ZF means ZF Friedrichshafen AG and all directly or indirectly affiliated companies according to §§ 15 ff. German Stock Law including but not limited to those companies where ZF Friedrichshafen AG holds a share of at least 50%. ZF also include ZF TRW entities.

文中的采埃孚是指采埃孚股份公司，以及根据§§ 15 ff. 德国证券法规定，所有直接或间接与采埃孚相关联的企业，包括但不限于采埃孚股份公司持股至少 50%的公司。采埃孚也包括采埃孚天合汽车。
Preface
序言

ZF continuously positions itself for the future. Advancements in technology, social responsibility, and production efficiencies are coming faster than ever before. ZF is prepared to meet these challenges by continuing to drive performance and results, by focusing on Best Quality, Lowest Cost and Innovative Technology. In this context, the continuous improvement of our quality systems, processes and product technologies, as well as the development, support and expansion of our business relations with our suppliers are particularly important to us.

一直以来，采埃孚着眼于未来。技术进步、社会责任和生产效率的变化日新月异，因此采埃孚专注于最佳质量、最低成本和创新技术，持续推动业绩与成果进步，时刻准备应对挑战。在这样的背景下，不断完善我们的质量体系、过程和产品技术，以及发展、支持和扩展同供应商的合作关系，对我们有着至关重要的作用。

Our prestige and position on the world market are determined by the quality of our products and the products supplied to our manufacturing facilities. Our supply partners are chosen as those companies who most directly emulate the behaviors we at ZF value so significantly. We partner with world class suppliers and consequently have high expectations of our supply base.

我们在全球市场上的声誉与地位取决于于我们的产品和我们供应商产品的质量。在供应商的选择过程中，我们将优先考虑行为和价值观与采埃孚高度一致的企业。我们与世界一流的供应商合作，因此对其也抱有很高的期望。

Key among these supplier expectations is a structured and methodical APQP process to ensure a smooth product launch, a focused drive toward continuous quality improvement, and a companywide understanding and commitment to product safety.

我们对供应商的关键期望之一是结构化和系统化的 APQP 过程，有了它，才能确保产品顺利投产，才能有针对性地持续推进质量改进，才能在全公司内倡导对产品安全的认知和承诺。

Zero defects is our goal.
我们的目标是零缺陷。

Based on the standards and regulations of the automotive industry, the application of this directive is intended to ensure smooth and cost-effective processes between ZF and our suppliers.
基于汽车行业的标准和规定，本质量方针旨在确保采埃孚与供应商之间建立顺畅和经济高效的合作。

The former quality directives "QR83" from ZF and the "GSQM" from TRW are replaced by the QD83 (edition 2018), which describes the current Customer-Specific Requirements of ZF. The topics listed in this directive do not constitute a restriction or exception to any stated regulations or legal requirements.

QD83（2018 版）将替代采埃孚上一版的质量方针“QR83”和天合的“GSQM”。新版本规定了采埃孚目前的客户特殊要求。本方针中列出的主题并不排除和限制有关规则以及法律要求。

We are aware that the success of ZF depends on the quality, cost, service and technology provided by our suppliers. We are committed to developing strong supplier partnerships through mutual trust and commitment.
我们深知采埃孚的成功取决于供应商提供的质量、成本、服务和技术。我们将不遗余力地同我们的供应商伙伴建立互利互益的合作关系。
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1. General Requirements

1.1. Scope
(IATF 16949: section 1.1)
The Global Supplier Quality Directive (QD83) is valid for the supply of production materials, software and Aftermarket products.

It is also valid for services that affect customer requirements such as sub-assembling, sequencing, sorting, rework, washing and calibration services.

It applies to all suppliers along the supply chain providing products to ZF. It is also applicable for customer directed suppliers (directed buy).

ZF suppliers are expected to extend the requirements of QD83 to their own suppliers and sub-suppliers.

This Quality Directive also applies to deliveries within the ZF Group (intra-company business).

ZF provides this document in English and German. Only the English version of this Quality Directive is a controlled document in compliance with IATF 16949. The English version is binding. Translations in other languages provided by ZF are meant only for information.

1.2. References
All reference documents mentioned in this directive and listed in section 6. (References) are the most current editions. Only the latest edition of each referenced document shall be used, unless otherwise specified by ZF.

1.3. Business Language
(IATF 16949: section 8.2.1.1)
All communications will be conducted in English unless otherwise requested by the ZF receiving plant.

Unless otherwise specified by ZF, documents including PPF/PPAP and APQP documents shall be written in English. In addition, they may display the native language of the supplier or of the ZF receiving plant, if common to both.

1.1. 范围
(IATF 16949:1.1)
全球供应商质量方针（QD83）适用于生产材料、软件和售后市场产品的供应。

本方针也适用于影响客户要求的服务，例如零件装配、排序、挑选、返工、清洗和校准服务等。

本方针适用于向采埃孚提供产品的供应链上的所有供应商，也适用于客户指定供应商（直接采购）。

采埃孚的供应商应将本方针的要求应用于其自身的供应商及次级供应商。

本方针也同样适用于采埃孚集团内部的交付（公司内部业务）。

采埃孚提供本方针的英文与德文版本。本方针只有英文版本是符合IATF 16949规定的受控文件。英文版本是具有约束力的版本。采埃孚提供的其它语言版本仅供参考。

1.2. 参考
本方针中提及的，以及在第六部分（参考）中列出的参考均为其最新版本。除非采埃孚另有规定，否则所有参考均使用其最新版本。

1.3. 商业语言
(IATF 16949:8.2.1.1)
除非采埃孚接收工厂另有要求，否则所有沟通均应以英语进行。

除非采埃孚另有规定，否则包含PPF/PPAP和APQP文件在内的所有文件均应以英文书写。此外，如供应商与采埃孚接收工厂的母语相同，则也可使用该语言。
1. General Requirements / 一般要求

1.4. Quality Management System
(IATF 16949: section 4)

An effective quality management system, set up according to the standards and regulations of IATF 16949, is a prerequisite for supplier relations with ZF. The effectiveness of the QM system should be reflected by:

- Continuous and verifiable improvement of processes, procedures, and products
- Delivered quality
- Delivery reliability
- Prompt and effective implementation of corrective actions
- Communication at all levels
- Appropriate and timely processing of new and revised projects

The goal of this quality management system is to achieve the "Zero-Defect" target.

The minimum requirement is certification according to ISO 9001 by an accredited certification body.

Certification according to IATF 16949 is required for automotive and service parts suppliers. If not yet accredited to IATF 16949, those suppliers shall have a plan to achieve certification.

The supplier shall inform ZF immediately if the certificate:
- has been revoked
- has expired without a successful recertification
- has been temporarily placed on suspension

If no recertification is planned, the supplier shall inform ZF, at least 3 months prior to the expiration date.

After a successful recertification, new certificates shall be sent to the ZF receiving plant electronically without explicitly being requested using the ZF communication platforms (accessible via the ZF Internet website). It is the responsibility of the supplier to ensure that each ZF receiving plant has been informed about the new certificate.

1.4. 质量管理体系
(IATF 16949:4)

根据 IATF 16949 的标准和规定建立有效的质量管理体系是成为采埃孚供应商的先决条件。质量管理体系的有效性体现在:

- 对过程、程序以及产品进行持续可证的改进
- 交付质量
- 交付可靠性
- 迅速有效地实施纠正措施
- 各级部门及人员沟通
- 及时正确地处理新的及更改的项目

本质量管理体系旨在达成“零缺陷”目标。

最低要求是经正规认证机构认证, 获得 ISO 9001 认证。

汽车及服务零件供应商则必须具有 IATF 16949 认证, 尚未经认可的供应商应有获得认证的计划。

当证书出现以下情况时，供应商应立即告知采埃孚:
- 证书被撤销
- 证书过期，且未能取得重新认证
- 证书暂时被吊销

如果没有计划重新认证，则供应商应在证书过期前至少 3个月告知采埃孚。

成功取得重新认证后，无需采埃孚明确要求，供应商应主动将新证书通过电子方式经由采埃孚沟通平台发送至采埃孚接收工厂（可通过 采埃孚网站 访问）。供应商有责任确保每一个采埃孚接收工厂都已知晓新证书。
Certification shall be provided by accredited certification bodies.

Audits
(IATF 16949: section 8.4.2.4.1)
ZF reserves the right to carry out audits and assessments on quality management systems, processes and products, with the ZF customer or a third party appointed by ZF if necessary, after prior notification.

1.5. Regulatory and Statutory Compliance
(IATF 16949: section 8.4.3.1/8.4.2.2/8.6.5)

ZF suppliers shall adhere to and pass down all applicable statutory and regulatory requirements to their suppliers in the entire supply chain.

The supplier shall apply the legal requirements of the production location and of the country of use (if named by ZF) during the APQP phase to all products, processes or services (internal and external). This process shall be completed at the latest by PPF/PPAP submission.

1.6. Government Regulatory Compliance, Corporate Social Responsibility & Sustainability
(IATF 16949: section 8.6.5/8.4.2.2/5.1.1.1)

ZF expects its suppliers and sub-suppliers to adopt and adhere to our minimum expectations towards business ethics, working conditions, human rights and environmental leadership. These expectations are described in ZF’s “Business Partner Principles”, available for download on the ZF Internet website (Business Portal >> Materials Management >> Compliance). Upon request or audit by ZF, suppliers shall provide evidence of adherence to these requirements.

认证须由经认可的认证机构提供。

审核
(IATF 16949：8.4.2.4.1)
采埃孚保留对质量管理体系、工艺及产品进行审核与评估的权利，如有必要，则可在事先通知后，与采埃孚客户或由采埃孚指定的第三方一同进行审核与评估。

1.5. 法规和国家标准合规性
(IATF 16949:8.4.3.1/8.4.2.2/8.6.5):

采埃孚供应商应遵守所有适用的法规与标准的要求，并将其传递给整个供应链中的供应商。

供应商应在 APQP 阶段将生产地及使用国（如采埃孚提供）的法律法规要求应用到所有的产品、工艺和服务（内部和外部）。这一步骤最晚应在提交 PPF/PPAP 前完成。

1.6. 国家法规合规性、企业社会责任和可持续性
(IATF 16949:8.6.5/8.4.2.2/5.1.1.1)

采埃孚期望其供应商及次级供应商采纳并遵守采埃孚对商业道德、工作条件、人权及环境领导力的最低期望。这些期望均在采埃孚《商业伙伴准则》中有所描述，可在采埃孚网站上下载（商业门户网站>>物料管理>>合规性）。应采埃孚要求或在接受采埃孚审核时，供应商应提供遵守这些要求的证据。
1.7. Quality Objectives  
(IATF 16949: section 6.2)
The supplier shall ensure that quality objectives to meet customer requirements are defined, established, maintained and reviewed for relevant functions, processes, and levels throughout the organization.

In the context of quality planning, the supplier is expected to develop a “Zero-Defect Strategy” and take all necessary actions in order to achieve the “Zero Defect” target.

If the quality performance has a potential to impact the safety, quality or delivery of products, the supplier shall inform immediately all possibly impacted ZF receiving plants and other involved parties in the supply chain to ZF.

1.8. Environment  
(IATF 16949: section 8.2.2.1)
Effective environmental management, which ensures compliance with the respective applicable environmental regulations and improves continuously and efficiently the environmental conditions of the supplier, is an essential contribution towards supply security. ZF is committed to the protection of the environment. All ZF plants are ISO 14001 certified. We therefore expect our suppliers to show voluntary commitment to environmental protection by implementing an environmental management system.

Suppliers operating foundries, galvanizing and paint shops, manufacturers of Printed Circuit Boards (PCB), primary and secondary cells, electronic components or performing any surface treatment using chemicals or dyes, resins, leather etc., grease and oil shall provide a certificate according to ISO 14001 or an equivalent system. If this certificate is not available, then a time schedule for certification needs to be presented.

Product-related environmental and Safety Data Sheet requirements
All supplies shall meet applicable legal, environmental and import regulations (e.g. EU REACH (EC) No. 1907/2006, EU ELV Directive 2000/53/EC, China requirements for prohibited substances on automobiles GB/T 30512-2014, ...). ZF Norm 9003 “Control of Prohibited and Regulated Substances” and ZFN 9004-1 “General ZF Packing Specification; Logistics, Environmental Protection” shall be applied.
Upon request, suppliers shall provide recycling and disposal concepts appropriate for their products. Additional data (e.g. energy consumption and emissions) may be requested for life cycle assessment of ZF products.

Suppliers shall submit Safety Data Sheets (SDS) for materials and mixtures, in accordance with the United Nation’s Globally Harmonized System (GHS) of Classification and Labelling of Chemicals and the European Classification, Labelling & Packaging (CLP) regulation.

For products classified as a dangerous good (e.g. pressurized shock absorber, pyrotechnic articles, lithium batteries, …) SDS or similar information shall be provided by the supplier in order for ZF to fulfill handling and transport requirements.

1.9. Special Characteristics
(IATF 16949: section 8.2.3.1 & 8.3.3.3)
ZF describes product and service requirements on the technical drawings, specifications and relevant purchasing documents.

All characteristics shall be complied with. There are characteristics with higher risks which require special consideration. These are the “Special Characteristics”.

Deviations in these characteristics can seriously affect product safety, product lifetime, assembly capability, product functionality, quality and can violate official or legal regulations.

Special Characteristics are specified by ZF and documented on the drawings and/or specifications. They are to be identified as well, from the risk analysis of the supplier, e.g. from the product and/or process FMEA, based on the supplier’s experience and knowledge.

根据要求，供应商应提供适合其产品的回收和处置方案。可能需要供应商提供额外的数据（例如能源消耗和排放量）用于采埃孚产品的生命周期评估。

根据联合国全球化学品统一分类和标签制度（GHS）和欧洲分类、标签和包装（CLP）法规的要求，供应商应提交材料和混合物的安全数据表（SDS）。

对于被分类为危险物品的产品（例如加压减震器、火药制品、锂电池等），供应商应提供 SDS 或类似信息，以便采埃孚能满足处理和运输要求。

1.9. 特殊特性
(IATF 16949:8.2.3.1 & 8.3.3.3)
采埃孚在技术图纸、说明书和相关采购文件中规定了对产品和服务的要求。

应遵守所有特性，其中某些高风险特性应给予特殊考虑。这些特性就是“特殊特性”。

这些特性的偏差会严重影响产品安全性、产品寿命、装配能力、产品功能性和质量，并有可能违反官方或法律法规。

特殊特性由采埃孚定义并在图纸和/或规范上载明。同时，也需根据供应商基于其经验与知识作出风险分析来确定，如产品和/或过程的潜在失效模式与影响分析等。
Special Characteristics as defined by ZF are categorized as follows:

- Critical Characteristics (C)
- Significant Characteristics (S)
- Pass Through Characteristics (PTC)
- Process Characteristics (P)

A detailed description of the ZF-standardized definitions, determinations and affiliated requirements is available for download on the ZF Internet website (see “Regulation of Special Characteristics (SC) within the ZF Group”).

The ZF requirements for Special Characteristics in the project planning phase are described in section 2.11 – Special Characteristics.

1.10. Sub-supplier Management
(IATF 16949: section 8.4)

Sub-suppliers have a significant impact on the quality of the final product. ZF suppliers shall have a documented supplier management system in place.

ZF suppliers are responsible for the development of their sub-suppliers. They shall have the necessary process, competence and resources to manage their sub-suppliers (including directed-buy suppliers and outsourced processes) and monitor their performance. They shall also ensure that the sub-suppliers comply with all the requirements contained in this directive.

An intent to change a sub-supplier shall be communicated well in advance to ZF. The change of a sub-supplier can only be implemented upon prior approval by ZF. See section 1.11 – Changes to Product or Process. Subsequently, Production Part Approval Process (PPF/PPAP) shall be performed.

ZF reserves the right to participate in audits and assessments of sub-suppliers regarding quality management systems, processes, products etc. jointly with the ZF supplier, ZF’s customers or a third party assigned by ZF. Advance notice will be given. ZF participation in a sub-supplier audit does not absolve the ZF supplier from their responsibility to properly monitor and develop the sub-supplier.

1.10. 次级供应商管理
(IATF 16949:section 8.4)

次级供应商对最终产品的质量影响重大，因此采埃孚的供应商均应具备一套文件化的供应商管理体系。

采埃孚供应商负责开发其次级供应商。他们必须具备必要的过程、生产力和资源来管理其次级供应商（包括指定供应商和外包过程）并监控其绩效。他们还应确保次级供应商遵守本方针中包含的所有要求。

供应商有意向更换其次级供应商时，应提前告知采埃孚。只有经采埃孚事先批准才能进行次级供应商的更换。具体请参阅 1.11 产品及过程变更。变更后，应执行生产零件审批流程(PPF/PPAP)。

采埃孚保留与采埃孚供应商、采埃孚客户或由采埃孚指定的第三方共同参与次级供应商质量管理体系、过程和产品等的审核与评估的权利。参与前将提前发出通知。采埃孚参与次级供应商审核并不免除采埃孚供应商正确监控和开发次级供应商的相关责任。
1.11. Changes to Product or Process  
(IATF 16949: section 8.2.4/8.5.6)

The supplier shall have a documented process to control and implement changes that impact product, product realization and manufacturing process.

A "Change" refers to all situations referenced in AIAG PPAP Manual and/or VDA Volume 2, Trigger matrix of Part history.

The effects of any change, including those changes caused by sub-suppliers, shall be assessed, verified and validated to ensure compliance with ZF requirements prior to implementation. The evidence of risks associated with the change shall be documented and assessed. Any intended change, deviating from the latest PPF/PPAP approval, shall be communicated as soon as possible to ZF to allow for a timely review and approval by ZF.

Suppliers shall submit a written request by sending the designated form to all affected ZF facilities (available for download on the ZF Internet website). The request shall be accompanied by a detailed timeline demonstrating proper change control that identifies necessary safety stock/bank requirements and timing to allow for a timely ZF/Customer approval and validation.

Changes shall not be implemented prior to the receipt of written approval from ZF.

Authorization to ship production material after a change implementation requires a new PPF/PPAP approval.

1.11. 产品及过程变更  
(IATF 16949:8.2.4/8.5.6)

供应商应该建立一个书面化流程，管控和实施对产品、生产和制造过程有影响的变更。

“变更”参照 AIAG PPAP 手册和/或 VDA Volume2，触发矩阵中提到的所有情况。

实施前，各类变更产生的影响，包括由次级供应商引起的变化在内，都应经过评估、核实和认证，以确保符合采埃孚的要求。与变更有关风险的证据应形成文档，并进行评估。任何计划实施的变更若与最新的 PPF/PPAP 批准的内容有偏差，均应尽快通知采埃孚，以便采埃孚及时审核和批准。

供应商应提交书面申请，并将指定表格发送给所有受影响的采埃孚工厂（表格可在采埃孚网站下载）。该申请应随附具体的时间表，列明变更的管控措施，说明必要的安全库存要求和时间节点，以确保采埃孚或客户及时审核和批准。

在收到采埃孚的书面批准前，不得实施任何变更。

变更实施后，生产物料的发运需获得新的 PPF/PPAP 批准。
1. General Requirements / 一般要求

If the change is related to electronic components (particularly semiconductor devices, passive components and LED components), section 5.4 shall be applied.

1.12. Product Safety (IATF 16949: section 4.4.1.2)

Product safety and product liability are particularly significant for companies in the automotive industry. The supplier has producer responsibility (product liability) for their parts and processes, including parts or processes from sub-suppliers, which ZF purchases to build their final products. Therefore, in order to prevent product liability risks, it is the responsibility of the supplier to do everything in their power, in terms of organization and technical matters, to guarantee the product safety.

The supplier shall have a documented process for the management of “product safety” related products and manufacturing processes.

ZF requires their suppliers to designate a Product Safety Representative (PSR) to be in charge of all related tasks described in IATF 16949 section 4.4.1.2.

Furthermore, the supplier shall apply these requirements to their supply chain.

1.13. Business Processes based on Electronic Data Exchange (IATF 16949: section 8.2.1.1)

Business processes based on electronic data exchange between ZF and its suppliers are a main focus of ZF’s strategy. According to this strategy, more and more of the processes which are described in this directive are managed by using the electronic communication platforms of ZF such as “SupplyOn” and “VIN-Vendor Information Network”.

ZF expects suppliers to take the necessary measures to support electronic data exchange with ZF via the above mentioned communication platforms and carry out transactions via ZF’s web based applications and communications. Suppliers are responsible for maintaining up to date contact information in the Vendor Information Network – Supplier Master and on SupplyOn Business Directory.

如果变更涉及电子元件（特别是半导体器件、被动元件和 LED 元件），具体操作请参见 5.4 节。

1.12. 产品安全 (IATF 16949:4.4.1.2)

产品安全和产品责任对于汽车行业尤其至关重要。采埃孚从供应商处采购，进行制造最终产品。供应商对自身及次级供应商提供的零件和工艺负有生产商责任（产品责任）。因此，为了避免产品责任风险，供应商有责任在组织和技术方面尽一切努力保证产品的安全性。

供应商应建立书面化流程，管理与产品和制造工艺相关的产品安全事项。

采埃孚要求所有供应商任命一名产品安全负责人（PSR），全权负责 IATF 16949: 4.4.1.2 下列出的所有相关任务。

此外，供应商还应在自身的供应链贯彻这些要求。

1.13. 基于电子数据交换的业务流程 (IATF 16949:8.2.1.1)

采埃孚与其供应商之间基于电子数据交换的业务流程是采埃孚战略的一大重点。根据此项战略，本方针中描述的流程应逐渐通过采埃孚的电子沟通平台管理，如“SupplyOn”和“VIN 供应商信息网络”等。

采埃孚希望供应商能采取必要的措施，通过上述沟通平台与采埃孚进行电子数据交换，并通过采埃孚网站的应用程序和沟通完成交易。供应商有责任及时更新平台上的联系信息——供应商信息网络中的供应商主数据和 SupplyOn 的企业名录。
All suppliers shall access the ZF communication platform frequently to stay up to date.

1.14. Communication with ZF Customers  
(IATF 16949: section 8.2.1)  
ZF expects suppliers to be available for technical support within the context of discussions at customers, on their own premises, or at ZF.

Communication concerning ZF products between the supplier and customers of ZF shall exclusively take place in agreement with ZF.

1.15. Contingency Plans  
(IATF 16949: section 6.1.2.3)  
Suppliers shall identify and evaluate internal and external risks to all manufacturing processes and infrastructure equipment which are essential to maintain production output and ensure that ZF requirements are met.

Suppliers shall develop a contingency plan for each supplier manufacturing/shipping location which may disrupt product flow to ZF.

ZF shall be informed immediately in the event of an actual disaster (e.g. interruption from externally provided products, services, recurring natural disasters, fires ...). In this case, suppliers shall provide ZF access to ZF's tools and/or their replacements.

Suppliers are required to regularly review and update each contingency plan, at a minimum annually. The contingency plan should include comprehensive testing of the recovery actions and should address potential gaps in component/raw materials. The implementation of any change concerning these contingency plans shall be documented and is subject to the change management process (see section 1.11 – Changes to Product or Process).
1.16. Control of Reworked and Repaired Products
(IATF sections 8.7.1.4/8.7.1.5)

For rework and repair of products, the supplier shall have a documented process and conduct a risk analysis (e.g. FMEA).

Any repair or rework not included in the agreed Control Plan during the PPF/PPAP phase is considered as a process change according to section 1.11 – Changes to Product or Process.

ZF shall be notified via the requested form “Deviation Request”. See section 4.5.

Written ZF approval is required prior to implementation.

1.17. Disposition of Nonconforming Products
(IATF 16949: section 8.7)

The supplier shall have a documented process for disposition of nonconforming products not subject to rework or repair.

For product not meeting requirements, the supplier shall verify that the product to be scrapped is rendered unusable prior to disposal, unless otherwise agreed with ZF.

Any component produced for supply to ZF, not sent directly to ZF or an authorized third party shall be destroyed in-house prior to recycling in order to make sure that the component may never be used in the intended application – unless otherwise agreed with ZF. This includes scrap, parts produced during production trials, engineering sampling, and all setup and inspection pieces.

The supplier shall not divert nonconforming product to service or other use without prior ZF approval.

1.16. 返工及返修产品控制
(IATF 8.7.1.4/8.7.1.5)

对于产品的返工和返修，供应商均应建立一个书面化流程，并执行风险评估（例如：FMEA）

根据1.11产品和过程的变更小节，PPF/PPAP阶段内任何不包括在已约定的控制计划中的返修和返工都将被视为过程变更。

供应商应提交“偏差申请”表格，通知采埃孚，参见4.5节。

获得采埃孚书面同意后方可实施。

1.17. 不合格品处置
(IATF 16949:8.7)

供应商应建立一个书面化流程，处理无需返工和返修的不合格品。

除非与采埃孚另有约定，供应商在处理不符合要求的产品前，应先核实其可用性进行。

除非与采埃孚另有约定，任何为采埃孚生产的零件，如不直接送至采埃孚或经授权的第三方，应在回收之前在内部销毁，以防止用于原定的制造工序中。这包括试生产期间、工程样件以及所有的调试和检验中产生的报废零件。

未经采埃孚批准，供应商不得将不合格品转用于服务或其他用途。
Suppliers shall guarantee conformance to this practice and shall guarantee that any and all sub-suppliers will conform to this practice. Evidence of communication of this policy to sub-suppliers shall be retained and presented to ZF when requested.

1.18. Escalation Model “Supplier/Purchased Parts”

Suppliers providing ZF with products and services that do not meet quality, delivery, or planning commitments and expectations are subject to enrollment in the escalation process to expedite improvement actions and visibility.

The ZF Escalation Policy is available for review on the ZF Internet website. Questions regarding the interpretation of this policy and the application therein shall be directed to the ZF receiving plant.

1.19. Lessons Learned (IATF 16949: section 6.1.2.1/7.1.6/10.3)

Supplier shall have a process to document and share knowledge, generally gained by experience within the organization.

For realizing an efficient product and process development process, the supplier shall consider at a minimum knowledge gained out of former projects, customer claims, recall actions, supplier complaints, change and deviation requests, audits, rework, repair and scrap. The supplier shall review and apply the Lessons Learned as a first step in the project. This process shall keep the focus on avoiding defects instead of detecting defects in the entire supply chain. The effectiveness is proven by continuous improvement of the production process reliability, supply quality and delivery performance.

供应商应保证遵守本项规定，并确保其所有次级供应商也均遵守本项规定。供应商向次级供应商传达本项规定时应留存证据，在采埃孚要求时需能提供此证据。

1.18. “供应商/采购零件”升级模型

如供应商向采埃孚提供在质量和交付方面与要求或期望不符的产品和服务，将被列入升级流程，以加快改善行动和透明度。

有关采埃孚升级政策，详情请见采埃孚网站。关于此项政策及其应用的疑问，应直接发送至采埃孚接收工厂。

1.19. 经验教训

(IATF 16949:6.1.2.1/7.1.6/10.3)

供应商应建立一套流程，在公司内记录并分享获得的经验教训。

为制定一套行之有效的产品和过程开发流程，供应商应至少采纳从往期项目、客户索赔、召回、供应商投诉、变更及偏差申请、审核、返工、返修和报废中获取的经验知识。作为实施项目的第一步，供应商应首先评审和应用获得的经验教训。本流程的重点是防止在供应链上产生缺陷，而不是发现缺陷。生产过程的可靠性、供货质量和交付的持续改进都是本流程有效性的评估依据。
1.20. **Retention Periods**  
(IATF 16949: section 7.5.3.2.1)  
The supplier shall define and maintain retention periods for documents, records and reference samples.

The applicable retention periods depending on the nature of the relevant documents and type of industry are described in the following standards:

**Automotive Industry**  
- IATF (section 7.5.3.2.1) – Record Retention  
- VDA 1 – Information Management, Documentation Control and Archiving  
- AIAG (6) – Record Retention

A ZF summary of the recommended minimum retention periods for the Automotive Industries is available for review on the ZF Internet website.

**Non-Automotive Industry**  
For some Non-Automotive businesses (such as Marine, Railway, Wind Power, Aviation and Military) these requirements may vary from the automotive standards described above.

In light of the limitation periods of product liability claims, retention periods up to 30 years are recommended.

These regulations and this summary do not replace legal requirements.

1.21. **Marking of Customer’s Property**  
(IATF 16949: section 8.5.3)  
All tools for manufacturing, testing or inspection equipment belonging to ZF or customers of ZF shall be permanently marked to clearly show that they are property of ZF or of the customer of ZF. These tools shall only be used for ZF products unless an authorization in writing exists. Failure to comply with tool identification requirements will result in delay or non-payment.

1.20. 保留期限  
(IATF 16949:7.5.3.2.1)  
供应商应定义并维护文件、记录和参考样本的保留期限。

下列标准描述了适用的保留期限，保留期限取决于相关文件的性质和行业类型：

**汽车行业：**  
- IATF (7.5.3.2.1) -- 记录保留期限  
- VDA 1-- 信息管理、文件管理和归档  
- AIAG (6)-- 记录保留期限

采埃孚有关汽车行业建议最短保留期限的要求可在采埃孚网站上查阅。

**非汽车行业**  
对于一些非汽车业务（如船舶、铁路、风力发电、航空和军事），保留期限的要求可能与上述汽车行业标准有所不同。

鉴于产品责任索赔的时效期限，建议保留期限最长为 30 年。

这些规定和本摘要并不取代法律规定。

1.21. **客户财产标识**  
(IATF 16949:8.5.3)  
所有属于采埃孚或采埃孚客户的，用于制造、测试或检验设备的工装应永久标识，以清楚表明它们是采埃孚或采埃孚客户的财产。除非有书面授权，这些工装只能用于采埃孚产品。违反工装识别要求将导致延迟或不付款。
1.22. Customer Specific Requirements
(IATF 16949: section 4.3.2)
Suppliers are expected to comply with specific requirements of ZF customers.

General customer specific requirements are already included in this directive and shall be implemented.

Additional customer specific requirements issued by ZF customers will be communicated on a project basis. Their application will be subject to an agreement between ZF and the supplier.

1.22. 客户特殊要求
(IATF 16949:4.3.2)
供应商应遵守采埃孚客户的特殊要求。

常规的客户特殊要求已包含在本方针中，并应予以实施。

采埃孚客户提出的追加特殊要求将在项目基础上进行沟通。这些要求的应用将遵守采埃孚和供应商之间的协议。
2. APQP Advanced Product Quality Planning

APQP 产品先期质量策划

(IATF 16949: section 8.1)

ZF’s objective is to involve suppliers in quality planning for a new project at the earliest possible stage. ZF always requires systematic planning from our suppliers in the context of project management according to VDA Volume Material Level Assurance (Product Creation – Maturity Level Assurance for New Parts), or AIAG APQP, provided ZF does not stipulate another procedure. This planning applies both to the parts made by the supplier as well as to the supplier’s purchased parts.

ZF shall be notified of the project manager and the project team.

For the respective part and/or project, the supplier shall, at a minimum, implement the planning steps specified below (see sections 2.1 to 2.35). Each section describes a necessary planning item (APQP element). If not otherwise specified by ZF, all of these requirements are mandatory.

Feedback shall be provided by means of the requested form, available for download on the ZF Internet website and/or the communication platforms supported by ZF, unless otherwise specified by ZF.

For parts produced and purchased by the supplier (raw materials, external processing, sub-suppliers), a status shall be drawn up which represents the individual evaluations in summary and puts emphasis on individual critical items.

Project-specific requirements which go beyond the contents of this Quality Directive will be agreed between ZF and the supplier.

2.1. Supplier Readiness

The early recognition and avoidance of quality risks is a key success factor for a flawless launch and stable serial supply. ZF reserves the right to determine components of increased risk or special priority and initiate a supplier readiness program for these components. The program shall be carried out by the supplier in cooperation with ZF. Content and procedures are described in the “ZF Supplier Readiness Directive” available for review on the ZF Internet website.

(IATF 16949: 8.1)

采埃孚的目标是让供应商尽早参与到新项目的质量规划中。采埃孚始终要求供应商在采埃孚没有规定其他流程的情况下在项目管理中根据 VDA 批量材料等级保证（产品创新——新零件成熟度保证）或 AIAG APQP 制定系统性计划。供应商生产及采购的零件均应依据此要求制定计划。

供应商应通知采埃孚，项目经理和项目团队的信息。

对于各零件和/或项目，供应商至少应实施以下计划步骤（见 2.1 到 2.35）。每个小节规定了一个必要的计划事项（APQP 要素）。除非采埃孚另有规定，其中所有内容均为强制性要求。

除非采埃孚另有规定，应通过规定表格（可在采埃孚网站下载）和/或采埃孚支持的沟通平台提供反馈。

对于由供应商生产和购买的零件（原材料、外加工、次级供应商），应制定一个总结单个评估的状态，并强调个别关键项目。

本质量方针以外的特定项目要求由采埃孚和供应商协商决定。

2.1. 供应商准备

尽早发现和避免质量风险是实现顺利投产和稳定连续供应的关键因素。采埃孚保留确定高风险或特殊优先级的组件的权利，并启动这些组件的供应商准备计划。供应商应与采埃孚合作执行该计划。可在采埃孚网站查看“采埃孚供应商准备方针”的内容和流程。
2.2. Early Supplier Involvement
Depending on the project, ZF will seek to involve their suppliers at an early stage to carry out a simultaneous engineering. ZF expects their suppliers to actively participate in these simultaneous engineering activities if invited by ZF.

In such a case, a simultaneous engineering process shall be carried out, involving both ZF and the supplier. A list of necessary activities shall be created, with a clear responsibility for the supplier or for ZF. Commitment to implementation of these activities shall be documented and confirmed. The final result will be assessed by ZF for approval.

2.3. Lessons Learned/Knowledge Transfer
(IATF 16949: section 7.1.6)
Prior to filling out the feasibility study, the supplier shall take all the relevant lessons learned and knowledge from previous or similar projects into consideration according to section 1.19 – Lessons Learned.

2.4. Feasibility Study
(IATF 16949: section 8.2.3)
The supplier shall analyze all technical documents (e.g. drawing, specifications, environment, statement of work, commodity specific and customer specific requirements …) as well as the Purchasing Terms & Conditions and this Quality Directive as part of a contract review.

The requirements are to determine and confirm:
• the feasibility of the design (for suppliers with design responsibility),
• the ability to manufacture,
• the ability to measure, achieve and sustain process capability for special characteristics.

We expect our suppliers to determine improvements in design, process and costs.

2.2. 供应商早期参与
根据具体项目，采埃孚将努力让供应商在早期阶段进行同步工程，希望受到邀请的供应商能积极参与到同步工程活动中。

在这种情况下，采埃孚和供应商应共同执行同步工程流程，制定必要工作清单，明确划分供应商和采埃孚的责任，同时记录并确认执行这些工作的承诺。最终结果将由采埃孚评估并批准。

2.3. 经验教训/知识传递
(IATF 16949:7.1.6)
开展可行性研究之前，供应商应根据 1.19 经验教训小节考虑之前或相似项目中所有相关的经验教训和知识。

2.4. 可行性研究
(IATF 16949:8.2.3)
在合同审查中，供应商应分析所有技术文件（例如图纸、规范、环境、工作说明、物料组和客户的特殊要求……）、采购条款和条件以及本质量方针。

需要确定和确认的要求包括：
• 设计可行性（如果供应商负责设计）
• 制造能力
• 特殊特性的测量、实现和保持过程性能的能力。

我们希望供应商能确定设计、流程和成本上的改善。
In this context, ZF also expects that the supplier considers issues such as packaging and shipping.

For each part, all potential suppliers shall submit a signed Feasibility Study form (available for download on the ZF Internet website) along with the quote, prior to sourcing and awarding of the contract. This is a prerequisite and does not guarantee award of business.

Prior to final sourcing award, ZF reserves the right to conduct a joint detailed technical review/verification with appropriate supplier representatives.

The submission of the feasibility study shall be accompanied by a Capacity Confirmation, if requested by ZF. Whenever there is a product or process change on existing business, the feasibility study shall be checked and confirmed. The confirmed feasibility study shall be a part of all part approval reports.

2.5. **Planning Contents**
(IATF 16949: section 8.1.1)
ZF shall be notified of detailed activity planning by means of the requested forms (available on the ZF Internet website) and/or via ZF’s communication platforms.

2.6. **Project Plan**
(IATF 16949: section 8.1)
The supplier creates a project plan based on the ZF specified project milestones and submits it to ZF. This schedule shall also indicate the dates that need to be complied with by returning the requested forms (available for download on the ZF Internet website) and/or by entering the requested planning data in information exchange platforms supported by ZF.

The supplier shall report on a regular frequency specified by ZF.
2.7. Product Description  
(IATF 16949: section 8.2.2)

Product description starts at a very early stage of the sourcing process (before the APQP phase) to ensure that all requirements from ZF and ZF’s customer are captured and included in all relevant documents (e.g. technical specifications, drawings, internal standards …).

All issues identified during the product description process will be tracked by means of an agreed action plan.

Dimensions not described in the 3D data models (if applicable) but necessary from a production engineering point of view (e.g. runner locations, parting lines) shall always be determined, specified and agreed with ZF in order to avoid interferences and problems with manufacturing and assembly.

2.8. Development Interface Agreement (only for Suppliers with Design Responsibility)

If required, ZF will ensure a project-specific clarification of the development related tasks and responsibilities. This is done by means of a “Development Interface Agreement”, available on the ZF Internet website. This document shall be filled in by ZF and the supplier with design responsibility. It shall be agreed upon by both parties.

2.9. Field Failure Analysis/No Trouble Found  
(IATF 16949: section 10.2.5/10.2.6)

For complaints from the field, the supplier has to plan a methodic analysis according to VDA Volume “Joint Quality Management in the Supply Chain – Marketing and Service – Field Failure Analysis”. The No Trouble Found process is part of this volume.

2.10. Quality Objectives  
(IATF 16949: section 6.2)

For measurement and evaluation of the achieved quality, internal project/product related quality objectives shall be defined by the supplier. The supplier shall monitor the KPIs at all times to meet the quality objectives set by ZF.
2.11. Special Characteristics
(IATF 16949: section 8.3.3.3)
Special Characteristics as well as their relevance and importance are defined in section 1.9 – Special Characteristics.

The supplier shall identify and mark them in all relevant product and process documents, such as drawings, FMEA, risk analyses, work instructions, control plans and ZF specific documents such as the Product Characteristic Matrix, Series Control Special Characteristics, etc.

These characteristics require particular consideration including capable processes, error proofing, special controls and monitoring in all relevant planning steps as described in the "Regulation of Special Characteristics (SC) within the ZF Group" (available for review on the ZF Internet website).

Concerning the verification management documents for Special Characteristics, the extent of the retention period to be applied needs to be defined in accordance with the requirements described in section 1.20 – Retention Periods.

2.12. Safe Launch Plan
The supplier shall agree upon a Safe Launch Plan prior to the PPAP run, using the requested form (available for download on the ZF Internet website).

For details, refer to section 4.4 – Safe Launch. A more in depth description of the Safe Launch Process can be accessed for review on the ZF Internet website.

2.13. Process Flow Chart
(IATF 16949: section 8.3.5.2)
The supplier shall provide a Process Flow Chart for the entire process chain from receiving inspection to packaging and shipping. This process flow chart shall be presented to ZF for common review. FMEA and Control Plan shall align with Process Flow Chart.

2.11. 特殊特性
(IATF 16949:8.3.3.3)
特殊特性及其关联性和重要性由 1.9 特殊特性小节规定。

供应商应在所有相关产品和过程文件中识别并标记这些特殊特性，包括图纸、FMEA、风险分析、作业指导、控制计划以及采埃孚特定的文件，例如：产品特性矩阵、量产控制特性等。

这些特性需要用下列方式来管控，包括过程能力、防错、特殊控制以及监控“采埃孚集团特殊特性（SC）规范”（可在采埃孚网站查看）中的相关计划步骤。

对于特殊特性的确认管理文件，保存期应遵守 1.20 保留期限的要求。

2.12. 安全投产计划
供应商应在实施生产件批准程序之前使用规定表格（可在采埃孚网站下载）制定安全投产计划。

详情请参见 4.4 安全投产。关于安全投产流程的更多说明，可在采埃孚网站查看。

2.13. 过程流程图
(IATF 16949:8.3.5.2)
供应商应提供从到货检验到包装和运输的整个过程链的过程流程图。流程图应提交给采埃孚共同审查。失效模式与影响分析和控制计划应与过程流程图相符。
2.14. Operation Plan
(IATF 16949: section 8.3.5.2)

An Operation Plan shall be completed for all single components and assemblies. It shall include all information on process steps, internal/external transport, means of transportation, as well as the machines and operating materials to be used. Necessary drawings e.g. for production stage, raw part as well as process descriptions, shall be issued.

2.15. Product and Process FMEA
(IATF 16949: section 8.3.5.2)

The Failure Mode & Effects Analysis (FMEA) shall be carried out to examine possible risks and their evaluation regarding severity, probability of occurrence, and the possibility of detection.

These risks shall be minimized by introducing appropriate measures.

The FMEA is thus an important instrument for preventing defects. The FMEA shall be carried out in a timely manner, so that the results and measures to be taken can still be incorporated into planning.

A FMEA shall be used for all phases of the product life cycle, such as design, production, assembly, packaging, transport, customer usage, as well as recycling and waste disposal.

The FMEA shall be used as a continuous improvement tool.

FMEAs shall be developed and/or revised in the following cases, e.g.:
- development/production of new parts
- introduction of new manufacturing methods
- relocation of plants
- drawing changes
- process changes
- if defects occur
- lessons learned

Product (Design) FMEA

Product FMEA shall be completed for all parts which are being designed within the responsibility of the supplier. Upon request by ZF, Product FMEA shall be presented to ZF.

2.14. 制造计划
(IATF 16949:8.3.5.2)

所有的单个组件和配件都应制定制造计划。其中应包括关于过程步骤、内/外运输、运输方式以及所用设备和操作材料的所有信息。应发布必要的图纸，例如：用于生产阶段的毛坯件和过程描述的图纸。

2.15. 产品和过程失效模式与影响分析
(IATF 16949:8.3.5.2)

应进行失效模式和影响分析（FMEA）以验证可能的风险并评估其严重性、发生概率以及检测到的可能性。

并采取适当措施将这些风险降至最低。

因此失效模式和影响分析是预防不合格品的重要手段。失效模式和影响分析应及时进行，从而能在计划中考虑到其结果和措施。

失效模式和影响分析应在产品生命周期的所有阶段使用，例如设计、生产、装配、包装、运输、客户使用以及回收和废弃物处理。

失效模式和影响分析应当作为一项持续性改善工具。

在以下情况下应制定和/或修改失效模式和影响分析：
- 开发/生产新零件
- 引入新的生产方式
- 工厂搬迁
- 图纸更改
- 过程更改
- 出现不合格品
- 经验教训

产品（设计）失效模式和影响分析

供应商负责设计的所有零件都应进行产品失效模式和影响分析。采埃孚要求时，应将产品失效模式和影响分析提交给采埃孚。
Process FMEA
Process FMEA shall be completed for all process steps of a component. In particular, the results of the process FMEA and the special characteristics shall be taken into consideration as basis for the Control Plan. Upon request by ZF, Process FMEA shall be presented to ZF. The following topics shall be considered:

Failure simulation along the FMEA (Product and Process)
The identified failure modes within the FMEA shall be simulated on the shop floor after industrialization of the production process in order to verify if the failures are detected. Additional failure modes and other potential causes shall be identified and integrated into the FMEA.

Material mix-up
The complete process chain during production, including the processes of the sub-suppliers, shall be analyzed for risk potential concerning the mix-up of material. All necessary actions shall be taken in order to eliminate the risk of material mix up (e.g. implementation of efficient interlocking systems).

Management of part variants
A system shall be implemented which eliminates the risk of a mix-up of similar looking parts.

Control of scrap parts, rework parts, setup parts and reference parts
This includes, in particular, the prevention of the mixing of suspect parts with good parts in special situations such as machine crashes, machine stoppage and restart.

Technical cleanliness
Technical cleanliness shall be implemented in the FMEA based on the specific requirements. The sub-suppliers, machine manufacturers and service providers have to be considered as well.

Process失效模式和影响分析
过程失效模式和影响分析应覆盖组件的所有过程步骤。特别是，过程失效模式和影响分析的结果和特殊特性应作为控制计划的基础。采埃孚要求时，应将过程失效模式和影响分析提交给采埃孚。

以下内容应考虑在内；

失效模式和影响分析中的故障模拟（产品和过程）
生产过程大规模实施之后，应在车间对失效模式和影响分析中找出的失效模式进行模拟，以确认是否检测到故障。还应找出其它的失效模式和潜在原因，并加入到失效模式和影响分析中。

材料混料
应分析包括次级供应商过程在内的整个生产过程链，找出与混料有关的潜在风险。应采取所有必要措施消除混料的风险（例如实行有效的链锁系统）。

零部件管理
应实施可消除相似零件混合风险的系统。

报废件，返工件，调试件和参考件控制
其中特别包括防止可疑零件与良品在设备碰撞，故障和重启等特殊情况下混合在一起。

技术清洁度
失效模式和影响分析中应按照具体要求实施技术清洁。次级供应商，设备制造商和服务供应商也必须考虑在内。
The product and all processes shall be designed so that all the requirements are fulfilled.

**By pass/Skip Process**

A system shall be designed and implemented to ensure that each process step can only be started if the previous one has been successfully completed.

**Lessons Learned**

All lessons learned from similar processes and products shall be taken into account for the new project. Among other things, lessons learned documentation, records of all internal and external complaints, 8D reports, as well as preceding FMEA's shall be considered. Lessons Learned of sub-supplier's issues have to be taken into account as well.

**FMEDA (Failure Mode Effect and Diagnostic Analysis)**

If requested by ZF, the SFF (Safe Failure Fraction) for electrical/electronic/programmable electronic safety-related systems shall be determined by the FMEDA based on the IEC DIN EN 61508-2. ZF shall be notified in written form about risks in the safety related system.

**Assessment**

An assessment of the FMEA process shall be performed. according to the international standards of VDA and AIAG or by means of the FMEDA checklist (available for review on the ZF Internet website).

**Implementing measures**

Risks which are identified with the help of a FMEA shall be minimized by taking appropriate measures. To implement the measures, target dates and responsibilities shall be assigned in such a way that the measures can be taken before the start of production. The measures introduced shall be re-evaluated regarding their effectiveness. ZF shall be informed immediately about any necessary design modifications.

2.16. **Test Planning/Development Release**

(IATF 16949: section 8.3.4.2)

Suppliers with responsibility for product design shall create and execute a plan, according to which the design (development results) will be tested to ensure that it meets the design specifications. This plan shall contain, among other things, information on the date, type, extent of the validation type, quantity of samples, etc. The difference between planning and realization (gap analysis) shall be evaluated.

产品和所有流程的设计应满足所有要求。

**旁路/跳过过程**

系统的设计和实施应确保只有在成功完成前一个过程步骤的情况下才能开始下一个。

**经验教训**

新项目应考虑到相似过程和产品的经验教训。除其它方面外，还应考虑经验教训文件、所有内外部投诉记录、8D 报告以及之前的失效模式和影响分析。次级供应商提出的经验教训也必须考虑在内。

**FMEDA（失效模式影响和诊断分析）**

如果采埃孚要求，应根据 IEC DIN EN 61508-2 通过失效模式影响和诊断分析确定电子/电气/可编程电子安全相关系统的 SFF（安全失效系数）。安全相关系统风险应以书面形式通知采埃孚。

**评估**

应根据 VDA 和 AIAG 国际标准或失效模式和影响分析检查表（可在采埃孚网站查看）对失效模式和影响分析过程进行评估。

**实施措施**

应采取适当措施尽可能降低失效模式和影响分析发现的风险。为实施这些措施，应确定目标日期并划分责任，使其能在生产开始前实行。对所采取措施的有效性应进行再次评估。如需做出任何设计修改，应立即通知采埃孚。

2.16. **测试计划/开发放行**

(IATF 16949:8.3.4.2)

负责产品设计的供应商应根据要测试的设计（开发结果）制定并执行计划，以确保其满足设计规范。计划应包括日期、类型、验证类型范围、样本数量等信息，还应评估计划和现实的差异（差距分析）。
2. APQP Advanced Product Quality Planning / APQP 产品先期质量策划

The development release shall be confirmed using the requested form (available for download on the ZF \textit{Internet website}), unless otherwise specified by ZF.

2.17. Control Plan

(IATF 16949: section 8.5.1.1)

The control plan presents a planning tool for preventive process security. It is implemented by a team through systematic analysis of production, assembly and test processes. This team should be made up of employees from Planning, Manufacturing and Quality Assurance as well as other related departments.

The results of product and process FMEAs, experiences with similar processes and products, as well as the application of improvement methods shall be taken into consideration in the control plans.

In the product development process, the control plan shall be created for the phases of pre-series production, safe launch and series production.

A control plan for prototypes shall be created if required by ZF.

For special characteristics, the sample plan frequency shall be based on quantity, e.g. 5 pieces out of 50. The “Layout Inspection and Functional Testing/Annual Revalidation” shall be included in the Control Plan. For more information, refer to section 4.3.

A detailed description of the process for preparing a control plan is included in VDA Volume 4 and in AIAG APQP.

除非采埃孚另有规定，开发放行应使用规定表格（可在采埃孚网站下载）进行确认。

2.17. 控制计划

(IATF 16949:8.5.1.1)

控制计划是预防性保证过程受控的计划工具，由团队通过对生产、装配和测试过程的系统分析加以实施。这支团队应由计划、制造和质量保证以及其它相关部门的员工组成。

控制计划应考虑到生产和过程失效模式和影响分析的结果、相似过程和产品的经验以及改善方式应用。

在产品开发过程中，应当为小批量生产、安全投产和批量生产阶段制定控制计划。

如果采埃孚要求，应为原型样件制定控制计划。

对于特殊特性，样本计划频率应基于数量，例如 50 取 5。控制计划应包括“全尺寸检验和功能测试/年度重新验证”。更多信息请参见 4.3 节。

制定控制计划的详细流程请见 VDA Volume 4 和 AIAG APQP。
2.18. Release of Product and Process Development
(IATF 16949: section 8.3.5)
The supplier shall evaluate and document its releases for individual stages of product and process development.

The results of these evaluations at each stage shall be described in the requested planning documents (available for download on the ZF Internet website).

2.19. Coordination of Production Control
(IATF 16949: section 8.5.1)
As a basic principle, all product and process characteristics are important and shall be complied with.

Special characteristics require the proof of process capability. For this purpose the supplier shall monitor these characteristics with suitable methods, e.g. with statistical process control (SPC).

If process capability cannot be achieved, 100% inspection shall be carried out.

Special characteristics which are not measurable or only measurable by destroying the product shall be monitored and documented with suitable methods. Test intervals and the size of random samples shall be determined and planned. Planned monitoring of the characteristics in series production shall be agreed with ZF. This information shall be documented in the Control Plan.

2.20. Planning and Procurement of Plant, Tools, Fixtures and Equipment
(IATF 16949: section 7.1.3.1)
All plant, facilities, tools, fixtures and equipment necessary for manufacturing are to be planned and procured to meet the contracted volume. They shall be in place, at the latest, by the initial sampling date.

All other equipment, as well as internal and external means of transport, shall also be taken into consideration.

2.18. 产品和过程开发的放行
(IATF 16949:8.3.5)
供应商应评估并记录产品和过程开发每个阶段放行的结果。

每个阶段的评估结果应记录在规定的计划文件中（可在采埃孚网站下载）。

2.19. 生产控制协调
(IATF 16949:8.5.1)
作为一项基本原则，所有产品和过程特性都非常重要，应当严格遵守。

特殊特性需要过程能力证明。为此，供应商应当以合适的方式监控这些特性，例如统计过程控制（SPC）。

如果加工能力不满足要求，应执行100%检验。

无法测量或只能通过破坏产品测量的特殊特性应当以合适的方式监控和记录。应确定和计划测试间隔和抽样数量。

批量生产中计划的特性监控，应征得采埃孚的同意。该信息应记录在控制计划中。

2.20. 工厂、工装、夹具和设备的规划与采购
(IATF 16949:7.1.3.1)
生产所需的所有工厂、设施、工装、夹具和设备的计划和采购都要符合合同规定的数量，且最迟在初始样件交样前到位。

所有其它设备以及内外部运输方式也应考虑在内。
2.21. **Cleanliness**  
(IATF 16949: section 8.2)
Based on the specific requirements, all types of contamination and their sources across the entire process chain must be considered in the FMEA. Alternatively, a specific cleanliness FMEA may be conducted by the supplier. The sub-suppliers, machine manufacturers and service providers must be considered as well.

The product, packaging and all processes (storage, handling, transportation …) shall be designed in such a way that dirt emergence, dirt accumulation, dirt trailing and contamination are avoided.

The use of harmful material with potential to impact the planned application shall be reported and requires an approval by ZF.

2.22. **Inspection planning**  
(IATF 16949: section 8.5.1)
Based on the control plan, the supplier shall create an inspection plan, which includes all characteristics to be inspected with the appropriate inspection equipment for each operation. In addition, the inspection frequency and type of documentation of the results shall be defined in the inspection plan.

2.23. **Planning and Procurement of Inspection Equipment**  
(IATF 16949: section 7.1.5.1)
The supplier determines the inspection method with the appropriate inspection equipment for all characteristics, shown on e.g. drawing, standards, specifications, etc. The procurement process shall be planned so that the necessary inspection equipment is available by the time of PPF/PPAP submission and suitability of the inspection process has been verified. External inspection and testing by service providers need to be planned as well. External service providers shall be accredited according to ISO/IEC 17025 or comparable national standards.

The verification shall be carried out according to the requirements of VDA Volume 5 or AIAG MSA. In addition to the MSA results, ZF may request or conduct an alignment of measurements in selected cases.

2.21. **清洁**  
(IATF 16949:8.2)
根据具体要求，失效模式和影响分析必须考虑到整个过程链上所有类型的污染及其来源。或者供应商也可以进行特定的清洁失效模式和影响分析。次级供应商、设备制造商和服务供应商也必须考虑在内。

产品、包装和所有过程（存储、处理、运输……）的设计都应当避免污垢的产生、积聚、蔓延以及污染。

如需使用可能影响计划应用的有害材料，应报告给采埃孚并获得批准。

2.22. **检验计划**  
(IATF 16949:8.5.1)
供应商应根据控制计划制定检验计划，覆盖到每项操作中所有需要采用合适的检验设备进行检验的特性。此外，检验频率和结果记录方式也应在检验计划中规定。

2.23. **检验设备的规划与采购**  
(IATF 16949:7.1.5.1)
供应商为图纸、标准、规范等所示所有特性制定检验方法和合适的检验设备。应为采购过程制定计划，以保证必要的检验设备在提交 PPF/PPAP 时到位，并确认检验过程是否合适。服务供应商提供的外部检验和测试也要制定计划。外部服务供应商应获得 ISO/IEC 17025 或等效国家标准认证。

验证应根据 VDA Volume 5 或 AIAG MSA 的要求进行。除了 MSA 的结果，采埃孚还可能在特定案例中要求或执行测量校准。
2.24. Capability studies
(IATF 16949: section 8.3.5.2/9.1.1.1)
The supplier shall agree to conduct the machine capability study and process capability study according to one of the automotive standards VDA Volume 2, VDA Volume 4 or AIAG book SPC. The following explanation is according to VDA. Please note the alternative definition in AIAG.

Minimum requirements for capability indices:
- Machine capability/short-term process capability Cm/Cmk 1.67
- Preliminary process capability Pp/Ppk 1.67
- Process capability/long-term process capability Cp/Cpk 1.33

Deviating requirements will be agreed by ZF with the supplier.

Machine capability study/short-term capability
The machine capability studies shall be planned in such a way that all verifications are available no later than at the time of the PPF/PPAP submission.

Preliminary process capability study
The evaluation of preliminary process capability studies shall be presented from at least 25 sub-groups, each consisting of 5 samples, unless otherwise agreed with ZF.

For attributive inspection, sample size is minimum 300 consecutive pieces, unless otherwise agreed between ZF and the supplier.

Containment, generally either 100% sorting or some form of mistake proofing, shall continue until such time that the process Ppk demonstrates preliminary capability unless otherwise agreed with ZF.

2.24. 能力研究
(IATF 16949:8.3.5.2/9.1.1.1)
供应商应同意根据汽车标准 VDA Volume 2, VDA Volume 4 或 AIAG 手册 SPC 其中之一进行设备能力研究和过程能力研究。以下说明基于 VDA。请注意 AIAG 中的另一种定义。

能力指数最低要求：
- 设备能力/短期过程能力 Cm/Cmk 1.67
- 初始过程能力 Pp/Ppk 1.67
- 过程能力/长期过程能力 Cp/Cpk 1.33

如出现偏差，将由采埃孚和供应商共同决定

设备能力研究/短期能力
应进行设备能力研究，并确保所有验证都在提交 PPF/PPAP 之前获得。

初始过程能力研究
除非与采埃孚另外达成一致，初始过程能力的评估，至少 25 个子组，每个子组包含 5 个样本。

除非采埃孚和供应商另外达成一致，对于计数型项目的检查，样本数量至少为 300 个连续工件。

除非与采埃孚另外达成一致，一般 100%检查或者防错手段的控制，应持续到过程 Ppk 被证明满足 ZF 的初始能力要求。
Process capability study/Long-term process capability
The long-term process capability study shall be submitted to ZF as soon as it can be determined according to above mentioned requirements. Furthermore the results of the process capability study shall be submitted upon request.

Centered production
Centered production shall be the target for characteristics which can be adjusted. In case of noncapable processes, 100% inspection/sorting or some form of mistake proofing shall continue until such time that the process Cpk demonstrates long term capability.

The measurement uncertainty shall be deducted from the specification limits in the following cases:

- For features/characteristics which do not have process capability and therefore require 100% inspection
- For processes which demonstrate sufficient process potential (Cp/Pp), but where the process is not centered and cannot be adjusted (e.g. stamping)

2.25. Planning of Preventive and Predictive Maintenance
(IATF 16949: section 8.5.1.5)
To ensure the delivery capability, a system for preventive and predictive maintenance on production equipment and tooling shall be developed.

A maintenance plan shall be set out which includes the maintenance intervals and the extent of the maintenance.

Consistent execution shall be documented in writing. In addition to defining preventive maintenance intervals, a contingency plan shall be established for all processes that can influence the ability to deliver. These are e.g. machines with capacity constraints and special tools.

2.25. 预防与预测性维护计划
(IATF 16949: 8.5.1.5)
为保证交付能力，应当为生产设备和模具开发预防和预测性维护系统。

制定维修保养计划，包括维修保养间隔和范围。

书面记录执行过程。除了规定预防性维护的间隔，还应为所有影响交付能力的过程制定应急计划。例如有产能限制的设备和特殊工装。
2.26. Status of Sub-suppliers and Purchased Parts
(IATF 16949: section 8.4)

If the supplier assigns orders to a sub-supplier, the sub-supplier shall also fulfill the requirements of this Quality Directive. This includes the implementation of a quality planning and feedback system with the sub-suppliers according to the requirements of section 2 – APQP Advanced Product Quality Planning.

The use of qualified sub-suppliers for the project shall be ensured. If requirements are not met, improvement plans shall be defined. The implementation shall be guaranteed before PPF/PPAP approval of the entire product. Special processes shall be considered as well. Refer to section 2.34 – CQI/Qualification of Special Processes.

A list of all sub-suppliers used shall be submitted to ZF using the prescribed form, available for download on the ZF Internet website. A copy of each approved sub-suppliers signed PPF/PPAP cover sheet shall be included with the supplier’s PPF/PPAP submission.

The status of the quality planning process shall be presented regularly. The activities shall be organized so that the Production Part Approval Process (PPF/PPAP) of the purchased parts is completed before the production process and product approval of the entire product.

2.27. Logistics
(IATF 16949: section 8.1.1/8.3.5.1/8.5.4)

In principle, ZF establishes a logistics agreement with the supplier.

Regardless of whether such an agreement was made or not, the following minimum requirements apply unless a variance has been explicitly agreed:

Planning of packaging including labeling
The supplier is responsible for packaging their components and to improve packaging if it is not fit for its intended purpose. The packaging must be designed in such a way to ensure that it is sufficiently robust to withstand shipment by land, air, sea, etc. and arrive on time without damage or contamination. The planned type of packaging must be agreed with ZF on the supplier’s initiative in sufficient time before PPF/PPAP or series production delivery.

2.26. 次级供应商和采购零件状态
(IATF 16949:8.4)

如果供应商将订单下给次级供应商，次级供应商也应满足本质量方针的要求。包括和次级供应商一起根据 2 APQP 产品先期质量策划的要求，实施质量计划和反馈系统。

应保证为项目选用具有资质的次级供应商。如果没有达到要求，应制定改善计划。应保证在整个产品获得 PPF/PPAP 批准之前实施。特殊过程也应考虑在内。请参见 2.34 CQI/特殊过程认证。

应使用规定表格（可在采埃孚网站下载）将次级供应商列表提交给采埃孚。供应商提交的 PPF/PPAP 材料应包括所有获得批准的次级供应商签字的 PPF/PPAP 封面页。

应定期报告质量计划过程的状态。工作应当井然有序，使采购零件的生产件批准程序（PPF/PPAP）在生产过程和整个产品获得产品批准之前完成。

2.27. 物流
(IATF 16949:8.1.1/8.3.5.1/8.5.4)

原则上，采埃孚应与供应商签订物流协议。

无论是否签订此类协议，除非另有明确协定，以下最低要求必须满足：

规划包括标签在内的包装
供应商负责包装自己的组件并在包装不适合目标用途时做出改进。包装设计必须确保足够坚固，可承受海、陆、空等形式的运输，能够准时送达且不会造成损坏或污染。供应商必须在 PPF/PPAP 或批量生产交付之前主动与采埃孚就计划包装类型达成一致。
The following ZF Standards shall be observed:
- “General Packaging Regulation Logistics, Environmental Protection” (ZFN 9004-1)
- “Global Logistics Directive” (GLD) Both are available for download and review on the ZF Internet website.

Site-specific detailed regulations shall be applied if requested.

**Corrosion prevention**
All products which could be impaired by interaction with the environment shall be protected appropriately. Approval for use of the planned corrosion inhibitors (if necessary) shall be coordinated in a timely manner with ZF on the supplier’s initiative and included with PPF/PPAP submission.

**Material flow**
To avoid mix up of batches and to be able to trace batches, raw parts, parts purchased from sub-suppliers and parts from supplier’s own production, “First In – First Out” principle shall be followed across all processes and delivery.
Supplier shall ensure the traceability of their products from ZF all the way back to their sub-suppliers. For this purpose, the parts or containers shall be labeled in a suitable way with batch identification number and revision status. The revision status shall be stated on the delivery note.

**Cleanliness**
The supplier is responsible for the cleanliness of both the parts and the packaging and shall take cleanliness specifications of ZF into consideration. Packaging shall protect the parts against contamination.

All packaging materials shall be recyclable, reusable or returnable – whenever possible.
For further requirements concerning packaging and cleanliness, refer to the ZF Global Logistics Directive (available for review on the ZF Internet website).

If required by ZF, the supplier shall ensure that the packaging for electronic parts conforms to the ESD specific requirements (Electro Static Discharge).

2.28. Traceability (IATF 16949: section 8.5.2.1)
The supplier shall set up a defined process which allows the traceability of a single part, batch production, or at a maximum 8 hours of production all the way back to each production step and inspection lot across the entire supply chain, down to the raw material/purchased parts.

The traceability plan must be agreed with ZF on the supplier’s initiative and installed in sufficient time before PPF/PPAP submission. ZF specific requirements for traceability must be taken into consideration.

2.29. Personnel (IATF 16949: section 7.1.2/7.2)

Capacity requirements
Personnel need to be planned in a timely manner for both the project and production. Planning shall be performed in such a way that sufficient capacity is available at the start of both project management and production.

Qualification
When a new station is set up or in the case of a station change, the personnel shall be trained according to the new conditions. Corresponding verification shall be documented.

When temporary/contracted personnel are deployed, a risk analysis shall be done up front in consideration of the workplace. This personnel shall be trained accordingly.
2.30. Station Release

(IATF 16949: section 8.3.5.2)

The supplier shall release all manufacturing and assembly stations before PPF/PPAP. While doing so, the availability and suitability of the items listed in the following points shall be ensured:

- capability studies
- error simulation completed and documented (e.g. verification of automatic test equipment)
- complete and valid work documents (e.g. operation sheets, control plans, inspection plans, ...)
- operating materials and maintenance plans
- inspection equipment
- means of transport
- provision of material with accompanying documents indicating the revision level of the parts

The inspection shall be performed using a suitable checklist. All production and assembly operations shall be included. The deviations, if any, shall be documented. Responsibilities shall be defined for implementing corrective and improvement measures and target deadlines shall be set.

After completing the defined measures, another inspection shall be performed, taking the deviations that had been previously identified into account. The results shall also be documented. A release for the PPF/PPAP can only take place once the results of the inspection are successful. This release shall be documented.

2.31. Manufacturing Prototypes

(IATF 16949: section 8.3.4.3)

General requirements for prototypes

For prototype parts, a prototype inspection report (dimension, performance, process data, etc.) shall be submitted with the first delivery and in the event of modifications (index/item number). For this purpose, the initial sampling form VDA Volume 2 or AIAG PPAP shall be used in accordance with ZF requirements. In this report, all drawing characteristics or the extent of the modification respectively, shall be verified on at least one part.
Apart from that, ZF will specify the necessary extent of documentation in the individual case.

If the prototype and production suppliers are different, the prototype supplier shall share with the production supplier the process knowledge gathered in prototype fabrication, if contractually agreed.

The process established to produce parts for validation shall not be changed without prior written agreement and acceptance by ZF. Change requests shall comply with the requirements of change management according to section 1.11 – Changes to Product or Process.

Prototype deliveries shall also be marked and documented via the requested form, available on the ZF Internet website.

Location and component specific requirements for prototypes
On request from ZF, special characteristics and additional characteristics defined by ZF are to be documented 100% during the prototype phase and in the ordered quantity. These characteristics are identified in the drawing.

If requested by the ZF receiving plant, the following additional requirements shall be fulfilled:

Proto 1
For each batch, all the special characteristics (for more information, see section 1.9 and 2.11) shall be measured and documented for 15% of the delivered parts (round up quantity). In addition to the measured values, the respective average and range shall be indicated. A deviation from this requirement is only possible under the following circumstances:

a) Characteristics are tool related
Production is taking place on series production machines and tools for which machine capability values are already available for similar parts (material, dimensions, and tolerances).

b) Parts coming from the series production
If this applies, all characteristics on two parts from each delivery have to be measured and documented. In this case, the respective average value and the range of series production shall be reported.
Measured values and other requested data (average value, range, capability values, and tool dependent characteristics) shall be documented using the specified form (available for download on the ZF Internet website) or an equivalent form.

Proto 2
For each prototype delivery, the documentation for special characteristics (for more information, see section 1.9 and 2.11) and further agreed upon characteristics shall be delivered for 5 parts. Quantities deviating from this are to be determined by the ZF receiving plant.

Measured values shall be documented using the specified form (available for download on the ZF Internet website) or an equivalent form.

2.32. Audit Planning
(IATF 16949: section 9.2/7.2.3/7.2.4)
The supplier shall issue an audit program which defines the regular execution and the extent of internal product and process audits. VDA Volume 6 part 5 or VDA Volume 6 part 3 or equivalent procedures are to be applied. Audits at sub-suppliers shall also be taken into consideration.
Suppliers shall have qualified auditors to fulfill the automotive standards.

Specific audit requirements related to special processes and products (CQI, Customer Specific Requirements, SPICE assessment, etc.) shall also be considered.

2.33. Capacity Verification (Run at Rate)
(IATF 16949: section 8.3.5.2)
A Run at Rate (R@R) is a performance driven trial run under serial production conditions.
The purpose of R@R is to demonstrate that ZF requirements for supplier capacity are met, to provide evidence that the supplier can produce the required volumes to specification with existing capacity and to identify potential process weaknesses.
Potential reasons for performing R@R:
- ZF requirement
- new product/ new supplier
- changes in product, process or equipment
- capacity increase
- relocation of tool and/or equipment
- supplier performance problems

Unless otherwise agreed, the R@R shall be applied to all production material supplied to ZF. The R@R Tool specified by ZF shall be used.

Catalogue parts are excluded from this R@R requirement. In case of any exception from performing a R@R, supplier capacity for the respective parts shall then be assured and documented with a separate capacity commitment signed by the supplier.

The R@R shall be conducted either on all process steps or on individual bottleneck/critical process steps. When limited to individual process steps, the reason(s) shall be documented.

R@R result shall be provided using the ZF R@R Verification Form signed by the Supplier and by ZF. The signed form “R@R Verification” is required for PPF/PPAP documentation. This form is part of the ZF R@R Tool and is available for download on the ZF Internet website.

2.34. CQI/Qualification of Special Processes
(IATF 16949: section 9.2.2.3)
The AIAG (Automotive Industry Action Group) is publisher of the CQI guidelines (Continuous Quality Improvement). CQI formats are available at www.aiag.org.

For suppliers and sub-suppliers dealing with special processes according to AIAG, relevant CQI-guidelines shall be considered.
If the result shows findings of the type “Need for Immediate Action” or “Fail Findings”, the supplier shall inform ZF immediately and provide an action plan.

Heat Treatment Process
Due to the critical performance of Heat Treat, ZF has taken steps to control the use of heat treatment suppliers. ZF encourages its suppliers to use heat treatment sub-suppliers previously approved by ZF. In the event that it becomes necessary to use a heat treat supplier that has not been approved by ZF, the supplier shall provide a valid CQI-9 self-assessment at the time of RFQ (Request for Quotation), along with the Basic Technical Workbook/Feasibility Study or during the APQP phase. ZF reserves the right to audit and then approve or reject the selected heat treat supplier.

The CQI assessments are self-assessments and shall be performed according to the CQI requirements at least annually. These self-assessments and action plans to address gaps shall be submitted electronically to ZF via the requested communication platform.

2.35. Maturity Level Assurance for New Parts
(IATF 16949: section 8.3.2.1)
For new parts, ZF reserves the right to process the project in accordance with the requirements of VDA Volume Maturity Level Assurance (Product Creation – Maturity Level Assurance for New Parts).

If this case applies, ZF will contact the supplier. Gates are then to be planned according to the ZF relevant milestones. For details, refer to the diagram below and to the relevant form on the ZF Internet website.

APQP Phases & Milestones: see figure on page 44.

CQI 评估是自我评估，应根据 CQI 的要求至少每年进行一次。
自我评估和解决差距的行动计划应通过规定的沟通平台以电子形式提交给采埃孚。

2.35. 新零件成熟度保证
(IATF 16949: 8.3.2.1)
对于新零件，采埃孚保留按照 VDA Volume 成熟度保证（产品创新——新零件成熟度保证）的要求推进项目的权利。

在这种情况下，采埃孚将联系供应商，然后根据采埃孚的相应里程碑规划节点。详情请参见下图及采埃孚网站相关表格。

APQP 阶段和里程碑：见 44 页图表。
Fig. APQP Phases & Milestones

AIAG APQP

Planning
Product Design und Development
Product Design and Development

Feedback Assessment and Corrective Action

Plan and Define Program
Product Design and Development Verification
Process Design and Development Verification
Product and Process Validation
Feedback, Assessment and Corrective Action

VDA maturity level assurance

ML0
ML1
ML2
ML3
ML4
ML5
ML6
SOP

Innovation release for full production development
Requirements management for the contract to be issued
Specifying the supply chain and placing the order
Release technical specifications
Completion of production planning
Parts from production tool and production facilities are available
Process and product approval
Project completion transfer of responsibilities to Production, Start requalification

Source: AIGA

ZF Global Development and Product Evolution Process (GDPEP)

Supplier SOP

D-Status 00
Proposal Creation
Proposal Acceptance
Concept Verification
Design & Process Planning Approval
Product & Process Approval
Product Launch
Project Closure

Application Phase
RFQ, Approval to Develop Proposal/Quote
Proposal/Quote Approval
Project Approval
Concept Approval
Design & Process Planning Approval
Product & Process Approval
Series Production

Source: VDA

图：APQP 阶段和里程碑

AIAG APQP

PLANNING
Product Design and Development
Product Design and Development

Feedback Assessment and Corrective Action

Planning
Product Design and Development
Product Design and Development

VDA maturity level assurance

ML0
ML1
ML2
ML3
ML4
ML5
ML6
SOP

Innovation release for full production development
Requirements management for the contract to be issued
Specifying the supply chain and placing the order
Release technical specifications
Completion of production planning
Parts from production tool and production facilities are available
Process and product approval
Project completion transfer of responsibilities to Production, Start requalification

Source: AIGA

ZF Global Development and Product Evolution Process (GDPEP)

Supplier SOP

D-Status 00
Proposal Creation
Proposal Acceptance
Concept Verification
Design & Process Planning Approval
Product & Process Approval
Product Launch
Project Closure

Application Phase
RFQ, Approval to Develop Proposal/Quote
Proposal/Quote Approval
Project Approval
Concept Approval
Design & Process Planning Approval
Product & Process Approval
Series Production

Source: VDA
3. PPAP/PPF Production Part Approval Process

(IAF 16949: section 8.3.4.4)
Production Part Approval Process (PPAP) is based on either VDA Volume 2 (PPF) or on the production part release process of the AIAG PPAP. ZF retains the right to specify one of these two procedures or a similar procedure.

Prior to start of Production Part Approval Process (PPF/PPAP), it shall be ensured that all activities of process and quality planning have been completed.

3.1. Initial Samples
(IAF 16949: section 8.3.4.4)
Initial samples are products made and tested under series production conditions (plants, machinery, operating materials and test equipment, machining conditions).

The test results on all characteristics must be documented within the initial sample report. The quantity of parts to be documented must be agreed upon with ZF.

The initial samples shall be submitted to the ZF receiving plant by the agreed date and shall include the initial sample inspection report and documents according to the submission levels specified in section 3.3 – Submission Levels. Initial samples shall be clearly identified by using the specified form, available for download on the ZF Internet website.

To identify the characteristics, matching numbers shall be used in the initial sample inspection report and in the accompanying current drawing released by ZF.

For assemblies manufactured according to a ZF design, including the single components, an initial sample inspection is obligatory and shall be presented to ZF.

For products based on the supplier’s own design, the supplier shall sample and present the assembly to ZF. Initial sampling shall also be performed for single components and, if necessary, for subassemblies. ZF shall be allowed to review this documentation as required.
ZF reserves the right to issue a complaint at a later date about deviations from the ZF specifications which have not been detected during the PPF/PPAP Approval Process.

3.2. Reasons for Initial Samples

(IATF 16949: section 8.3.4.4/8.5.6.1)

In alignment with above mentioned standards and regulations, the PPF/PPAP Approval Process is required if any of the following changes apply at the supplier or sub-supplier:

- if a product is ordered for the first time (marked on order)
- after the supplier has changed a subcontractor
- for all affected characteristics after any product modification
- for all affected characteristics following a drawing index modification
- following a delivery stop
- following an interruption in delivery after a stop shipment (business on hold)
- following an interruption in delivery of more than one year
- following an interruption in production of more than one year
- if production procedures/processes have been changed
- following the introduction of new/modified molding equipment (e.g. stamping, rolling, pressing, forging, molding equipment, in the case of several dies/molds and/or multiple dies/molds, for each cavity/cluster)
- following any type of relocation of PPF/PPAP-approved production or the use of new or relocated machinery and/or operating materials
- after use of alternative materials and design changes in product appearance attributes applied to material such as paint, leather, wood, ... where there is no appearance specification. (e.g. color, smell ...)
- change in test/inspection method or new technique (no effect on acceptance criteria). For change in test method, supplier should have evidence that the new method provides results equivalent to or better than the old (previous) method.
• Production following upgrade, refurbishment, rearrangement of existing tooling or equipment, if requested by ZF

Exceptions to approach and scope are only permissible in agreement with ZF, for example in the following cases:
• interruption in delivery or production of more than one year
• small production batches, after-sales service parts
• standard and catalogue parts

3.3. Submission Levels
(IATF 16949: section 8.3.4.4)
In general, unless otherwise specified by ZF, Submission Level 3 applies.

In the case of bulk material (i.e. grease, oil, granulate ...) the submission shall take place via the relevant AIAG Bulk Material Checklist, unless otherwise specified by ZF.

The form describing for the Submission Levels is available for download on the ZF Internet website.

3.4. Initial Sampling according to 3D Data Model
(IATF 16949: section 8.3.5.1)
Measurements must be performed based on the valid 3D data model, if applicable. The number of measuring points must be selected in a way that allows positive determination of all dimensions. Details of the measurement are to be agreed with ZF. The characteristics identified and determined in section 2.7 – Product Description must be documented with the initial sample.

3.5. Assessment of Product and Process for Serial Production Release
The supplier shall conduct a written self-assessment of product and process maturity for serial production using the VDA “Matrix for assessing the serial production maturity for product and process”.

• In ZF’s requirements, upgrades, refurbishments, and reconfiguration of existing tooling or equipment, if requested by ZF

Exceptions to approach and scope are only permissible in agreement with ZF, for example in the following cases:
• interruption in delivery or production of more than one year
• small production batches, after-sales service parts
• standard and catalogue parts

3.3. 提交等级
(IATF 16949:8.3.4.4)
一般情况下，除非采埃孚另有规定，提交等级为3级。

对于散装材料（例如油脂、石油、颗粒等），除非采埃孚另有规定，应通过相关AIAG散装材料检查表提交。

描述提交等级的表格可在采埃孚网站下载。

3.4. 根据3D模型制造初始样件
(IATF 16949:8.3.5.1)
如适用，测量必须基于有效的3D数据模型。测量点数量的选择必须能够确定所有尺寸。测量细节必须经过采埃孚同意。在2.7产品描述中，识别和确定的特性必须对应于初始样件进行记录。

3.5. 为批量生产放行进行的产品和过程评估
供应商应按照VDA“产品和过程批量生产成熟度评估矩阵”对批量生产的产和过程成熟度进行书面自我评估。
3.6. **Initial Sample Documentation**  
(IATF 16949: section 8.3.4.4)  
The initial sample documentation according to the requested submission level (see section 3.3) shall be supplied at the same time as the initial samples.

ZF may require suppliers to submit a validation package that contains additional documents and forms beyond those required by AIAG/VDA.

Missing, incorrect, incomplete or delayed submission of initial sample documentation will be recorded as a supplier performance failure and will affect the supplier's performance rating.

Initial samples without complete documentation will not be processed and will lead to subsequent costs, which will be charged to the supplier.

3.7. **Deviation in initial sample**  
(IATF 16949: section 8.3.4.4/8.7.1.1)  
Documents, records, and initial sample parts may only be submitted if all specifications are fulfilled. In case of deviations, the supplier shall first obtain written permission from ZF using the requested form available for download on the ZF Internet website or on the communication platform (see 1.13 – Business Processes based on Electronic Data Exchange) and attach it to the submitted documentation. Initial samples with deviations that have no deviation approval will not be processed by ZF.

The following shall be submitted along with the deviation request:
- 8D report
- An action plan to return to planned serial conditions
- The planned point of time when normal production can be resumed

3.8. **Material Data Reporting**  
(IATF 16949: section 8.3.4.4)  
For all supplies to ZF, material data needs to be provided where legal reporting obligations apply.

3.6. **初始样件文件**  
(IATF 16949:8.3.4.4)  
在提供初始样件的同时应根据所要求的提交等级（见3.3）提供初始样件文件。

采埃孚可能会要求供应商提交包含AIAG/VDA要求之外的文件和表格的验证包。

初始样件文件的缺失、错误、不完整或延迟提交都会被记为供应商绩效不良，并影响供应商的绩效评定。

没有完整文件的初始样件不会进行后续流程，由此导致的后续花费将向供应商收取。

3.7. **初始样件偏差**  
(IATF 16949:8.3.4.4/8.7.1.1)  
只有满足所有规范才能提交文件、记录和初始样件。如果出现偏差，供应商应首先通过规定表格（可在采埃孚网站下载）或沟通平台（见1.13 基于电子数据交换的业务流程小节）获得采埃孚的书面许可并将其附在提交的文件中。采埃孚不会接收，未获得偏差批准的有偏差的初始样件。

偏差申请应包括以下材料：
- 8D报告
- 恢复计划批量生产条件的行动计划
- 恢复正常生产的计划时间点

3.8. **材料数据报告**  
(IATF 16949:8.3.4.4)  
对于供应给采埃孚的所有产品，如果有法律报告义务，则应提供材料数据。
Where PPF/PPAP requirements apply, suppliers shall report material and substance information for all types of purchased materials, components or items supplied using the International Material Data System (IMDS) (www.mdsystem.com).

Suppliers for COEMS programs (Chinese Original Equipment Manufacturers) and their joint ventures with global OEMs (Original Equipment Manufacturer) for the China market shall also report material and substance information in the CAMDS system (China Automotive Material Data System) (www.camds.org).

Suppliers shall submit IMDS and, if required by ZF, CAMDS to ZF as soon as possible upon award of new business, but in any case prior to the PSW (Part Submission Warrant) or as part of the PPF/PPAP process. The supplier IMDS/CAMDS information shall be subject to ZF review and approval. Missing material data will lead to rejection. Additional information is available in the ZF Norm ZFN 9010 on the ZF Internet website.

For parts delivered to assemble in the vehicles for the China Automotive market, suppliers shall provide an “End-of-Life/ELV test report” from an authorized lab to ensure compliance with National Standard of the People’s Republic of China, GB/T 30512-2014 - Requirements for prohibited substances on Automobiles.

Changes of legal or other requirements shall prompt a re-check and subsequent update of the data provided to ZF (IMDS submission, CAMDS submission, SDS, compliance declaration, etc.).

Different reporting requirements may be applicable for supplies to non-Automotive products or ZF Aftermarket.

如需遵守 PPF/PPAP 的要求，供应商应使用国际材料数据系统（IMDS）（www.mdsystem.com）为所有类型的采购材料、组件或供应产品报告材料和物质信息。

面向 COEMS（中国原始设备制造商）项目及中国市场的全球 OEM（原始设备制造商）合资企业的供应商还应在 CAMDS （中国汽车材料数据系统）（www.camds.org）系统中报告材料和物质信息。

供应商应根据新业务尽快向采埃孚提交 IMDS（如果采埃孚要求还应提交 CAMDS），且一定要在 PSW（零件提交保证）之前或作为 PPF/PPAP 流程的一部分。供应商 IMDS/CAMDS 信息应提交采埃孚审查和批准。如缺失材料数据，将驳回申请。更多信息请见采埃孚网站上的采埃孚规范 ZFN 9010。

对于供应中国汽车市场的车辆装配零件，供应商应取得授权实验室提供的“生命周期结束/ELV 测试报告”，以确保符合中华人民共和国国家标准 GB/T 30512-2014 对汽车行业禁用物质的要求。

如果法律或其它要求发生变化，应立即重新检查并更新提供给采埃孚的数据（提交的 IMDS 材料、CAMDS 材料、SDS 合规声明等）。

非汽车行业产品或采埃孚售后的供应商可能适用不同的报告要求。
3.9. **PPF/PPAP Submission Process**  
(IATF 16949: section 8.3.4.4)  
The PPF/PPAP documents shall be submitted via the process requested by the ZF ordering plant. They shall be submitted along with the List of PPF/PPAP Elements in the order of the element numbers stipulated in the "Submission Levels" form.

Incomplete or incorrect PPF/PPAP documentation will be rejected.
4. Serial Production Requirements

4.1. Introduction
Once the manufacturing process is successfully validated (PPF/PPAP is approved), the serial production phase begins.

During this stage, there are a number of requirements each supplier and sub-supplier shall be fully aware of and follow. Key areas for this phase are detailed in the following sections.

4.2. Processing Complaints
(IATF 16949: section 10.2.6)
Suppliers are expected to immediately notify all possibly impacted ZF plants and other involved parties in the supply chain to ZF, when made aware of a potential safety, quality or delivery issue.

Complaint Management
ZF categorizes complaints based on the source of concern and its severity. ZF also uses several Q-KPIs to assess the quality of all deliveries. For more information, please refer to the ZF Description of Supplier Q-KPIs, available for download on the ZF Internet website.

After a complaint is issued by ZF, containment actions shall be implemented immediately. Containment status (D3 of 8D report) shall be reported to ZF at the latest within one working day and updated periodically. ZF plants and other involved parties in the supply chain to ZF possibly affected are to be informed at once by the supplier.

The reporting takes place via the communication platform supported by ZF or via the requested forms (available for download on the ZF Internet website).

An analysis of the root causes always needs to be carried out using suitable problem-solving methods and submitted to ZF.

Detailed analyses (such as Ishikawa, 3x5 why, error simulations ...) are also to be carried out. When requested, these documents shall be submitted to ZF.

4.1. 引言
一旦生产过程验证成功后 (PPF/PPAP 获得批准)，即进入了批量生产阶段。

在这个阶段，所有供应商和次级供应商都要清楚认识到并遵守一系列的特殊要求。量产阶段的关键要求详情请见以下章节。

4.2. 处理投诉
(IATF 16949:10.2.6)
如果发现潜在的安全、质量或交付问题，供应商应立即通知到所有可能受到影响的采埃孚工厂或采埃孚供应链中其他相关各方。

投诉管理
采埃孚投诉分类基于问题来源及其重要性。采埃孚使用若干 Q-KPI 评估所有交付产品的质量。更多信息请参见采埃孚的供应商 Q-KPI 描述，可在采埃孚网站下载。

采埃孚提出投诉后，应立即采取遏制措施。遏制状态 (8D 报告的 D3) 最迟应在工作日内报告给采埃孚并定期更新。供应商应立刻通知可能受到影响的采埃孚工厂和采埃孚供应链上的其它相关各方。

应通过采埃孚支持的沟通平台或规定的表格（可在采埃孚网站下载）进行报告。

必须采用适当的问题解决方法分析根本原因并提交给采埃孚。

此外还要进行详细的分析（例如鱼骨图、3x5 why、失效模拟等）。如有要求，这些文件应提交给采埃孚。
The completed 8D report shall be submitted within 10 working days at the latest.

If necessary, other target dates may be established in agreement between supplier and ZF.

The 8D process can only be closed by the acceptance of ZF.

Identification of certified parts or packaging after a complaint
The clean point information shall be determined and communicated at once to the person in charge at ZF. In addition, it shall be documented in the 8D report.

Subsequent deliveries from warehouse and work in progress which have been subjected to 100% inspection or testing due to complaint shall be marked or labelled. This shall be done via the appropriate label or form (available for download on the ZF Internet website). Every packaging unit shall be clearly labelled with the requested label or form until permanent corrective actions have been implemented successfully.

The type of marking on the individual part needs to be agreed with the ZF receiving plant, described on the requested "Certified Parts" label or form, and included on the 8D Report.

Complaints from the field
In the event of complaints from the field, the relevant actions previously planned in the APQP phase are to be carried out.

In the case of components for which no faults were found in the investigation process (NTF - No Trouble Found), measures shall be applied according to the VDA Volume "Joint quality management in the supply chain – marketing and service – field failures analysis". Refer also to section 2.9.

ZF retains ownership rights of all material returned for analysis. If destructive testing is required to determine root causes, ZF shall be notified prior to the testing process. The destruction of any part returned for analysis without written permission from ZF is strictly forbidden. Material associated with a complaint, wherein responsibility of failure is indeterminate or disputed, shall be returned to ZF for retention unless otherwise agreed in writing.

完整的 8D 报告最迟应在 10 个工作日内提交。

如有必要，供应商和采埃孚还应商定其它目标日期。

8D 流程必须经采埃孚批准才能结束。

断点后产品或包装的标识要求
断点信息应立刻确定并告知给采埃孚负责人，并记录在 8D 报告中。

收到投诉后，经过 100%检验或测试的库存或在制交付件都应做标记或贴上标签，并使用合适的标签或表格（可在采埃孚网站下载）。每个包装单元均应采用规定标签或表单清楚标明，直到成功实施永久性纠正措施。

每个单个零件上的标记方法应与采埃孚接收工厂达成一致，并描述在上述要求的“确认件”的标签或表单上，并加入到 8D 报告中。

售后投诉
如果出现售后市场的投诉，应执行之前在 APQP 阶段计划的相关行动。

如果在调查过程中没有发现任何组件故障（NTF—未发现故障），应根据 VDA Volume “供应链共同质量管理——市场和服务——现场失效分析” 采取措施。另请参见 2.9 小节。

采埃孚保留所有返回件的所有权，用以进一步分析。如果需要进行破坏性测试确定根本原因，应在测试前通知采埃孚。严禁未经采埃孚书面同意破坏任何退回分析零件。除非另有书面协议，如果故障责任不确定或存在争议，被投诉的物料应交还采埃孚保管。
Measurement and Improvement of Supplier Quality Performance

It is the expectation of ZF that suppliers will achieve and maintain zero defects and 100% on time delivery.

ZF continuously monitors the performance of their supply base using key performance indicators (KPI’s) designed to evaluate launch performance, delivery performance, complaint and warranty performance, and serial production quality performance. ZF monitors and evaluates these KPI’s in order to:

- Permit and enable supplier performance comparisons
- Derive necessary strategies and initiatives for supplier development activities
- Continuously improve supplier quality performance

These performance indicators and the associated metrics are defined on our ZF Internet website.

ZF will update supplier performance data monthly on the supplier communication platform. Suppliers shall access their performance data through the ZF communication platform.

The supplier’s performance status is taken into consideration for future sourcing decisions as well as for identifying areas to focus continuous improvement efforts.

4.3. Layout Inspection and Functional Testing/Annual Revalidation

(IATF 16949: section 8.6.2)

All products shall be subjected to an annual layout inspection and functional testing (revalidation), unless agreed otherwise with ZF. After previous agreement with ZF, for parts that are similar for ZF, the requalification can be carried out per product group (“Family”) or results for the current series production tests can be included, for example:
• Cyclical series production releases
• Product audits (aggregates, modules, components, parts, etc.)
• Records for initial item and final item tests
• SPC evaluations
• Initial sampling
• Incoming goods inspection

The valid ZF specifications are the basis for requalification/revalidation. A layout inspection and functional testing usually covers:
  • Dimension
  • Material
  • Function

Other test items are to be agreed with the ZF receiving plant. The layout inspection and functional testing/annual revalidation shall be planned and presented with the ZF initial sample inspection and shall be included in the Control Plan.

The results shall be documented and made available for evaluation by ZF. For this purpose, the initial sample inspection report forms from VDA Vol. 2 (PPF) or PPAP (PSW) from AIAG shall be used. If the test results are negative, the supplier shall immediately contact ZF.

The risk for ZF, the cause of the fault, and corrective actions shall be specified. The results of the layout inspection shall be submitted to ZF upon request.

4.4. Safe Launch

Introduction
Safe Launch planning is designed to protect both ZF and the supplier during the initial phases of product supply. A Safe Launch process shall be implemented to detect symptoms of potential issues in new processes and to ensure that new launches are defect free. To accomplish this, a Safe Launch Plan shall be agreed during the planning phase. During Safe Launch, an increased frequency of inspection and monitoring shall be performed on designated and other agreed characteristics.

• 周期批量生产放行
• 产品审核（装配件、模组、组件、零件等）
• 最初和最终项目测试记录
• SPC 评估
• 初始样件
• 来料检验

有效的采埃孚规范是重新验证的基础。全尺寸检验和功能测试通常包括:
  • 尺寸
  • 材料
  • 功能

其它测试项应与采埃孚接收工厂达成一致。全尺寸检验和功能测试/年度重新验证应制定计划，与采埃孚初始样件检验报告一起提交，并包含在控制计划中。

测试结果应存档记录并可供采埃孚评估。为此，应使用 VDA Vol. 2 (PPF) 的初始样件检验报告表或 AIAG 的 PPAP (PSW)。如果测试结果发现问题，供应商应立即联系采埃孚。

说明采埃孚的风险、故障原因以及纠正措施。应根据要求将全尺寸检验结果提供给采埃孚。

4.4. 安全投产

引言
安全投产计划的目的是在产品供应的初始阶段为采埃孚和供应商双方提供保护。应实施安全投产流程以发现新过程中的潜在问题迹象，确保新的投产没有缺陷。为此，应在计划阶段商定安全投产计划。在安全投产期间，应提高指定和其他商定特性的检验和监控频率。
Team
The supplier nominates an empowered interdisciplinary team with defined responsibilities to ensure the conformity of the parts and to analyze and eliminate internal rejects in a timely manner.

Safe Launch Duration
In general, the Safe Launch phase starts with the PPF/PPAP submission and extends until start of production (SOP of the ZF customer) + 90 days, unless otherwise specified by ZF. The program duration may also be specified by a quantity of product.

Exit and Restart Criteria
Zero defect supplies during the entire Safe Launch phase and fulfillment of all agreed criteria qualify the supplier for an exit out of the Safe Launch phase.

Any defect discovered during the Safe Launch Phase resets the event to “0” and the Safe Launch Phase is restarted.

Documentation
Filled in Safe Launch forms, inspection raw data and capability charts shall be submitted on agreed frequency to ZF by means of the information exchange platforms defined by ZF (accessible via the ZF Internet website).

Safe Launch Process Description
A more in depth description of the Safe Launch Process can be accessed for review on the ZF Internet website.

4.5. Deviation Approval
(IATF 16949: section 8.5.6.1.1/8.7.1.1)
In case of deviations from the specification, the following forms shall be used and submitted to ZF in order to obtain release prior to delivery:

退出和重启标准
如果在整个安全投产阶段零缺陷供应并满足了所有商定标准，供应商即有资格结束安全投产阶段。

在安全投产阶段发现任何缺陷都会将安全投产阶段重置为“0”并重启该阶段。

文件资料
填写完整的安全投产表格、检验的原数据和能力图表都应按照商定的频率，通过采埃孚规定的信息交换平台提交给采埃孚（可通过采埃孚网站查询）。

关于安全投产流程的更多说明，可在采埃孚网站查看。
Deviation Request Form
8D Report Form

The submitted information shall indicate when the supplier plans to return to normal production.

All deliveries based on a deviation approval shall have additional identification labels on all load carriers. For this purpose, the requested forms shall be used (available for download on the ZF Internet website).

偏差申请表
8D 报告表

提交信息应说明供应商计划何时恢复正常生产。

所有基于偏差认可的交付物都应在各级包装物上标注额外的识别标签。为此应使用规定表格（可在采埃孚网站下载）。
5. Specific Requirements for Electronic Components

电子元器件特殊要求

For suppliers who develop and/or produce, assemble or test electronic components (particularly semiconductor devices, passive components and LED components) the additional, specific requirements described in section 5 shall be applied.

5.1. AECQ

(IATF 16949: section 8.3.4.2/8.5.6.1)

Suppliers who develop and/or produce, assemble or test electronic components shall at a minimum fulfill the respective qualification standard from the Automotive Electronics Council (AEC; e.g. AECQ 100; AECQ 101; AECQ 200). Exceptions or deviations to above, shall be communicated to and agreed with ZF.

5.2. Robustness Validation

(IATF 16949: section 8.3.4.2/8.5.6.1)

The supplier shall provide their approach to robustness validation in the development phase. In addition, the procedure of robustness validation shall be made available to ZF for review and approval. For further information, refer to ZVEI – Handbook of Robustness Validation.

5.3. Mission Profile for Electronic Components

(IATF 16949: section 8.2.3.1/8.3.4.2/8.5.6.1)

Upon award of business, ZF may issue a series of work documents to be taken into account by the supplier:

- Mission Profile
- Statement of Work (SOW) and/or
- Semiconductor Group Standard

The Semiconductor Group Standard will be provided by ZF along with the RFQ. It shall be followed during the development phase, where the supplier and ZF shall mutually share all relevant details required as per the APQP process concerning:

- 任务概况
- 工作说明书（SOW）和/or
- 半导体标准

采埃孚还应同时提供半导体标准和 RFQ。在开发阶段可以遵守，供应商和采埃孚应共同分享 APQP 流程所需的所有相关详细信息：
5.4. **Product Change Notification (PCN) and Product Termination Notification (PTN) for Electronic Components**

(IATF 16949: section 8.5.6)

Suppliers who develop and/or produce, assemble or test electronic components shall inform ZF about changes affecting product and/or process. Details of change shall be submitted to ZF via the requested form and comply with the requirements of PCN/PTN as described in the current version of the European Standard (ZVEI) and/or in further valid standards.

The supplier remains responsible for all changes, irrespective of ZVEI notification requirements. For change classification, ZF requires a formal delta (change) FMEA/risk assessment associated with the change.

The supplier shall include a completed ZVEI Delta Qualification Matrix (DeQuMa) with all requests for change. This document is available on the ZVEI website. Additionally, ZF may deem further testing necessary prior to accepting the change. ZF may request a data review of the critical parameters for the process or processes affected by the change. This should be in the form of a comparison of new process against existing process.

For initial release and changes related to software during the full product lifecycle (development, launch, production, aftermarket) the supplier shall adhere to the specific software release process of ZF. This shall include management and verification of software revisions and requires approval by ZF.

5.4. **电子元器件产品变更通知（PCN）和产品终止通知（PTN）**

(IATF 16949:8.5.6)

开发和/或生产、组装或测试电子元器件的供应商应向采埃孚通知影响产品和/或过程的变更。变更详情应按照当前版本欧洲标准（ZVEI）和/或后续发布的有效标准中对PCN/PTN的要求，通过规定表格提交给采埃孚。

无论ZVEI通知要求为何，供应商都应对所有变更负责。对于变化类别，采埃孚要求提供与该变化相关的正式delta（变化）FMEA/风险评估。

供应商应提供包括记录所有变更的完整ZVEI变化认证矩阵（DeQuMa）以及矩阵中规定的要求。该文件可在ZVEI网站获得。此外，采埃孚可能会在接受变更之前要求进一步测试。采埃孚可能要求审查和变更相关的（所有）过程关键参数，将新过程与现有过程进行对比。

对于初始释放和整个产品生命周期（开发、投产、生产、售后）中的软件相关改变，供应商应遵守采埃孚规定的软件放行流程。其中包括软件版本管理和验证以及采埃孚批准的要求。
5.5. **Functional Safety of Software and Components with Integrated Software**

(IATF 16949: section 8.3.2.3)

Suppliers who develop or supply software or electronic components with integrated software shall meet the requirements from Automotive SPICE or an equivalent standard. Unless otherwise agreed, the technological maturity level 2 or higher needs to be fulfilled according to the VDA Volume “Automotive SPICE Process Assessment Model” for processes, which are part of the “VDA process scope.”

ZF retains the right to carry out an assessment at the supplier’s location.

If maturity level 2 currently cannot be achieved, the supplier shall provide an action plan including an adequate time schedule to achieve maturity level 2.

When safety-relevant electronics and software are included in the scope of supply, then the development process shall be “state-of-the-art” and comply with IEC DIN EN 61508, ISO 26262.

Safety-relevant parts, their documentation and the drawings shall be marked as such so that they can be clearly identified throughout the development phase and series production process.

The requirements of the necessary safety level (e.g. SIL, ASIL ...) are specified in the respective specification. The safety concept with design and implementation specifications shall be agreed with ZF.

5.6. **Cybersecurity**

If safety relevant electronics and software are included in the scope of the supply, it shall be ensured, according to the requirement of ZF, that an unsecure access is impossible. The necessary access protection can be based on software and/or physical devices in the production and during transport. In addition, all relevant production equipment and the IT infrastructure shall be, at a minimum, secured to the level of ZF requirements. The hedge-concept shall be discussed between ZF and the supplier in the APQP phase and shall be approved by PPF/PPAP submission.

5.5. **软件和集成软件组件的功能安全**

(IATF 16949:8.3.2.3)

开发或供应软件或集成软件电子元器件的供应商应满足Automotive SPICE或等效标准的要求。除非另外达成一致，过程应根据VDA Volume “Automotive SPICE 流程评估模型”达到2级或以上技术成熟度。

采埃孚保留在供应商的场所进行评估的权利。

如果目前无法达到2级成熟度，供应商应提供一份行动计划，其中包含达到2级成熟度的适当时间安排。

如果供应范围包括安全相关电子产品和软件，开发流程应为最先进的水平并遵守IEC DIN EN 61508, ISO 26262。

安全相关零件的文件和图纸应做上标记，从而在整个开发阶段和批量生产过程中能够清楚识别。

安全等级（例如SIL、ASIL等）要求在各自的规范中规定。设计和实施规范的安全理念应得到采埃孚的同意。

5.6. **网络安全**

如果供应范围包括安全相关电子产品和软件，根据采埃孚的要求确保杜绝不安全的访问。可基于软件和/或生产和运输中的物理设备制定必要的访问保护措施。此外，所有相关生产设备和IT基础设施的安全水平至少应满足采埃孚的要求。采埃孚和供应商应在APQP阶段讨论安全防护概念，并获得PPF/PPAP提交批准。
ZF reserves the right, after pre-announcement, to audit the hedge-concept, possibly jointly with the ZF customers. During the audit, it shall be ensured that ZF and the customers are allowed to obtain access to the safety relevant production, the logistic area and the IT sector.

采埃孚保留在提前告知之后审核（可能与采埃孚客户共同审核）防护概念的权利。在审核中，应确保采埃孚和客户能够查看安全相关生产、物流区域和 IT 部分。
# 6. References

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| ZFN 9010 | 国际材料数据系统（IMDS）材料数据表接受标准 |

| ISO/IEC 17025 | 测试和校准实验室一般能力要求 |
| GLD | 全球物流方针 |
7. Forms

All necessary communication / work forms and relevant documents can be downloaded in their current version from the ZF Internet website.

The **QD83 web page** is accessible from ZF’s public website via [https://www.zf.com/](https://www.zf.com/) by following the “**Business Portal / ZF Supplier Board**” path at the bottom of the page.

The forms and documents made available on this platform represent the ZF standard and cover the minimum requirements. Other forms may be used on the condition that they fulfill the minimum ZF requirements and the ZF receiving plant has approved the use of these forms.

The supplier shall ensure that they always work with the latest version of the forms.
### 8. Glossary

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<td>Automotive Electronics Council</td>
<td>汽车电子设备委员会</td>
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<td>AIAG</td>
<td>Automotive Industry Action Group</td>
<td>汽车工业行动集团</td>
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<td>APQP</td>
<td>Advanced Product Quality Planning</td>
<td>产品质量先期策划</td>
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<td>CLP</td>
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<td>CQI</td>
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