contains non-commissioned software content that is relevant at least with regard to special characteristics O and/or E.D according to chapter 4, the contractor must indicate this non-commissioned software content by means of electronic communication (e.g. JIRA, KPM etc.).

[A: BM_309]

The details of the communication, in particular the definition of the tool to be used, must be determined by the contractor with the purchaser during the first project meeting.

[I: BM_311]

The purchaser reserves the right to define further special characteristics or criteria on a project-specific basis, which oblige the contractor to implement the requirements of Chapter 6 of this document. These additional arangements shall be defined between the contractor and the purchaser during the first project meeting.

[A: BM_312]

In case further special characteristics or criteria for reporting non-commissioned software have been agreed between the contractor and the purchaser, the contractor shall deal with any non-commissioned software in accordance with the requirements of chapter 6 of this document if these special characteristics and/or criteria are present.

[I: BM_282]

In addition to checking the scopes of supply to be provided, the check for possible non-commissioned software content can also be performed during the design phase. As part of creating quotation documents, the contractor might want to go back to existing solutions after checking the existing project requirements. These existing solutions might contain non-commissioned software content as per BM_165 that is subject to an obligation to report as per BM_116.

[A: BM_185]

The contractor must report its own findings without delay.

[A: BM_294]

If software versions are to be used in Group Research, pre-development, or for concept development, these software versions do not need to be checked for potential non-commissioned software content as per BM_116 and/or BM_185.

[A: BM_295]

If solutions arise from the investigations of Group Research, for pre-development, or during concept development that are to be transferred into a production solution, then the requirements of this Performance Specification, in particular BM_116 and BM_185 from section 3.2.1, must be applied.

[I: BM_296]

This can be achieved, for example, by testing the requirements that led to these solutions and, in the case of the transfer of program code or executable software modules (libraries), by testing the solutions in the regular development cycle for production software versions and documenting the result.

[I: BM_268]

If the purchaser finds that software provided by the contractor might contain non-commissioned software content, the purchaser will inform the contractor of these findings.

[A: BM_269]

The contractor must promptly check the information as per BM_268 for whether the provided software actually contains non-commissioned software content.

[A: BM_270]

The contractor must promptly inform the purchaser about the results of the check as per BM_269.

[A: BM_255]

If the contractor develops a solution that would lead to non-commissioned software content in the software during the design phase (creating the software architecture), the contractor must not provide any software content that contains this non-commissioned software content without an agreement with the purchaser.

[A: BM_169]

The contractor must specify a short title when reporting non-commissioned software content.

[A: BM_170]

The contractor must specify a unique designation for identification purposes when reporting non-commissioned software content.

[A: BM_171]

The contractor must specify a date (report time) when reporting non-commissioned software content.

[A: BM_172]

The contractor must describe the function of the reported non-commissioned software content when reporting non-commissioned software content.

[A: BM_303]

As per BM_172, the function of the non-commissioned software content must be reported in a technically generally understandable form.

[A: BM_173]

The contractor must specify the purchaser's projects in which the non-commissioned software content is being used when reporting non-commissioned software content.

[A: BM_174]

The contractor must specify the program releases (software versions) in which the non-commissioned software content is being used when reporting non-commissioned software content.

[A: BM_183]

The contractor must describe the effects of keeping, removing, or deactivating the non-commissioned software content when reporting non-commissioned software content.

[A: BM_297]

For reporting non-commissioned software content to the purchaser, the contractor can use the template "Formular zur Dokumentation nicht beauftragter Softwareumfänge_v1_1.docx".

[A: BM_300]

If the contractor would like to use its own form for reporting non-commissioned software content, the submitted information must completely cover at least those aspects specified in template "Formular zur Dokumentation nicht beauftragter Softwareumfänge_v1_1".

[A: BM_178]

If the contractor changes (revises) the software or parts of the software that the contractor already reported as non-commissioned software content, the contractor must treat this software or software components as new non-commissioned software content.

[I: BM_288]

Without a decision about the use of non-commissioned software content that has already been reported but has not received comments from the purchaser, only development software versions, but not production software versions, may be produced. For this purpose, the contractor must notify the purchaser of any expected feedback from the purchaser on non-commissioned software content at an early enough point in the process. This is especially important in the end phase of the project for deliveries from the contractor that could be classified or defined as ready for production. The notification could be given, e.g., with a corresponding supplement with the delivery documentation described in BM_274.

[A: BM_289]

If the software delivered by the contractor contains already reported non-commissioned software content and the purchaser has not yet issued a final statement on its use and the delivered software is classified as ready for production by the contractor and purchaser, the delivery documentation for this software delivered by the contractor must include a notification of the purchaser's missing feedback on the non-commissioned software content that was already reported and is contained in this delivery.

[A: BM_291]

If the software delivered by the contractor contains already reported non-commissioned software content and the purchaser has not yet issued a final statement on its use and the delivered software is classified as ready for production by the contractor and purchaser, the contractor must not use this software to produce any production software versions.

[A: BM_184]

If the software delivered by the contractor does not contain any non-commissioned software content, the contractor must declare in the delivery documentation for this software that this software is free of any non-commissioned software content.

[A: BM_304]

If submission of the report on non-commissioned software content by electronic systems as per BM_176 has been agreed between contractor and purchaser, the contractor can use this method to report that the software is free of non-commissioned software content o the purchaser's contact responsible for the joint project.

[A: BM_308]

The contractor must agree with the purchaser on the preferred variant of feedback as per BM_184 and BM_304, e.g., within the framework of the initial project meetings.

[A: BM_298]

The contractor can use the template "Bestätigungsformular über den Ausschluss von nicht beauftragtem Softwareumfang_2020Feb11" to implement requirement BM_184.

[A: BM_301]

If the contractor would like to use its own form for implementing requirement BM_184, the submitted information must completely cover at least those aspects specified in template "Bestätigungsformular über den Ausschluss von nicht beauftragtem Softwareumfang_2020Feb11".

[A: BM_274]

To implement requirement BM_184, the contractor must supplement the delivery documentation described in section 5.3 of LAH.893.909 "Group Basic Requirements for Software" with a statement as per BM_184.

6.2   Dealing with Non-Commissioned Software Content (Beifang)

[A: BM_117]

Due to the relevance for certification and type approval of vehicles and components in which the software is used, the purchaser is entitled to demand that the contractor remove any content which is classified as non-commissioned software content during the software development or that the contractor deactivate this content through suitable measures before the software is created (prebuild) under specific conditions. The purchaser will make this decision as early as possible. The contractor must implement this decision. The purchaser and contractor will reach an agreement with respect to individual contractual specifications on settling the expenses incurred due to removal of this content. After the contractor indicates any time delays expected due to implementing this decision, the purchaser and contractor will agree upon appropriate changes to the delivery schedule.

[A: BM_118]

The performance obligations as per BM_116 and BM_117 mentioned above apply to the scope of supply (BM_161) both in the case of changes to existing or already commissioned software as well as in the case of new orders for software as such and in combination of hardware with software.

[A: BM_179]

The documentation requirements described in Performance Specification LAH.893.909 (Group Basic Requirements for Software (KGAS)), section 5.3 "Delivery documentation" as well as the request-specific requirements for sample documentation, e.g., Component Performance Specification in section 4.2.3 "Sample documentation" must be supplemented by the contractor in terms of information on the non-commissioned software content.

[A: BM_181]

If an agreement was made between the purchaser and the contractor to deactivate or to remove non-commissioned software content, the contractor must indicate the software version in which the non-commissioned software content was deactivated or removed.

[A: BM_290]

The contractor must send the notification as per BM_181 on removed or deactivated non-commissioned software content to the purchaser in writing.

[A: BM_299]

The contractor can use the template "Bestätigungsformular über Entfernung_2020Feb11.docx" for implementing requirement BM_290.

[A: BM_302]

If the contractor would like to use its own form for implementing requirement BM_290, the submitted information must completely cover at least those aspects specified in template "Bestätigungsformular über Entfernung_2020Feb11.docx".

[A: BM_182]

If the contractor also delivers the associated hardware in addition to the software, the contractor must specify the respective Volkswagen Group company part number of the ECU/component, if this was not already specified by section 3.2.3 "Sample documentation" of the Component Performance Specification and the requirements described therein.

6.3   Miscellaneous

[A: BM_89]

The contractor must evaluate the non-commissioned software content contained in the scope of the project with respect to special characteristics as per the criteria in section 4 and/or as per deviating criteria in the sense of BM_33.

7 Appendix

7.1 Abbreviations

AECD	Auxiliary Emission Control Device
AES	Auxiliary emission strategy
BES	Base emission strategy
SC	Special characteristics
SC	Special characteristics
ChESS	Change management for embedded software systems
Core functions	Functions that fulfill the criteria of operating system core functions; sometimes also called "basic functions"
CR	Change request
CRETA	Database for calibration data
ECM	Emission control module
ESC	Electronic Stability Control
FSK	Functional safety strategy
FuSi	Functional safety
HARA	Hazard analysis and risk assessment
TCM	Transmission control module
HMB	Semi-deactivated engine
JIRA	Web application for problem management, troubleshooting, and operative project management
KPM	Group Problem Management
LR	Lib request (library request)
HV	High voltage
ECM	Engine control module
LV	Low voltage
OBD	On-board diagnostics
OCU	Other control units
ProPlaTo	Program version planning tool
ReqIF	Requirements Interchange Format
ECU	Electronic control unit
SAS	Secondary air system
SOC	State of charge
StSt	Start-stop system
TSS	Technical safety strategy
ICE	Internal combustion engine
zFAS	Central driver assistance control module

7.2 Definition of Terms

Calibration: defining and verifying the software components that can be calibrated (after code generation/software build) for implementing the basic requirements

[I: BM_286]

Configuration: identical to calibration

[I: BM_144]

Functions: solutions implemented through hardware and software for product requirements

[I: BM_285]

Design phase: in this phase, the contractor develops the solution for the stated requirements

[I: BM_287]

Parameterization: identical to calibration

[I: BM_142]

Program release: a delivered software package is a program release

[I: BM_239]

Platform functions: software solutions that fulfill more than just the requirements of one purchaser
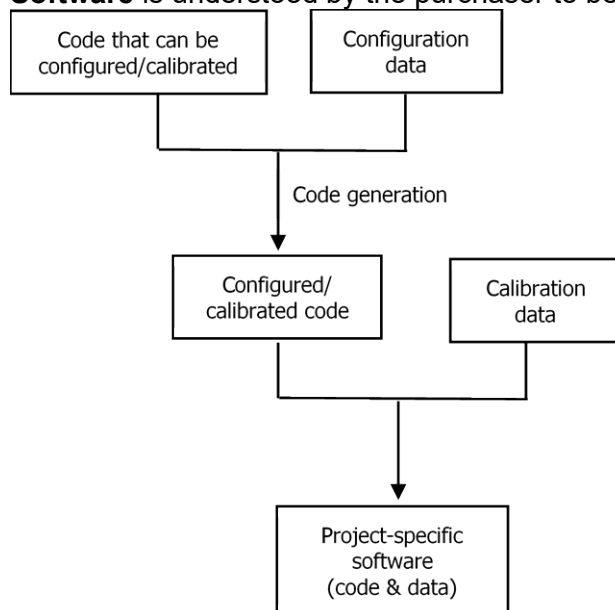
[I: BM_240]

Platform software: see "Platform functions"

[I: BM_155]

Robust: a product is robust if no critical project-specific effects are foreseeable for the planned use

[I: BM_145]

Software is understood by the purchaser to be code and if necessary its calibration

```
┌─────────────────────┐   ┌─────────────────────┐
│   Code that can be   │   │    Configuration    │
│ configured/calibrated│   │        data         │
└─────────────────────┘   └─────────────────────┘
           │                         │
           └──────────┬──────────────┘
                      │  Code generation
                      ▼
┌─────────────────────┐   ┌─────────────────────┐
│    Configured/       │   │     Calibration     │
│  calibrated code     │   │        data         │
└─────────────────────┘   └─────────────────────┘
           │                         │
           └──────────┬──────────────┘
                      ▼
          ┌─────────────────────┐
          │   Project-specific   │
          │      software        │
          │   (code & data)      │
          └─────────────────────┘
```

[I: BM_292]

Production software version: type of software version understood to be a software version that could be used by the customer and is provided for the necessary release cycle