

SUPPLIER QUALITY MANUAL

(MAN.QLTY – 08, REV. 04 - 09/05/2023)



REVISION LIST

REVISION	DATE	NOTES
00	01/09/2001	New edition
01	07/10/2012	Full revision
02	08/05/2013	Full revision
03	05/08/2014	PPAP par. updated, specifications adapted to definition of "good(s)"
04	09/05/2023	Full revision.

PREPARED BY:	APPROVED BY:
Supplier Quality Development	GCF Quality Chief Quality Officer – M. Borsari
Supplier Quality Development Manager – A. Grazioli	GCF Purchasing Chief Purchasing Officer – B. Sarti

CONTENTS

1	GENERAL REQUIREMENTS	6
1.1	QUALITY MANAGEMENT SYSTEM	6
1.2	MANAGEMENT SYSTEM FOR OCCUPATIONAL SAFETY AND THE ENVIRONMENT	7
1.3	CUSTOMER SPECIFIC REQUIREMENTS	8
1.4	PRODUCT REGULATIONS	8
2	NEW SUPPLIER SELECTION REQUIREMENTS	8
2.1	NEW SUPPLIER PRE-ASSESSMENT	9
2.2	BREMBO QUALITY REQUIREMENTS - BQR	9
2.3	NEW SUPPLIER HOMOLOGATION.....	9
2.4	SW AND/OR FUNCTIONAL SAFETY SUPPLIER QUALIFICATION	10
2.5	FEASIBILITY STUDY	12
3	REQUIREMENTS FOR PRODUCT AND PROCESS DEVELOPMENT	12
3.1	GENERAL APQP REQUIREMENTS	12
3.2	APQP WORK AREAS	13
3.3	SPECIFIC APQP REQUIREMENTS	14
3.4	SW SUPPLIER MONITORING.....	17
4	REQUIREMENTS FOR PRODUCT AND PROCESS VALIDATION	20
4.1	PPAP	20
4.2	PROCESS AUDIT	24
4.3	FUNCTIONAL SAFETY ASSESSMENT FOR SAFETY-CRITICAL MECHATRONIC COMPONENTS	25
4.4	RUN@RATE	26
5	REQUIREMENTS FOR SERIES PRODUCTION	26
5.1	CHANGE MANAGEMENT	26
5.2	IDENTIFICATION, TRACKING AND TRACEABILITY	27
5.3	MANAGEMENT OF CRITICAL CHARACTERISTICS	27

5.4	RAW MATERIALS	30
5.5	PROCESS CAPABILITY	30
5.6	MANAGEMENT OF SUB-SUPPLIERS	33
5.7	PRODUCT AND PROCESS DEVIATIONS.....	33
5.8	NON-CONFORMITY MANAGEMENT	34
5.9	PRODUCTION AND CONTROL EQUIPMENT BELONGING TO BREMBO	35
5.10	CQC – QUALITY AND CONFORMITY CERTIFICATE	36
5.11	PERIODIC REQUALIFICATION.....	36
5.12	CHARGES TO SUPPLIER	37
5.13	MANAGEMENT OF WARRANTY RETURNS.....	37
5.14	SPECIAL STATES OF SUPPLY AND NBH.....	38
5.15	RECORD KEEPING	39
6	PERFORMANCE MONITORING	40
6.1	QUALITY PERFORMANCE INDICATORS.....	40
6.2	LOGISTIC PERFORMANCE INDICATORS	40
6.3	POOR PERFORMANCE	41

INTRODUCTION

The purpose of Brembo supply quality management system described in this manual is to select, develop and monitor suppliers who are capable of maintaining the highest quality level of supplied goods, playing an active role in Brembo's commitment to the excellence of its products, its focus on customers and continuous improvement.

Brembo sees its suppliers as a critical resource for its own success, complete customer satisfaction and the achievement of established goals, and firmly believes in establishing a relationship based on trust, integrity and transparency.

Brembo asks its suppliers to adopt the same principles and work proactively towards a "ZERO DEFECT" approach through:

- effective application of the Quality Management System defined by the Organization;
- the adoption of product and manufacturing process development processes based on prevention and continuous improvement;
- careful compliance with the defined control plans with special attention to the monitoring over time of all the critical characteristics defined by the technical specifications;
- the cascading of the contents of this manual to its own sub-suppliers in order to guarantee quality along the entire supply chain.

The Brembo Supplier Quality Manual applies to all its suppliers of direct materials and services and defines the Quality requirements and rules that are at the basis of the relationship between Brembo and its suppliers, from supplier's approval to the development of a new product and for the entire duration of series production in order to guarantee adequate levels of quality and reliability of the purchased components and/or services.

The electronic on-line version of this manual is the only officially recognized. Any downloaded and/or printed copy becomes an uncontrolled document.

1 GENERAL REQUIREMENTS

1.1 QUALITY MANAGEMENT SYSTEM

All Brembo's suppliers of direct materials and services must have a certified Quality Management System.

Brembo's aim is for all suppliers of direct materials and services (for example, outsourced services) to be certified in accordance with the latest edition of the IATF 16949 standard obtained from accredited certifying bodies. Brembo manages all the suppliers in accordance with the requirements outlined in this standard.

Exceptions to this will be assessed on a case-by-case basis. Finally, for mechatronic components (HW and/or SW), compliance with ISO 26262 and ASPICE is required, where applicable.

Brembo requires its own suppliers to use IATF 16949 or ISO 9001 certified suppliers (sub-suppliers for Brembo) and manage them in accordance with these standards. Brembo suppliers must consider themselves guarantors for their own sub-supply chain as far as compliance with these requirements is concerned.

The Supplier must promptly inform Brembo of any changes of the certifying body, suspensions and/or cancellations of certification.

1.2 MANAGEMENT SYSTEM FOR OCCUPATIONAL SAFETY AND THE ENVIRONMENT

The Supplier must guarantee correct management of health, occupational safety and environmental issues and comply with the related applicable laws and regulations on their premises. The Supplier must also comply with the legislation in force and the practices defined by Brembo in case of visit to Brembo premises.

All Brembo suppliers must apply an environmental management system on their premises which is defined in accordance with international standards (EMAS, ISO 14001, etc.) or equivalent in accordance with existing national standards and attain third party certification; they must also implement an effective occupational safety management system, using, for example, the standards defined by ISO 45001 or equivalent such as those found in national standards and preferably attain third party certification. Suppliers are committed to disseminating and consolidating an occupational safety culture that promotes responsible behavior by workers.

To ensure compliance with the regulations in force, Brembo requires its suppliers to enter information on the materials they supply and their components into the International Material Data System (IMDS).

More specifically, the Supplier is obliged to comply with all applicable national and international regulations and standards governing the supply and use of substances and comply with any legal restrictions as well as their presence in the items supplied. The following list is not exhaustive but includes obligations defined by the European Community as part of the REACH Regulation (EC) no. 1907/2006 and its amendments and additions (European Union), as well as those defined as "REACH-like" such as China REACH for the People's Republic of China, K-REACH for South Korea, KKDIK for Turkey, those defined within ELV (End of Live vehicle) such as ELV Directive no. 2000/53 and any other "ELV-like" regulations such as AIS 129 for India and GB30512-2014 for China.

Brembo also reserves the right to perform audits, possibly using third parties, in the areas of occupational safety, environmental and social responsibility on its suppliers' premises if considered necessary in a virtuous process of continuous improvement and sustainability of its "Supply Chain". Brembo guarantees full confidentiality of all information it becomes aware of.

1.3 CUSTOMER SPECIFIC REQUIREMENTS

The Supplier must acknowledge and apply Brembo's specific end-customer requirements and any other requirement in addition to the IATF 16949 standard. These are available at the link <http://www.iatfglobaloversight.org>. The Supplier is responsible for diffusing these requirements along its entire supply chain and ensuring their implementation.

Whenever suppliers manage one or more processes defined as "special" according to the specific AIAG (CQI-xx) manuals and these are required by Brembo's end customer, the Supplier must ensure that their process is compliant with the requirements described in the related CQI-xx. In any case, a process assessment must be conducted at least once a year using the appropriate CQI-xx checklists. These process assessments must be made available to Brembo if specifically requested.

Specifically, when requested by Brembo or the end customer, when supplying parts subject to safety and regulatory requirements, in order to ensure product safety and legislative compliance (Product Integrity - VDA) throughout its entire life cycle, the Supplier must appoint a Product Safety and Conformity Representative (PSCR) in the Organization; responsible for the correct management, implementation and monitoring of product safety and applicable legislative requirements.

1.4 PRODUCT REGULATIONS

Due to the fact that Brembo exports, or may export, its products throughout the world, suppliers are expressly obliged to ensure that the supplied products, processes and services comply with the mandatory and legal requirements in force in the various Countries as far as application/end use is concerned. The Supplier is responsible for conveying this requirement along its entire supply chain and ensuring that it is correctly implemented. Any restrictions or failures to comply with must be promptly communicated in writing to Brembo.

It is understood that the products supplied to Brembo must meet the requirements outlined in the specifications for the certification for the various countries such as, as a non-exhaustive example, CCC (China), KC (Korea), EAC (Eurasian Customs Union), InMetro (Brazil), SNI (Indonesia), Better Brake (USA), AMECA (USA), etc. The suppliers shall provide evidence of achieved legal component certifications, according to technical specifications and regulations, ensure certification renewal within specified timeframe and submit related certificates during first sampling process and at any renewal.

2 NEW SUPPLIER SELECTION REQUIREMENTS

2.1 NEW SUPPLIER PRE-ASSESSMENT

Brembo requires potential new suppliers to fill in a Supplier Pre-assessment Questionnaire with a specific check list.

Any potential Supplier is asked to list any essential technical, qualitative, economic/financial, production/logistic, legislative and ethical aspects that distinguish them so that an initial assessment can be made to ensure compliance with Brembo's requirements. There is also the possibility of spontaneous submission using the Supplier Pre-Assessment Questionnaire available at <http://www.brembo.com>.

Completion of the pre-assessment questionnaire is a mandatory requirement to access the subsequent approval stages.

2.2 BREMBO QUALITY REQUIREMENTS - BQR

Brembo has defined self-assessment check lists (Brembo Quality Requirements - BQRs) that outline the minimum requirements that the supplier must meet both for the Quality Management System and the various types of production processes (e.g., machining, shell casting, surface treatments, etc.). During the pre-selection stage, Brembo sends the general requirements check list (Brembo General Quality Requirements) and the check lists related to the production processes (Brembo Quality Requirements) in order to have an overview of the Quality Management System, process management and how the supplier carries out product and process controls. The Supplier must return the completed check lists to Brembo with a self-assessment of the level of compliance with the listed requirements. Either when the requirement is fully met or only partially met, since a process or process management solution different from the one requested by Brembo is used, the Supplier must give a detailed explanation in the specific space provided.

Brembo reserves the right to check what has been stated by the supplier by performing on-site inspections or during APQP.

For potential new suppliers, compliance with BQR requirements is mandatory for approval.

For existing suppliers, renewed confirmation of compliance with the BQR requirements is mandatory for the allocation of a new project.

2.3 NEW SUPPLIER HOMOLOGATION

The suitability of a potential supplier to be part of Brembo's supply chain and future awarding of a project is verified through an homologation audit performed by dedicated personnel.

To check compliance between Brembo's requirements and the Supplier's Process and Quality Management System, the audit is carried out on a product/product family similar to the one that the Supplier is being inquired for.

To obtain approval as a Brembo supplier, the minimum requirements for the Quality Management System certification outlined in paragraph 1.1 are binding.

The homologation audit is conducted using a specific check list which examines the following areas of assessment:

- general information (company structure, quality, environmental and safety certification, compliance with regulations in force, ethical principles, etc.);
- technical and technological expertise;
- product and process development process;
- quality management;
- production and logistics management;
- management of sub-suppliers.

The final result of the audit has the following three possibilities:

- **Approved;**
- **Not approved, to be reviewed;**
- **Not approved.**

In case any gap is identified, the supplier must submit an improvement plan within one week after being notified of the result of the audit. Depending on the criticalities found, the submitted action plan and the timeframes defined by the supplier, Brembo may request a follow-up audit.

The state “not approved” excludes the possibility of becoming a Brembo supplier. The state “not approved, to be reviewed” means that the Supplier must be reassessed once the measures outlined in the improvement plan have been implemented.

2.4 SW AND/OR FUNCTIONAL SAFETY SUPPLIER QUALIFICATION

For mechatronic components, the Supplier is required to meet the requirements outlined in the table below.

Table 1: Requirements for mechatronic components

	NON SAFETY-CRITICAL COMPONENT	SAFETY-CRITICAL COMPONENT
SW	ASPICE HIS/VDA scope qualification of at least CL2 level already obtained on an application project or about to be obtained with INTACS accredited assessors (or equivalent standards) substantiated by an official report that attests the ongoing procedure.	<ul style="list-style-type: none">• Requirements for a non safety-critical component;• Compliance with ISO 26262 or ongoing compliance verification assessed using a similar product already in series production at the supplier's. (*)

HW (electromechanical)	IATF 16949 or ISO 9001 certification at least or the presence of a plan to achieve this certification substantiated by official communication from a certifying body that attests the ongoing certification process.	<ul style="list-style-type: none"> Requirements for a non safety-critical component; Compliance with ISO 26262 or ongoing compliance verification assessed using a similar product already in series production at the supplier's. (*)
SW + HW (ECU, electromechanical)	The requirements for the two previous cases are applied (SW and HW).	<ul style="list-style-type: none"> Requirements for a non safety-critical component; Compliance with ISO 26262 or ongoing compliance verification assessed using a similar product already in series production at the supplier's. (*)

(*) The requirement is considered to be met if no major non-conformity has been found.

In addition, Brembo may ask the Supplier for an extract of the result of assessments in accordance with ASPICE and/or ISO 26262 obtained on other application projects and/or similar products already in series production.

In order to be qualified as a SW supplier, Brembo requires a specific "Supplier Self-Assessment Report SW" check list to be completed. The check list has two assessment forms, the first one contains the requirements for "SW" whereas the second one contains the requirements for Safety; the second one should only be completed if the Supplied SW has been assessed as Safety critical.

For Safety qualification of the Supplier of Safety critical HW components, the "Supplier Self-Assessment Report Safety-Critical HW" check list must also be completed in addition to the requirements outlined in paragraph 2.3.

If the mechatronic component (SW and/or HW) being procured is SEooC (Safety Element out of Context), Safety qualification is not necessary since the product is already certified with the relevant ASIL by the supplier. Brembo is responsible for notifying the Supplier of the result of the SW and/or Safety qualification based on assessment of the above checklists. The final result will be one of the following:

- **SW and/or Safety qualified;**
- **Not SW and/or Safety qualified, to be reviewed;**
- **Not SW and/or Safety qualified.**

If Brembo requests it, the supplier must submit an improvement plan, according to the agreed timeframes, which includes the measures that will be taken to fill the identified gaps.

The state "not qualified" excludes the possibility of becoming a Brembo supplier. The state "not qualified, to be reviewed" means that the Supplier must be reassessed once the measures outlined in the improvement plan have been implemented.

2.5 FEASIBILITY STUDY

For every new product or service that is the subject of a request for quotation, in order to investigate and determine in advance the Supplier's ability to meet technical, quality, capacity, and schedule compliance requirements, the supplier is asked, before a new project is assigned, to conduct a feasibility study which considers all specifications and documentation sent by Brembo (drawings, technical specifications, quality specifications, required volumes, project schedules) and to perform an assessment of the ability to meet the requirements. The Supplier is asked to return the result of this assessment to Brembo.

Confirmation of the Supplier's feasibility study and acceptance by Brembo are mandatory for allocation of a new project.

The Supplier should perform this analysis by making preliminary studies or referring to considerations or assessments made on products that are already in series production to ensure that the result of the feasibility study to be returned to Brembo is highly reliable. Every time significant changes are made to the project, the feasibility study must be updated.

3 REQUIREMENTS FOR PRODUCT AND PROCESS DEVELOPMENT

3.1 GENERAL APQP REQUIREMENTS

Advanced Product Quality Planning (APQP) is a structured method of management of the product/service development process which involves close interaction between the Supplier and Brembo and defines the activities required to ensure that project objectives are met by focusing on the following aspects:

- **planning:** identify, define and plan activities to be carried out, responsibilities, time and costs, risks, resources, intermediate goals, and final objectives;
- **communication:** define the members responsible for APQP within the organization, effectively exchange information and intervene promptly on critical issues with appropriate escalation procedures;
- **monitoring:** arrange formal meetings to check the progress of the project, verify any deviations from what was planned, take appropriate corrective actions.

The APQP plan includes consecutive phases that must be proactively monitored by the Supplier, which should also guarantee extensive communication with the specific Brembo departments. The Supplier must guarantee that internal activities proceed in line with the project milestones communicated by Brembo. The Supplier is also responsible for ensuring that an APQP process is implemented at any sub-supplier of products or services required for the project.

The Supplier must provide its own dedicated resources, responsible for the internal APQP activities and proactive communication with Brembo. At the start of the project, the Supplier must inform Brembo of the APQP contact person who is in charge of these activities.

Brembo defines the APQP level that applies to the specific supplied product/service and shares it with the Supplier by means of a dedicated check list ("Supplier APQP Plan").

The APQP levels and specific documentation/requirements are listed in *Table 2*.

If changes are made to the project as a result of customer requests (e.g., changes in technical requirements, project timeframes), Brembo may request supplementary activities from the Supplier in addition to those initially planned and agreed upon.

For each APQP element where there is a deviation from the planned tasks, it is the responsibility of the Supplier to prepare a recovery plan that outlines the activities and responsibilities and to promptly inform Brembo's APQP contact person.

3.2 APQP WORK AREAS

The activities for the four APQP levels, reported in *Table 2*, are only intended to be a guide. For each specific project, Brembo reserves the right to include or remove some requirements from the specific level chosen, depending on the criticality of the product/project. A detailed APQP plan will be communicated and discussed with the supplier at APQP kick off.

Table 2: APQP levels and specific documentation/requirements

	WORK AREAS	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Preliminary supplier assessment	R	R	R	R
2	Project requirements (for prototypes and series production)	R	R	R	R
3	Additional requirements	R	R	R	R
4	Development Interface Agreement (DIA) (only for mechatronic safety-critical components)	R	R	R	R
5	Design FMEA	N/R	N/R	R	R
6	Checks/reviews	N/R	N/R	R	R
7	Prototypes	N/R	N/R	R	R
8	Prototype validation	N/R	N/R	N/R	R
9	Feasibility studies	R	R	R	R
10	Drawings and standards (series production)	R	R	R	R
11	Sub-suppliers	N/R	N/R	R	R
12	Development of production process	N/R	N/R	R	R
13	Flow chart	N/R	R	R	R
14	Process FMEA	N/R	R	R	R
15	Measurement systems	R	R	R	R

16	Work instructions	R	R	R	R
17	Packaging specifications	N/R	R	R	R
18	Pre-series production	N/R	N/R	N/R	R
19	Series production control plan	R	R	R	R
20	Process capability	N/R	R	R	R
21	Supplier PPAP	R	R	R	R
22	Full production capacity tests	N/R	N/R	N/R	R
23	Series production validation	N/R	R	R	R

Key:

R= Required;

N/R = Not Required.

3.3 SPECIFIC APQP REQUIREMENTS

3.3.1 DIA

For safety-critical mechatronic components, Brembo requires the Supplier to agree to and approve a DIA (Development Interface Agreement) which defines the activities and documents required for the development of functional safety of the product in accordance with the ISO 26262 Standard.

The activities defined in the DIA and their implementation will be verified by Brembo.

3.3.2 FMEA

Refer to the latest available version of the AIAG/VDA FMEA Handbook for implementation of the design and process FMEA.

3.3.3 PROTOTYPES

The Supplier must conduct feasibility studies on prototype components.

The Supplier is responsible for defining the prototype production process and for defining the related process parameters, guaranteeing traceability if changes are made, preparing the prototype parts, and preparing the prototype quality certificates as requested by Brembo and defined in the purchase order.

The Supplier must also prepare a prototype control plan to verify all characteristics prescribed by Brembo and the customer. The prototype control plan must define the tests and dimensional, material and functional checks to be carried out on the prototype components.

If specifically requested in the Brembo prototype purchase order, the Supplier must perform checks on these prototypes following the I.QA.SY-00 procedure: "Prototype controls and measurements" defined by Brembo. The procedure defines the number of pieces to control and all the supporting documents that the Supplier must provide with the shipments. The measurements of the dimensions reported in the drawing, must be indicated in the document M.QA.SY-00: "Sample measurement report" whereas document M.QA.SY-01: "Critical characteristics measurement report" must also be completed for the special characteristics.

If the documentation is incomplete or missing, this may result in the prototype batch not being accepted.

3.3.4 SUB-SUPPLIERS

The Supplier must define and share with Brembo the list of its sub-suppliers, to whom the concepts of the APQP must be disseminated; more specifically, Brembo's requirements and critical characteristics must be communicated to the sub-suppliers within their area of responsibility (e.g., supply of materials, subcomponents, etc.).

The Supplier is required to agree on the definition and planning of the activities required for project development with the sub-suppliers.

The Supplier is also responsible for the validation of the sub-supply components and related production processes and must provide evidence to Brembo.

The Supplier must be able to provide evidence that the customer requirements have been cascaded along the entire sub-supply chain.

3.3.5 MEASUREMENT SYSTEMS

The Supplier is responsible for ensuring that the measuring instruments required to check the identified characteristics are adequate and subjected to periodic calibration as well as capability studies referring to a standard agreed with Brembo (e.g., AIAG's Measurement System Analysis (MSA) manual). The Supplier is also responsible for guaranteeing that the methods used to take the measurements are in line with those used in the supplied Brembo plant.

3.3.6 PACKAGING SPECIFICATIONS

The Supplier is responsible for agreeing on and defining with Brembo the product packaging specifications based on product criticalities and any additional requirement. The packaging specifications for sub-supplied material (where necessary), packaging and internal handling specifications (assessed by Brembo during process validation audits) must also be defined and the packaging specifications for products shipped to Brembo agreed on and approved in advance.

These specifications must include the type of packaging, the auxiliary materials and the identification method to be used (labeling, etc.).

3.3.7 PRE-SERIES PRODUCTION

The reinforced pre-series production control plan must be used as a basis for creating the series production control plan.

3.3.8 SERIES PRODUCTION CONTROL PLAN

The Supplier must outline a series production control plan which must include all the sub-processes and the entire production flow from material reception to shipment and periodic requalification.

All the product characteristics must be listed in the control plan. The Supplier must systematically monitor the process/machine parameters that are subject to significant changes over time (e.g., temperatures, times, speeds, pressures, etc.), adequately record the controls performed by uniquely identifying the method used (e.g., using control recording checklists), and define a reaction plan in the event of non-conforming products.

If the criticality of the project or component/service covered by the APQP requires it, the Supplier is responsible for defining and implementing a Safe Launch Control Plan for the start of series production. The content and timeframes for application of the Safe Launch Control Plan must be agreed with Brembo.

3.3.9 PROCESS CAPABILITY

The Supplier must provide evidence that Brembo process capability requirements (see par. 5.3) related to critical characteristics are understood. The Supplier must have a statistical process control system that allows to conduct process capability studies (see par. 5.5) for the critical characteristics that require it, during process validation and in series production with a certain frequency, at least every three months. The Supplier is required to share these studies, upon Brembo request.

3.4 SW SUPPLIER MONITORING

If a software component is developed (made-to-order SW, customized SW, or components with integrated SW), the Supplier must give Brembo feedback regarding this development in accordance with the points outlined in this chapter. Brembo coordinates SW Supplier Monitoring activities by recording their progress on a specific form.

The Supplier must provide its own dedicated resources, responsible for the internal SW Supplier Monitoring activities and proactive communication with Brembo. At the start of the project the Supplier must inform Brembo of the contact person in charge of these activities.

N.B. For HW components with integrated SW, both APQP activities (see 3.1, 3.2, 3.3) and SW Supplier Monitoring are required.

The SW must be developed in accordance with ASPICE (VDA scope) with a maturity level of at least 2 (Capability Level - CL2) on all required and applicable processes.

3.4.1 SW SUPPLIER MONITORING WORK AREAS

The SW Supplier Monitoring elements for the management of a SW component developed by the Supplier are described in the following paragraphs.

3.4.1.1 PRELIMINARY SW SUPPLIER ASSESSMENT

The receipt of the approval from Brembo is a pre-condition for the software component supplier for the SW and/or safety qualification as described in par. 2.4.

3.4.1.2 PROJECT REQUIREMENTS

At this stage, the Supplier must prepare a SW development plan which includes the release of a certain number of baseline SW solutions of defined maturity agreed with Brembo in accordance with the project timeframes and milestones. The Supplier will also receive the project requirements from Brembo in order to allow the analysis and assessment of its ability to meet them.

3.4.1.3 DIA

Brembo requires the Supplier to agree to and approve a DIA (Development Interface Agreement) which defines the activities and documents required for the development of functional safety of the product in accordance with the ISO 26262 Standard.

The activities outlined in the DIA and their implementation will be verified by Brembo.

3.4.1.4 CHECKS/REVIEWS

The Supplier must inform Brembo, in writing (e.g., deviation list), in case of negative outcome of the activities planned and executed to verify compliance to all the requirements.

3.4.1.5 DEFINITION AND PLANNING OF BASELINE SW

In this stage, Brembo evaluates and approves the Supplier's baseline SW release plan. This plan must specify the number of releases with their timeframes and maturity as far as compliance to the project requirements, the tests performed on the release and the completeness of the attached documentation are concerned.

3.4.1.6 SUB-SUPPLIERS

The Supplier must compile and share the list of their subcontractors with Brembo and disseminate the Supplier Monitoring SW concepts and applicable design requirements to them.

The Supplier is required to agree on the definition and planning of the activities required for project development with the sub-suppliers as well as the definition and planning of the baseline SW releases.

The Supplier is also responsible for validating and approving the baseline SW released by their own sub-suppliers.

3.4.1.7 SHARING OF DEVELOPMENT, TESTING AND VALIDATION SYSTEMS AND TOOLS

The Supplier must guarantee that the tools required for the development, testing and validation of the SW are adequate for the complexity and characteristics of the SW that is being supplied. The Supplier must inform Brembo of the names, versions and configurations of all the tools used during development and validation. If updates are required, these must be communicated and agreed upon with Brembo.

3.4.1.8 RELEASE OF BASELINE SW

In accordance with the release plan, suppliers must deliver the baseline SW to Brembo in the established manner and timeframe. More specifically, the Supplier must define the requirements met by the baseline SW, guarantee traceability if changes are made, implement the baseline SW, perform validation testing and write a validation report. Finally, the Supplier must deliver each baseline SW product in a manner and timeframe agreed with Brembo and in accordance with information security criteria.

3.4.2 SW APPROVAL PROCESS

The SW Approval Process requirements for each baseline SW product are described in the following paragraphs.

3.4.2.1 PROJECT WORK PRODUCTS

The Supplier is responsible for possessing all the work products associated with the baseline SW which will be released in accordance with project requirements, ASPICE (VDA scope) and any other relevant standards.

Any work products addition or exclusion must be agreed with Brembo during the planning stage.

3.4.2.2 RELEASE NOTES

Each software (SW) release must be accompanied by a Release Note with the results of the tests performed on that release attached. The Release Note must include the following information:

- Information on the supplier;
- Information on supplied product;
- Product configuration;
- Date and method of delivery;
- Level at which requirements are met and information on requirements that are not met;
- Environmental requirements;
- Installation procedures;
- List of solved problems with respect to previous release;
- Known bugs and fixes.

3.4.2.3 TEST PLANS AND TEST SPECIFICATIONS

The Supplier must define and share a validation plan for SW release with Brembo ensuring that it is managed in accordance with the ASPICE processes (VDA scope).

The Supplier is also required to perform regression tests to validate the functionality of the SW in case any changes are made to the SW.

3.4.2.4 DOCUMENTATION FOR VERIFYING THE TOOL DEVELOPMENT AND TESTING/VALIDATION CHAIN

The Supplier must send to Brembo the documentation with the tool development and testing/validation chain, i.e., the names, versions and configuration of all the tools/SW used during development and testing/validation.

3.4.2.5 REPORT WITH RESULTS OF TESTS PERFORMED ON RELEASED SW

The Supplier is responsible for attaching the test report, indicated in par. 3.4.2.2, performed on the baseline SW that is being released, to the Release Note.

3.4.2.6 RELEASED SW

The Supplier is responsible for sending each SW release to Brembo referring to the agreed methods of delivery in order to obtain approval.

3.4.2.7 REFERENCE CONFIGURATION FREEZE

The Supplier must keep a copy of all the released baseline SW and all the tool development and testing/validation chain configurations for 15 years or as specified in the supply contract.

3.4.3 ASPICE ASSESSMENT

If a more in-depth check of how the processes are implemented by the Supplier is considered necessary with regard to the level of maturing (Capability Level - CL) defined in the contract, Brembo may ask for an ASPICE Assessment to be conducted on the project by an appropriately appointed competent assessor (INTACS-certified).

4 REQUIREMENTS FOR PRODUCT AND PROCESS VALIDATION

4.1 PPAP

Brembo requires the Supplier to produce and submit an initial sample before the start of series production, in line with the timeframes communicated at the start of the project. Brembo requires an initial sample in line with PPAP (Production Part Approval Process) method. By issuing of purchase order, Brembo informs the Supplier of the PPAP level and number of samples required and the expected delivery schedule.

The Supplier is required to produce the parts using a definitive process and equipment and series production conditions (Off Tool Off Process OTOP) so that the initial sample products or services are representative of the series production. Any deviation from the above must be agreed on with Brembo prior to PPAP submission.

The PPAP has four levels classified in increasing order of complexity. These levels and specific documentation/requirements are listed in the following table:

Table 3- PPAP level requirements

	REQUIREMENTS	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Reference project documentation (e.g. drawing, specifications, requirements) <ul style="list-style-type: none"> • Supplier documentation • Brembo documentation 	T T	T P	* P	* *
2	Authorized project modifications, not yet made official on the project documentation but already introduced to the product (Engineering Change Documents)	T	P	P	*
3	Request for approval of component “Initial Sample Report (RPC)” - sheet 1	P	P	P	P
4	Design FMEA (only for suppliers who are responsible for the project or co-designers)	T	T	P	*
5	Production flow chart	T	T	P	*
6	Process FMEA	T	T	P	*
7	Control plan	T	T	P	*
8	Documentation assessing ability of measurement system and means of control	T	T	P	*
9	Dimensional results report (“First Sample Report (RPC)” - sheet 2)	T	P	P	*
10	Results of tests performed on materials, performance and duration (performed by qualified external laboratory if requested)	T	P	P	*
11	Process capability verification documentation	T	P	P	*
12	“Appearance Approval Report (RAE)”, if expressed requested	T	T	P	*
13	Initial sample parts	P ⁽¹⁾	P	P	*
14	Master samples (“counter samples”)	*	*	*	*
15	IMDS	P	P	P	P

(1) for PPAP level 1 at least one part is always requested.

Key:

P = to be formalized and sent to Brembo;

T = to be formalized and sent to Brembo only if specifically requested;

* = to be formalized and made available at the supplier's if specifically requested by Brembo.

Level 4 refers to the first sample verified by Brembo at the Supplier's premises. Brembo may ask for other documents in addition to those required for the assigned PPAP level.

If an initial sample is rejected, the costs incurred by Brembo to handle and check it will be charged to the Supplier, unless differently agreed.

Brembo may ask the Supplier to submit an additional PPAP one year or more after the first PPAP submission, for example, for periodic product revalidation or after a prolonged suspension of supply (at least one continuous year). In the latter case, approval of the PPAP is mandatory for resuming supply.

The PPAP must be submitted to the Brembo production site indicated on the purchase order. If any other Brembo production site is supplied with the same part, the Supplier must send an approved and signed First Sample Report (RPC).

In addition to the indications given in *Table 3*, all evidences must be submitted for sub-supplied parts in line with the requirements specified in this chapter when they are subject to specific Brembo design (specific Brembo drawing available). For sub-supplied parts, on the other hand, that are subject to internal supplier design, the PPAP documentation presented to Brembo must be integrated with the approval documentation for the initial samples of these sub-components and/or sub-services.

All the initial sample documentation must be provided in English unless differently agreed.

4.1.1 SPECIFIC PPAP REQUIREMENTS

4.1.1.1 AUTHORIZED PROJECT MODIFICATIONS (ENGINEERING CHANGE DOCUMENTS)

The Supplier must record any difference from the project documentation (drawings, BDS or other technical specifications) in an Engineering Change Document.

The document, which serves as authorization to proceed in a different way from what prescribed in the officially issued documents, must first be submitted to Brembo for evaluation and possible acceptance before being attached to the PPAP documentation.

If a PPAP is submitted with differences in drawings and/or specifications which have not been formally authorized, the PPAP will not be approved. If the authorization is sent by email, a copy of the document (e.g. email) which clearly indicates the person who authorized it must be attached to the PPAP documentation.

4.1.1.2 FIRST SAMPLE REPORT

For each Brembo part that is subject to initial sampling, the Supplier must submit a request for approval of the component using the specific Brembo form ("First Sample Report (RPC)" - sheet 1) to which all reports (dimensional, materials, etc.) and necessary documentation must be attached according to the assigned PPAP level (see *Table 3*) and the Brembo contractual requirements.

4.1.1.3 DIMENSIONAL CHECKS

The Supplier must attach the certification of compliance with the dimensional requirements specified in the project documentation and Control Plan to the PPAP documentation. For products made on different production lines or with equipment with different molds/cavities, the characteristics of each configuration must be certified.

All the dimensional checks must be attached by the Supplier using the “First Sample Report (RPC)” - sheet 2.

For all the PPAP parts to be sent to the customer, the Supplier must guarantee the traceability of the controls performed and all the measured parts must therefore be univocally marked.

4.1.1.4 RESULTS OF TESTS ON MATERIALS AND FUNCTIONAL TESTS

The Supplier must attach the results of the tests on materials and functional tests indicated on the project documentation to the PPAP documentation.

For products made on different production lines or with equipment with different molds/cavities, the characteristics of the material in each configuration must be certified.

If specifically requested by Brembo or if the required test equipment is not available, the tests on materials and the functional tests must be performed by a qualified external laboratory in accordance with the ISO/IEC 17025 standard and by means of related accredited testing procedures if available, otherwise a calibration report referred to national/international samples must be presented. The results are considered valid for approval of the PPAP.

Brembo reserves the right to repeat any tests on materials or functional tests carried out by the supplier. In case of discrepancy with the results stated by the Supplier, the Supplier must repeat the tests at an ISO/IEC 17025 accredited laboratory and with a testing procedure accredited by the competent bodies (e.g., corrosion test according to ISO EN 9227). These results will be considered valid for approval of the PPAP.

4.1.1.5 MASTER SAMPLES (“COUNTER SAMPLES”)

The Supplier must take a sample part from the PPAP production run (produced in the same conditions as those supplied to the customer for approval) and measure all its characteristics (except for destructive tests or tests that may compromise its condition), and keep it for the entire period in which the part is supplied.

This master sample must be univocally marked with all the information required for traceability (production batch, production date, production line, etc.) and must also indicate the date the PPAP was approved by Brembo.

For products made on different production lines or with equipment with different molds/cavities, a sample part must be kept, in the conditions stated above, for each configuration.

The storage conditions for the master samples must guarantee the conservation of all their characteristics for the required period of storage. For products with an expiry date, a period of validity for the master sample must be defined. Once expired, a new sample must be kept. The methods and timeframes used for its implementation and control must be agreed in advance with Brembo.

4.1.1.6 IMDS – INTERNATIONAL MATERIAL DATA SYSTEM

Indicating the substances in the purchase materials supplied by the supply chain (including the percentage of recycled materials) is part of the new product approval process (PPAP) and must be done by the supplier using the IMDS (International Material Data System), unless differently agreed.

The reported data must be uploaded by the supplier onto the dedicated web portal at least 10 working days before PPAP submission, so that the department appointed by Brembo can approve or reject the uploaded data, which must be in line with IMDS recommendations and comply with the rules and content of the regulations in force.

The ID code issued by the IMDS and approved by Brembo must be indicated in the specific field in the First Sample Report (RPC), so that the PPAP can be approved by Brembo. In case the data are not correctly entered into the IMDS and the ID code is not indicated, the PPAP will be rejected by Brembo.

If the IMDS ID code is indicated by the Supplier but the approval, by the designated Brembo department, of the data on the IMDS database is still pending, the PPAP may be approved with condition.

Additional requirements may be necessary or requested by Brembo in case of specific demands or requests from the end customer.

4.2 PROCESS AUDIT

Once the PPAP has been approved, Brembo verifies the supplier's production process by performing a process audit following a specific checklist.

The audit may have 4 different results, depending on the assessment percentage obtained:

- **Approved Process;**
- **Temporarily Authorized Process with action plan;**
- **Temporarily Authorized Process with reinforced control;**
- **Process Not Approved.**

For the results “Temporarily Authorized Process with action plan”, “Temporarily Authorized Process with reinforced control” or “Process Not Approved”, a special state of supply may be applied.

If necessary, the Supplier must send, within one week from the communication of audit's result, an improvement plan by completing the specific fields on the "Action plan" sheet for each unresolved point.

The Supplier's process must be approved before the start of series production. A temporarily approved process requires the immediate implementation of an improvement plan agreed with Brembo (as described above). Such plan must be constantly monitored and updated by the Supplier in accordance with the defined timeframes and shared with Brembo. Approval of the process depends on effective implementation of the improvement plan.

Depending on the criticalities found, the action plan sent and the timeframes defined by the supplier, Brembo may assess the need for an additional on-site audit.

Using the specific Brembo checklist, on an annual basis, the Supplier must carry out a process requalification applying the "product/process family" approach which includes all stages of production involving Brembo products. The reports for this requalification must be made available to Brembo if specifically requested.

Depending on the Supplier's performance, occurred critical issues and the Supplier's level of involvement in new projects, Brembo reserves the right to conduct on-site process requalification.

4.3 FUNCTIONAL SAFETY ASSESSMENT FOR SAFETY-CRITICAL MECHATRONIC COMPONENTS

For safety-critical mechatronic components, the Supplier must demonstrate the compliance of the supplied product/component with ISO 26262 as stated in the DIA (par. 3.3.1)

In case it is considered necessary, Brembo may request and organize Functional Safety audits and/or assessments (which do not replace Confirmation Measures, which are under responsibility of the supplier).

Depending on the outcome of the assessment, if non-conformities are detected, an appropriate recovery plan should be immediately prepared and agreed upon with Brembo, with the related risk analysis.

Depending on the outcome of the assessment, the Supplier can be assessed by Brembo as:

- **Not approved.**
- **Approved with conditions.**
- **Approved.**

Within one week after being notified, the Supplier must submit an improvement plan including actions which will address the gaps reported in the assessment. Depending on the criticalities found, the action plan sent and the timeframes defined by the Supplier, Brembo may request a follow-up assessment.

The state “not approved” excludes the possibility of becoming a Brembo supplier. The state “approved with conditions” means that the Supplier must be reassessed once the actions outlined in the improvement plan have been implemented.

4.4 RUN@RATE

The purpose of the full-capacity production test (Run@Rate) is to verify, under series production conditions and for a set period, that the process is capable of producing products that meet the agreed quality and production capacity requirements.

Brembo may ask the Supplier to perform this test as part of self-assessment or to perform the check directly at the Supplier's site, using the specific Brembo check-list.

The full-capacity production test must be performed following the specific “Run@Rate Supplier Production Capacity Evaluation” form.

If the Run@Rate results do not confirm that the agreed requirements have been met, the Supplier must formalize and share a recovery plan with Brembo that guarantees that the requirements will be met.

5 REQUIREMENTS FOR SERIES PRODUCTION

5.1 CHANGE MANAGEMENT

For the entire period of series and spare parts production, the Supplier must guarantee a product and/or service that complies with the specifications and meets the process and product/process control conditions declared during submission and approval of the PPAP.

If the Supplier needs to make changes to the product or production process (for example, production site, production flow, production cycles, machines, equipment, molds, materials, sub-suppliers), it must submit a written request to Brembo and obtain formal approval before implementing the change. This request must be sent to Brembo with a period of advance notice, consistent with the criticality of the change.

The actions to be taken before the change is approved must be agreed upon with Brembo and must be consistent with the criticality of the change to be made.

The Supplier is responsible for any validation and/or testing cost requested by Brembo or Brembo's customer.

Unless differently agreed, the Supplier must submit a new PPAP and, if a change has a high impact on the process or the product, is responsible to develop a plan for introducing the change using APQP methodology.

The parts can only be shipped by the Supplier to Brembo once the aforementioned PPAP has been approved by Brembo.

If the change management requirements outlined in this document are not complied with, the Supplier will be held liable for any costs or damages that Brembo or Brembo's customer may incur.

5.2 IDENTIFICATION, TRACKING AND TRACEABILITY

The Supplier must define the size and characteristics of its production batch and use a system that allows:

- the identification and traceability of raw materials, semi-finished products, sub-components and products stored in its warehouses, throughout the production process or in storage/during processing at any sub-suppliers;
- the identification and traceability of the product status throughout the production cycle with regard to production conditions, tests and inspections, the difference between a "compliant" and "non-compliant" product, the identification of products with safety and/or regulatory characteristics, the identification of the finished and approved product with markings on the product if necessary;
- correct FIFO (First In First Out) management.

In addition, through product identification and the various records that link the different stages of the production process, the Supplier must ensure adequate tracing of the products supplied, i.e., be able to trace the batch of raw material used, the batch of subcomponents used and all the information needed to identify any defective batches, know the production and control methods, the results of product testing and the destination of all the involved parts. The Supplier is responsible for verifying and ensuring that the above requirements are conveyed, implemented, and maintained along the entire sub-supply chain, even for outsourced processes.

The Supplier must implement, where possible, technological solutions aimed at meeting the above requirements through the use of appropriate digital and interconnected systems that make tracking/tracing information available and usable by querying the production control management system (e.g., barcode reading systems, QR codes, special markings).





5.3 MANAGEMENT OF CRITICAL CHARACTERISTICS

“Critical characteristics” are the characteristics to which Brembo, with its expertise and experience in design and FMEA analysis, gives a special importance and criticality.

The Supplier is expected to know the meaning of the symbols that Brembo assigns to the characteristics used in its technical documents, the degree of importance of the characteristics assigned to its supply components and the requirements associated with them. The compliance of these characteristics and strict control of the production process are essential.





Brembo defines four types of critical characteristics as described in *Table 4*:





Table 4 - Definition of critical characteristics

CHARACTERISTIC	SYMBOL	DEFINITION
SAFETY		Essential characteristics for the final product regarding the safety of the user or a third party.
REGULATIONS		Essential characteristics for vehicle type approval in the countries where the products are marketed and, more generally, for compliance with national and international regulations.
ASSEMBLY		Characteristics which if not compliant may seriously affect the functionality of the product when used and/or its assembly on the vehicle.
IMPORTANT		Characteristics which if not compliant may seriously affect the functionality of the product when used and/or its correct assembly in the Brembo processes.

For each critical characteristic specified during the design phase, the Supplier must meet the requirements listed in *Table 5*. The Supplier is also responsible for guaranteeing not only the cascading of these requirements along the entire supply chain involved in the production of Brembo parts, but also the correct management by the sub-suppliers involved.

Table 5 – Requirements related to the critical characteristics

ID	REQUIREMENT				
1	Identification of the machine/system in which the characteristic is created/verified	X	-	-	-

ID	REQUIREMENT				
2	Identification of the characteristics on the documents (e.g. drawing, FMEA, control plan, control cycles, instructions, etc.)	X	X	X	X
3	Recording of results of tests and controls as specified in the control plan/cycle	X	X	X	X
4	Short term process capability (*)	≥ 1.67 or 100% check.	≥ 1.67 or 100% check.	≥ 1.67 or 100% check.	≥ 1.67 or 100% check.
5	Long term process capability (*)	≥ 1.67 or 100% check.	≥ 1.67 or 100% check.	≥ 1.33 or 100% check.	≥ 1.33 or 100% check.
6	Deviations	NOT ALLOWED	NOT ALLOWED	-	-
7	Traceability	X	X	X	X
8	Identification of characteristics on product identification labels	X	-	-	-
9	R&R of measuring instruments for control of significant characteristics (*)	X	X	X	X
10	Cg/Cgk of measuring instruments for control of significant characteristics (*)	X	X	X	X
11	For critical raw materials: - certificate for each batch of raw material (e.g., 3.1 according to UNI EN 10204 or equivalent); - diffusion of critical symbol and related design FMEA severity ranking downstream of supply chain (e.g., critical symbol on certificate); - adequate material management to avoid use of incorrect raw material.	X	X	X	X

(*) requirement not applicable if material name has a special symbol. Refer to par. 5.4.

If the Supplier uses its own symbols for critical characteristics, it must outline a clear correlation with the ones used by Brembo.

For all characteristics identified as critical, production processes must guarantee a zero defect level. This must also be ensured for product/process characteristics which if not complied with may have a serious impact on the Supplier's production process and its process characteristics, identified in the process FMEA, that are considered critical for safety, regulations, functionality and assembly.

5.4 RAW MATERIALS

The conformity of each batch of raw material must be verified with specific checks and evidence must be given by presenting a certificate that guarantees the material properties (e.g. UNI EN 10204-3.1 or equivalent). The requirement applies to all types of raw material (for example, metallic material, rubber, fiber).

If the raw materials mentioned in the Brembo drawings are defined as critical characteristics, the Supplier shall refer to the specific requirements as per *Table 5*, here above.

In addition, for raw materials accompanied by safety symbol S, the Supplier is required to include the S symbol in the certificate, in order to indicate that the material is used for safety products.

Alternative management of the S requirement must be agreed upon with Brembo in order to determine the necessary actions for proper management of the requirement (e.g., requalification, acceptance checks, etc.).

5.5 PROCESS CAPABILITY

The Supplier's production processes must guarantee minimum variability, and therefore maximum repeatability, of the product characteristics with regard to the defined specifications. In particular, with regard to production processes that have an impact on the critical characteristics, conditions of minimum variability in the short term (during process validation) and in the long term (throughout the life of the process/project) must be ensured.

5.5.1 PROCESS CAPABILITY STUDIES DURING PPAP

During first sampling, on all critical features defined by Brembo in addition to those considered critical by the Supplier, a short term capability must be guaranteed according to the requirements in *Table 5* (except in cases where there is a 100% check of the characteristic throughout series production). The Supplier must therefore perform a short term capability study for each critical characteristic. This study must be performed on a sample consisting of at least 125 pieces produced using an OTOP (Off Tool Off Process) process taken consecutively from production.

If the required level of process capability (see *Table 5*) is not reached, the Supplier is responsible to implement a suitable reinforced control system (100% checks, poka yoke, etc.) to guarantee part compliance until the required process capability conditions are restored.

5.5.2 PROCESS CAPABILITY STUDIES DURING SERIES PRODUCTION

On any critical feature defined by Brembo in addition to those considered critical by the Supplier, a long term capability must be guaranteed according to the requirements in *Table 5* (except in cases where there is a 100% check of the characteristic throughout series production). The Supplier must therefore perform a long term capability study for each critical characteristic. This study must be performed on a sample of at least 125 pieces produced using an OTOP (Off Tool Off Process) process taken *non*-consecutively from production batches (in order to include the real sources of process variability).

The long term capability studies on the critical characteristics must be performed at least every three months and the data must be made available to Brembo if specifically requested.

If the required level of process capability (see *Table 5*) is not reached, the Supplier is responsible to implement a suitable reinforced control system (100% checks, poka yoke, etc.) to guarantee part compliance until the required process capability conditions are restored.

In order to prevent and/or intercept special causes of variability during series production, the Supplier must constantly monitor the critical product/process characteristics using appropriate Statistical Process Control (SPC) techniques (e.g., X-R control charts). Finally, the Supplier is responsible for defining suitable reaction plans that can promptly tackle these special causes of variability. The aim of these reaction plans is to guarantee the compliance of the products that are supplied to Brembo.

5.5.3 CAPABILITY STUDIES WITH LOW SAMPLE SIZE (<125 PIECES)

If the capability study cannot be performed on a sample size of at least 125 pieces (with, in any case, a sample size of no less than 30 pieces), the process capability goal must be adjusted in view of the lower statistical significance of the sample. To this end, Kane's method can be used to obtain, based on the low sample size, the target values needed to assess process capability. *Table 6* shows the correlation between the required process capability level and batch size according to Kane's method.

Table 6 - Process capability target values with a low sample size (Kane's method)

		Required capability level		
		1.33	1.67	2
Sample size	125	1.33	1.67	2
	100	1.45	1.82	2.18
	90	1.46	1.84	2.2
	80	1.46	1.84	2.2
	70	1.46	1.84	2.2
	60	1.48	1.85	2.22
	50	1.5	1.89	2.26
	40	1.52	1.9	2.28
	30	1.54	1.94	2.32

5.5.4 CHARACTERISTICS THAT CANNOT BE HANDLED WITH CAPABILITY STUDIES

For critical characteristics with stability and repeatability that cannot be analyzed and demonstrated with a capability study, the Supplier, upon agreement with Brembo, must define and implement:

- suitable capability studies and monitoring tools on secondary product/process characteristics which are directly correlated;
- suitable 100% checks on secondary product/process characteristics which are directly correlated.

In these circumstances, the Supplier must provide evidence to demonstrate the correlation between the primary and secondary characteristics during product/process development and add it to the PPAP documentation, . These secondary product/process characteristics must be traced in the process FMEA documents and Control Plan.

5.6 MANAGEMENT OF SUB-SUPPLIERS

The Supplier must demonstrate to have a process and criteria in place for approving its suppliers, which must have and maintain a certified Quality System for the entire duration of the supply .

The Supplier must also demonstrate to have a process and criteria in place for monitoring its suppliers (with regard to process suitability, management of critical characteristics, quality and service performance, consistency of action plans, for example) and guarantee the prompt implementation of corrective action if non-conformities arise and the implementation of improvement plans if performance does not meet expectations.

The Supplier must guarantee that Brembo and its end customers' requirements are correctly cascaded along the entire supply chain.

Any change of sub-suppliers or change of sub-suppliers' processes during series production must be communicated to and authorized in advance by Brembo.

If risks are identified on Brembo's product or criticalities related to the sub-suppliers manufacturing process and/or product, Brembo, together with the Supplier, reserves the right to approve the sub-supplier or perform on-site inspections.

5.7 PRODUCT AND PROCESS DEVIATIONS

Brembo reserves the right to receive supply products that do not comply with requirements, through a special deviation approval process, only in exceptional cases.

There are two types of deviation request:

- **Product:** this regards product/service characteristics that do not comply with the technical specifications (dimensions, materials, surface treatments, results of functional tests, etc.), with the exception of critical characteristics with the S or R symbol, for which no deviations are allowed.
- **Process:** this regards production process and/or Control Plan characteristics and/or parameters that do not comply with what was submitted and approved during PPAP, process validation audit or during APQP as long as the product/service complies with the technical specifications.

The deviation request must be sent to Brembo before the involved product/service is shipped, by completing the specific form "Request for waiver/deviation from supplier" and must be submitted to each supplied Brembo plant.

The Supplier must also implement suitable methods of identification agreed upon with Brembo to guarantee the traceability of the parts delivered with a deviation (e.g., identification label, special packaging/containers, marking on individual parts, etc.).

The product/service that has a deviation can be shipped once the "Request for waiver/deviation from supplier" form has been accepted and signed by Brembo, unless differently agreed. The approval of a deviation request can be considered valid only for the characteristic it was requested for.

5.8 NON-CONFORMITY MANAGEMENT

It is in the interests of both Brembo and the Supplier to identify any non-conforming products as quickly as possible. Brembo can intercept non-conforming supply products during various stages of its process and also when the end product is used by customers.

If a non-conformity occurs, Brembo sends to the Supplier a non-conformity notification, which the Supplier must respond to by implementing an effective problem solving process which includes the following activities:

- estimation of the involved products and assessment of the impact of the non-conformity;
- containment action to be taken to promptly eliminate the risk of sending further non-conforming products to Brembo (e.g., sorting, additional checks);
- in-depth and systematic analysis to find the root cause of the non-conformity;
- corrective and preventive measures to be taken to eliminate the cause of the non-conformity and prevent reoccurrence;
- verification of corrective actions effectiveness;
- evaluation of corrective actions extension to other similar products and/or processes.

The number of non-conformities that occur, the associated demerit and the number of rejected parts contribute to the overall supplier performance evaluation.

Information on how to handle non-conformities must be communicated to Brembo by the Supplier through a specific 8D report or an alternative problem solving methodology to be agreed upon with Brembo. More specifically, the Supplier must send:

- (3D) within 24 hours, information on the containment action that the Supplier intends to take on Brembo's and its own site (e.g., selections, additional checks) and evidence that problem solving has been activated;
- (5D) within 10 working days (5 days for non-conformities that has an impact on critical S/R characteristics), an analysis and determination of the root cause(s) of the problem and a complete plan of the corrective actions required to solve the identified causes.

The Supplier must promptly notify Brembo of the outcome of any sorting campaign and/or reintegration of the defective batch.

Brembo reserves the right to intervene on the material (sorting/rework) if needed to guarantee production continuity as well as to scrap non-conforming material 20 days after the date in which the statement of non-conformity is received, unless differently indicated or agreed upon with the Supplier.

However, the timeframes for closing the 8D report (or alternative problem solving methodology) may vary according to the criticality and/or complexity of the identified non-conformity; in these cases, the above timeframes may vary subject to agreement between Brembo and the Supplier.

The Supplier must promptly inform Brembo if non-conforming or suspect material is shipped.

If non-conforming material is returned to the Supplier to be investigated, after analysis, the Supplier must promptly make this material unusable in accordance with the IATF 16949 standard.

In the event of severe and/or repetitive non-conformities, Brembo may ask the Supplier to apply special supply statuses (special containment processes) called CSL (Controlled Shipping Level), structured into different levels depending on the severity and reoccurrence of the non-conformities. These special supply statuses are described in chapter 5.14.

The Supplier must promote, within its organization, training courses on advanced problem solving methodologies and provide Brembo, on request and/or during audits, evidence of such training given to the personnel responsible for handling both internal and external non-conformities.

5.9 PRODUCTION AND CONTROL EQUIPMENT BELONGING TO BREMBO

All the production and control equipment that belongs to Brembo, or Brembo's customers, in use on the supplier's sites, must be clearly and univocally identified, handled and stored to guarantee its integrity over time and must be used for the production and control of Brembo products only, unless differently agreed.

The Supplier must, at its own expense, perform periodic calibration and routine maintenance on this equipment and periodically check its suitability, unless agreed otherwise.

In case of extraordinary maintenance or complete rework (e.g., end-of-life molds), the Supplier must promptly notify it to Brembo Purchasing in order to receive authorization well in advance, so that Brembo can start its internal approval process and there is sufficient time for the refurbishment, which is managed directly by the Supplier.

5.10 CQC – QUALITY AND CONFORMITY CERTIFICATE

Unless differently agreed, the Supplier must complete and keep at its production plant all CQC (Supplier Quality and Conformity Certificate) certificates for each individual batch produced attesting product compliance and the successful execution of the checks and tests outlined in the control plan.

The Supplier must provide the Quality and Conformity Certificate to Brembo Quality using the specific Brembo form in the cases shown in *Table 7*, unless differently agreed.

This paragraph does not apply to the supply of integrated SW.

Table 7 - Cases in which CQC should be provided and characteristics included in certificate

TYPE OF DELIVERY	REASON FOR CERTIFICATE	CASES IN WHICH CERTIFICATE IS SENT	CHARACTERISTICS TO BE INCLUDED IN CQC
PROTOTYPES	Prototype stage	Always, for each batch supplied to Brembo	All those specified in the technical documentation unless differently agreed with Brembo
SERIES PRODUCTION BATCHES	Reporting of non-conformities	First 3 batches delivered after corrective actions	All those shared during APQP in addition to those affected by reporting of non-conformities
	Product supplied with deviation (including potential batches which are requested prior to first sampling)	All batches delivered within deviation validity period	All those shared during APQP in addition to those affected by deviation
	Brembo request (special product verification)	Within 24h from the issuing of the request	All those shared during APQP in addition to those requested by Brembo
	CSL 1 / CSL 2 / CSL 3	All the batches delivered during the period in which the measures are implemented	All those shared during APQP in addition to those affected by measures

5.11 PERIODIC REQUALIFICATION

In order to guarantee an adequate quality level over the entire product life cycle, the Supplier must perform periodic product and process requalification.

Brembo requires complete product and process requalification on yearly basis at least (including dimensional analysis, capability studies, material certificates, functional tests, legislative and government specifications/requirements, MSA studies and any aesthetic reports). The approach can be followed “for product/process families” and must be shared by the Supplier and agreed upon with Brembo.

The supplier must follow the dedicated Brembo check list for requalification process. The frequency and content of the requalification tests must be included in the control plan and generally must be re-assessed and agreed with Brembo if the product and/or process is modified, if there are significant changes in the required production volumes or if the Supplier's performance is not adequate and in line with the quality targets set by Brembo. Any change or modification to the requalification plan must be agreed between the Supplier and Brembo.

The Supplier must analyze, document and record the results of requalification and make them available to Brembo if specifically required. The Supplier is also responsible for guaranteeing that a robust and effective requalification process is implemented along the entire sub-supply chain.

5.12 CHARGES TO SUPPLIER

The Supplier is responsible for damages caused to Brembo and/or its customers attributable to non-conformities in the supplied product. Brembo reserves the right to charge the Supplier for costs arising from the non-conformities' management or PPAP's rejection due to deficiencies in the submitted documentation or non-conformities found in the supplied samples.

For warranty costs incurred as a result of defects identified by Brembo's customer network, the allocation of responsibility to the Supplier and costs is based on:

- the parts replaced during the warranty period and confirmed as defective, with responsibility attributed to the Supplier;
- a sample of the parts replaced in the customer network is made available to Brembo and then to the supplier in order to perform the analysis needed to determine the cause of the defect;
- the results of the analysis performed on the received samples determining Supplier's responsibility degree.

5.13 MANAGEMENT OF WARRANTY RETURNS

In the event of non-conformities and warranty returns, the involved suppliers must support, within their area of competence, the activities for the non-conformities management and more specifically ensuring the following:

- Analysis of the samples returned under warranty;
- Definition of measures that must be taken to eliminate the confirmed root cause of the defect;

- Responsibility for warranty costs.

If a supplied component is involved in a return under warranty from Brembo's customer network, the Supplier must guarantee a prompt and effective analysis of the defect.

The Supplier is therefore advised to have a procedure to manage warranty returns which includes tracking non-conformities, analyzing defects, and defining corrective actions that aim to remove the cause of the defect and ensure continuous improvement of the product.

For products where the responsibility for the defect is confirmed to lie with the supplied component, the Supplier is required to indemnify Brembo for the related costs, as described in par. 5.12.

5.14 SPECIAL STATES OF SUPPLY AND NBH

In case of severe and/or repetitive non-conformities, serious process management deficiencies, failure to apply the control plan, or to manage critical characteristics, Brembo will ask the Supplier to apply special containment processes called CSLs (Controlled Shipping Level):

- **CSL 1:** the Supplier must perform a 100% check on the supplies in which non-conformities have been found;
- **CSL 2:** the Supplier must use an external body which performs a 100% check on the supplies in which non-conformities have been found;
- **CSL 3:** the Supplier must use an external body which will guide towards the removal of the structural process management and/or problem solving deficiencies.

A CSL status is motivated by the following situations:

- evident and severe problems with the quality of supplies (out-of-tolerance, failure to meet process capability requirements, for example);
- a failure to apply shared control plan and/or procedures related to the critical characteristics (S,R,M,I);
- poor process management impacting on product's quality level;
- high levels of disruption caused to Brembo production plants due to unapproved PPAPs and/or Supplier performance indicators which are significantly not in line with targets;
- ineffective problem solving processes which can lead to repetitive non-conformities.

If a CSL is assigned, the Free Pass system is suspended at all Brembo sites involved in the supply issue and sorting campaigns shall start under responsibility of the supplier. In case Brembo needs to perform urgent sorting activities, the related costs will be charged to the Supplier.

If issues are found on the characteristics and/or checks already in CSL 1 status, the opening of a CSL 2 or CSL 3 is requested.

During CSL status, all the batches supplied to Brembo must be accompanied with a CQC (product quality and compliance certificate) or equivalent form. The contents of the CQC, reinforced control plan, component identification and criteria for exiting the special supply status are defined when the CSL is opened and shared with the supplier.

The CSL status can be extended in case of real risk that the problem may affect additional codes/code families (e.g., same production processes, equipment, subcomponents, raw materials).

The conditions for closing CSL status are as follows:

- implementation of the corrective actions agreed upon during the kick-off meeting and effectiveness check;
- evidence of checks, performed by the supplier or a third party, demonstrating zero rejection on the characteristic;
- positive returns from the plant(s) in terms of zero rejection on components put into CSL status;
- positive completion of the defined growth plan (for CSL 3);

Brembo also reserves the right to open a New Business on Hold (NBH) status for the Supplier in such cases:

- failure to comply with contractual requirements;
- severe and repetitive quality issues;
- failure to comply with the Code of Ethics and/or the current legislation in force;
- financial problems with a potential impact on the continuity of supplies to Brembo;
- critical logistic issues;
- serious co-design issues with an impact on Brembo and/or the end customer such as failure to meet deadlines and comply with action plans for products being developed, resulting in delays in component validation;
- voluntary false statements by the supplier;
- escalation from CSL 3;
- serious change management problems (e.g. changes made without informing Brembo and/or not authorized by Brembo).

In this condition, new projects cannot be assigned to the Supplier until this status is closed.

5.15 RECORD KEEPING

Unless specific requests are made by Brembo or its end customer, the Supplier must comply with the following periods for keeping documented information on the products supplied to Brembo.

- 15 years, from the end of series production (including spare parts), for product and production process approval documents;
- 15 years from when the information was first recorded for all other documents and records.

All the documented information must be made available if specifically requested by Brembo.

6 PERFORMANCE MONITORING

6.1 QUALITY PERFORMANCE INDICATORS

The main supplies quality indicators are defined as:

- **Quality Index (QI)** which measures the level of disruption caused by the Supplier to Brembo plants (calculated based on demerit coefficients assigned according to the type of disruption caused);
- **PPM** (parts per million of non-conforming parts found in Brembo and its Customers' process);
- **% initial samples approved (PPAP).**

The targets are communicated to the suppliers at the beginning of the year or when a new relationship begins with a new supplier.

At regular intervals, Brembo shares to all the suppliers a dashboard that indicates the set targets and summarizes the results of the performance indicators:

- quality index (QI);
- no. of non-conforming pieces;
- PPM;
- no. of Notices of Non-Conformity divided up according to QI demerits;
- no. of Notices of Non-Conformity with impact on customer;
- result of submitted PPAPs;
- quality index (QI) divided up according to Brembo plant;
- no. of Notices of Non-Conformity divided up according to Brembo plant;
- PPM divided up according to Brembo plant.

6.2 LOGISTIC PERFORMANCE INDICATORS

Brembo performs a periodic monitoring of the logistic performance of its suppliers and requires improvement actions to be taken by the supplier, in case criticalities arise.

6.3 POOR PERFORMANCE

The Supplier is assessed on the basis of the QI, PPM, % PPAP approval, number of customer complaints, open special states of supply, market recalls due to quality issues. Based on an assessment of all these factors, the suppliers are classified into three risk levels:

- Low risk: no criticalities detected;
- Medium risk: implies the need to implement a corrective action plan agreed with Brembo;
- High risk: implies the need to implement a corrective action plan agreed with Brembo and an internal escalation process that may lead to the decision not to assign the supplier new projects.