Guideline
CLAAS PPAP

CLAAS group description and requirements
For CLAAS users and suppliers

CLAAS PPAP
PRODUCTION PART APPROVAL PROCESS

CLAAS

History and release notes:

Version	Date	Editor	change description and notes of release
1.0	08/10/2019	Alexandre Lefort - CSQM	First release
1.1	03/11/2021	Alexandre Lefort CSQM	A samples deleted
1.2	15/02/2022	Alexandre Lefort CSQM	B samples deleted
1.3	25/05/2022	Alexandre Lefort CSQM	Minor changes

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1 Purpose

This guideline describes the PPAP process and specific requirements for the approval of new or revised production process or parts, including responsibilities, valid for CLAAS Group* and their suppliers.
Terms and conditions for samples, and particularly initial samples, are also included in this guideline.

*CLAAS Group are within the CLAAS KGaA mbH connected companies according to the purpose of paragraph 15 of the German Stock Corporation Act (Aktiengesetz).

2 PPAP definition

The Production Part Approval Process (PPAP) has been implemented to ensure that CLAAS and its suppliers fully understand engineering and customer requirements. The selected parts must have the potential to meet these requirements during an actual production run, at the quoted production rate.

PPAP submissions (to CLAAS) generally relate to top-level product or assemblies supplied to CLAAS. The supplier shall provide evidence of product conformity to engineering and customer requirements. Initial sample parts may be required for inspection prior to the release of series production.

3 PPAP scope

A PPAP is generally required at three phases of the product life cycle:

- Product development (C samples)
- Production release of a new product into production
- Validate and document product or process changes in serial production, in order to ensure continued production capability.

For sample stages description, see CN 01 0402 and sampling requirements.

3.1 When is a PPAP required?

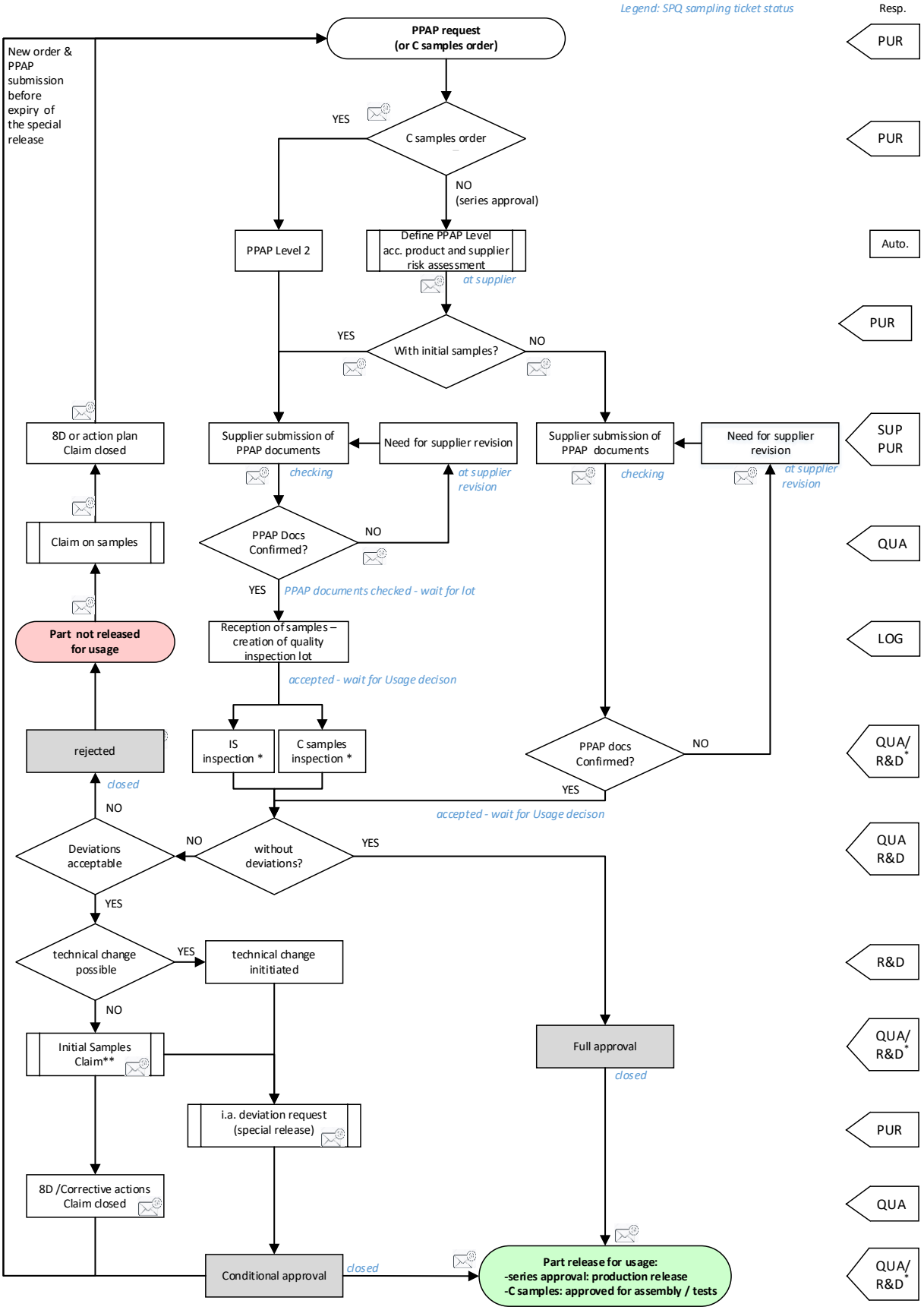
Various changes may trigger the PPAP process. These changes could be initiated by either CLAAS or a supplier to CLAAS. PPAPs and notifications to CLAAS are required for:

	PPAPs are requested for following cases:
1	New part or product design
2	Engineering changes to design, specification or material of an existing part
3	Changes of or at a subcontractor (e.g., heat-treating, painting, etc.) that may affect the performance of the part(s)
4	Moving an existing part/operation/process to a different supplier, or to a different manufacturing location of an existing supplier
5	Changes to product or process due to deviations
6	Material change
7	Refurbishment or significant modification of existing tooling or equipment
8	Tooling or equipment transfer to a different plant location, or for production from an additional plant (relocation)
9	Product will be produced on tooling after twelve (12) or more months of inactive status
10	Product or process changes related to components of the production part that could impact the performance and/or durability
11	Change to the inspection or test methods
12	Changes in equipment (same process flow with the same basic technology or methodology) e.g. new equipment, additional equipment, replacement or change in equipment size

	PPAPs may be requested in the following cases:
1	Tool movement within the same plant or equipment movement within the same plant. Cell configurations or location within the same plant may be changed without affecting process flow. No change made to process flow or control plan
2	Identical gauge replacement e.g. gauges replaced as a part of a gauge maintenance or calibration system

Based on CLAAS decision, the supplier has to submit the PPAP documentation, and if required, initial samples to CLAAS. The supplier must contact the CLAAS representative with details of any planned change to design, process or manufacturing location before implementation. Suppliers are asked to send a request to the specific CLAAS representative allowing sufficient time for the approval process to take place.
Suppliers should create contingency plans to avoid any risk in case of change rejection, so that there will be no interruption to supplying CLAAS. Suppliers shall document all changes and maintain records.
If the supplier doubts that a PPAP is necessary, the CLAAS representative must be contacted prior to implementation.

4 PPAP process



*Series approval: QUA
C samples : R&D or QUA
** No claim on C samples

LOG	CLAAS Logistics
PUR	CLAAS Purchasing
QUA	CLAAS Quality
R&D	CLAAS R&D
SUP	Supplier

5 PPAP initiation

CLAAS Purchasing will request PPAP documentation and order C samples or initial samples if the release of samples is required according to the scope defined above (see 3.1).

The supplier will receive a PPAP submission request (CLAAS PPAP ticket) in the CLAAS Supplier Portal Quality (SPQ) and will also be informed via an e-mail, which includes a direct link to the ticket in the SPQ.

6 PPAP requirements

CLAAS Purchasing is responsible for ensuring PPAP request / Initial Samples or C samples purchase order and providing part specifications. The documentation defines the main requirements including part details and technical specifications, and possibly additional requirements regarding planning activities.

6.1 Core PPAP document

The minimum level of PPAP submission in all cases must include a Part Submission Warrant (PSW). Further required documents are specified according to the PPAP submission level defined in 6.2.

A CLAAS PPAP template is available in the SPQ. The supplier can use and submit PPAP documents with this template. Alternatively, suppliers can submit PPAP documentation using their own templates, as long as they fulfil the basic information requirements of the CLAAS template. This should be agreed upon between suppliers and the CLAAS responsible.

For the Part Submission Warrant (PSW) the supplier must use the CLAAS template.

6.2 CLAAS PPAP submission levels and contents

CLAAS defines the PPAP level based on part and supplier risk assessment.
Below is the list of CLAAS PPAP levels and related documentation to be provided by the supplier:

			Series approval				C samples
			Level 1	Level 2	Level 3	Level 4	Level 2
PPAP documentation	1	**Part Submission Warrant (PSW)**	X	X	X	X	X
	2	**Dimensional test report** (incl. confirmed packaging spec. and BOM)		X	X	X	X
	3	**Material test report**		X	X	X	X
	4	**Commodity relevant test report** (commodity test matrix)		X i.a.*	X i.a.*	X i.a.*	X i.a.*
	5	**Customer Engineering Approval**			X	X	
	6	**Process Flow Diagram**			X	X	
	7	**Control plan(s)**			X	X	
	8	**Design FMEA**				X	
	9	**Process FMEA**				X	
	10	**Process capability**				X	
	11	**Measurement System Analysis**				X	
Samples acc. CN010402	12	**Samples Inspection**	i.a.* Initial Samples	i.a.* Initial Samples	i.a.* Initial Samples	i.a.* Initial Samples	C samples

*i.a.: if applicable

7 Samples (C samples / initial samples)

7.1 Samples definition and quantities

The supplier is responsible for the compliance of initial samples to CLAAS specifications and requirements. The supplier should submit samples that are in conformity with requirements. Supplier inspected non-conforming samples should not be submitted to CLAAS.

- **Initial Samples**

-Initial samples must be taken from a production run using the tooling, processes, materials (according to CN 01 0402), gauging, and utilizing operators from the serial production
-Parts from each unique production process e.g. duplicate assembly line or each production process must be measured and a representative tested.
-Identical parts, from various identical devices, tools, moulds e.g. casting or pressing moulds, forging dies or female moulds or patterns, must be measured and tested.
-Identical parts from multiple moulds must be also for each cavity measured and representative tested.

Generally the number of initial samples is five (5) per tool, mould, cavity, and/or device. These shall be chosen at random from the production, but according to the above conditions. In agreement with CLAAS this number may be reduced or increased. The number of requested initial samples will be specified in the PPAP purchase order.

If destructive testing is required, sectioned samples should be delivered with initial samples to prove conformity. This should be agreed upon on a case by case basis with CLAAS Quality personnel.

- **C Samples**

C samples must be taken from a production run with part and process maturity in accordance with CN 01 0402.
C samples are NOT for series release and can only be used for test purposes.

7.2 Identification and delivery of samples

Initial samples must be marked, e.g. with consecutive numbering, so that the test results can be assessed individually. All test and measurement reports must clearly include the same numbering as on initial samples.

The packaging of initial samples delivery should be labeled with the sample stage level defined in the purchase order, including:
- « C SAMPLES »
- « INITIAL SAMPLES »

7.3 Costs of samples

Unless otherwise agreed by contract, the costs of samples of acceptable quality that comply with required specifications, shall be incurred by CLAAS.

The costs for rejected and/or unsuitable samples shall be incurred by the supplier

7.4 Timing and agreed submission deadline

PPAP documentation and samples should be submitted by the agreed upon deadline, between CLAAS and the supplier. PPAP documentation should be provided and approved before submission of initial samples. Any non-conforming initial samples that are submitted may cause delay with the agreed upon schedule. For this reason CLAAS expects sample testing to be conducted within the agreed timeline.

If the submission deadline cannot be met, the supplier should inform CLAAS Purchasing before the deadline (as early as possible).

In order to avoid non-conforming samples from being delivered, CLAAS may request a part and process review, by the supplier, prior to sample submission. The purpose being to evaluate and fix in advance any possible timing or technical issues.

8 PPAP submission and follow-up tool: SPQ

The supplier submits the PPAP documents to CLAAS through the CLAAS Supplier Portal Quality.

Suppliers:
Link to supplier portal quality:
https://supplier.claas.com/portal/claas

9 PPAP decisions and status

9.1 Decisions:

The CLAAS quality department checks the provided documents and the delivered initial samples (if requested). The supplier gets automatically the information about final decision (for documents and initial samples) via email. Results are documented in SPQ.

Final decisions for PPAP approval:

Approved
PPAP documentation and initial samples (if requested) meet specifications and requirements.
The series production of the parts is released.

Conditional Approval
Initial samples don´t meet specifications (minor deviations).
A corrective action plan will be required.
A deviation request with special release may be processed.
If applicable initial samples may be claimed and new initial samples ordered and delivered.
The series production of the parts is released (under restrictions).

Rejected
PPAP documentation or Initial Samples (if requested) do not meet required specifications.
The series production of the parts is not released.
Initial samples will be claimed and new initial samples will be ordered.

Remark:
Even if initial or C samples are in accordance to specifications, they will not be released as long as the PPAP documentation is not completed and approved.

9.2 PPAP process status follow up

All steps of the submission and approval process can be followed in the CLAAS SPQ in the linked sampling ticket:

Status in SPQ	**Description**
New	New sampling ticket (linked to the PPAP request) not already transferred to the supplier.
At supplier	Supplier requested to submit PPAP documents and Initial Samples if applicable.
At supplier revision	Supplier is requested to revise and resubmit the PPAP documentation.
Checking	CLAAS Quality requested to check and make a decision about PPAP documentation.
PPAP documents checked - wait for lot	PPAP documentation checked - waiting for Initial Samples (if requested) or C-samples
Accepted wait for UD	Initial Sample or C-samples reception completed (if applicable); waiting for final usage decision
closed	PPAP documentation and initial samples (if applicable) are approved or rejected.

10 Records retention

PPAP records should be retained for the time mentioned in the Quality Assurance Agreement (QAA) signed with CLAAS from the submission date of the PPAP documentation package.
The retention time of records are specified for parts with significant characteristics (SC) and parts with critical characteristics (CC like safety or regulations). The supplier must consider these requirements.

11 Description of PPAP documents

Documents submitted by the supplier are specified according to the PPAP submission level. Additional documents may be required depending on specific product requirements.

Qualified laboratory documentation
Inspection and testing for PPAP approval must be performed by a qualified laboratory as defined by CLAAS requirements (e.g., an accredited laboratory). The qualified laboratory (internal or external to the supplier) shall have a laboratory scope and documentation showing that the laboratory is qualified for the types of measurements or tests that are being conducted.

Design record
The supplier shall retain the design record for products / parts, including records for sub-components when applicable. For any product, part or component, there will be only one design record, regardless of who has design-responsibility. The design record may reference other documents making them part of the design record (technical book of specification, CN, etc.). For parts identified as black box, the design record specifies the interface and performance requirements. Parts identified as catalogue parts, the design record may consist only of a functional specification or a reference to an industry standard.

1-Part Submission Warrant

Upon fulfilment of all PPAP requirements, the supplier shall complete and submit a PSW. The level and scope of the submission must be written in the PSW comments.

2-Dimensional test report

Includes:
-BOM: Bill of material (part list)
-dimensional report(s)
-packaging instruction

- **Bill Of Material (BOM)**

The BOM is a list of the raw materials, sub-assemblies, intermediate assemblies, sub-components, parts, and the quantities of each needed to manufacture the end product.

- **Dimensional report**

Documented measurement results taken from the sample production parts under serial conditions. The dimensional results are verified against the design specified on drawing and relevant engineering standards. Dimensional characteristics from the drawing (and control plan) have to be measured and reported as evidence of the final product conformity to the specification. Documents must refer to the design record, change level, and dates. Parts must be clearly identified (numbered) so that part correspondence is clear on the dimensional report. Unless otherwise specified by CLAAS, the measurement report should be provided for each initial sample received.

- **Packaging instructions**

Evidence of compliance of series packaging should be submitted as part PPAP package when possible. The packaging instructions contain all necessary information regarding series packaging of the parts. This packaging instruction (format) could be used as a work instruction by the supplier. The packaging should be previously agreed with the relevant CLAAS Logistic Department.

3-Material test report

At a minimum, the supplier shall certify compliance to the material specified by the design record. The supplier shall perform tests for all parts or materials specified in the design record. This may be fulfilled by an inspection report or with a separate certificate of compliance. The certificate of compliance shall be directly traceable to the product supplied. When specified by the design record, the chemical, physical, metallurgical, performance or functional test results shall be provided (e.g. Material/Performance Test Results, Mill certificate).
The required material test reports should be specified on drawings or in CLAAS norms (CN norms).

4-Commodity test report

- **Appearance Approval Report (AAR)**

Typically applies only for parts having appearance criteria with colour, grain (texture), or surface appearance requirements. The AAR shall be completed for each part having appearance requirements on the design records.

- **Performance Test Results**

Where performance or functional characteristics are defined in the design record (part performance requirement according to the technical book of specifications, requirements listed in the CLAAS norms that are applicable for a specific part, legal and safety requirements etc.), these shall be documented and supported by appropriate test records.

- **Haptics**
- **Odour**
- **Reliability**
- **…**

5-CLAAS engineering approval

When applicable the supplier shall retain evidence of customer engineering approval. A signed CLAAS engineering approval, approved by the CLAAS design responsible engineer, shall be submitted as part of the PPAP package.

6-Process flow diagram

Documentation that clearly describes the production process including steps and sequences. Standardized process flows may be used for product families of similar parts or materials where applicable. The process flow diagram typically starts with incoming goods of single parts, assemblies, raw material, etc., and ends with final packaging and shipment. Parallel process steps, to obtain semi-finished parts, should be identified for each of them. Controls that are not “online”, but as additional, separated steps (e.g. specific test bench or quality gate) should be identified as process step in the diagram.

7-Control plan

A comprehensive control plan must be provided detailing the manufacturing and inspection methods used for each feature detailed in the design record. Control plans may be generated for part families of related where applicable. Controls performed on each process step of the process flow diagram should be identified in the documents and linked to the process step number of the process flow diagram. Key characteristics controls may be issued from the PFMEA. This means also that all SC/CC key characteristics should be identified in the control plan.

8-Design FMEA

Applicable if the supplier holds full design responsibility. The document needs to be developed in accordance with AIAG Potential Failure Mode and Effects Analysis reference manual. A single Design FMEA may be applied to a family of similar parts or materials. Key characteristics (SC/CC) from CLAAS technical specification or drawing must be all identified in the DFMEA

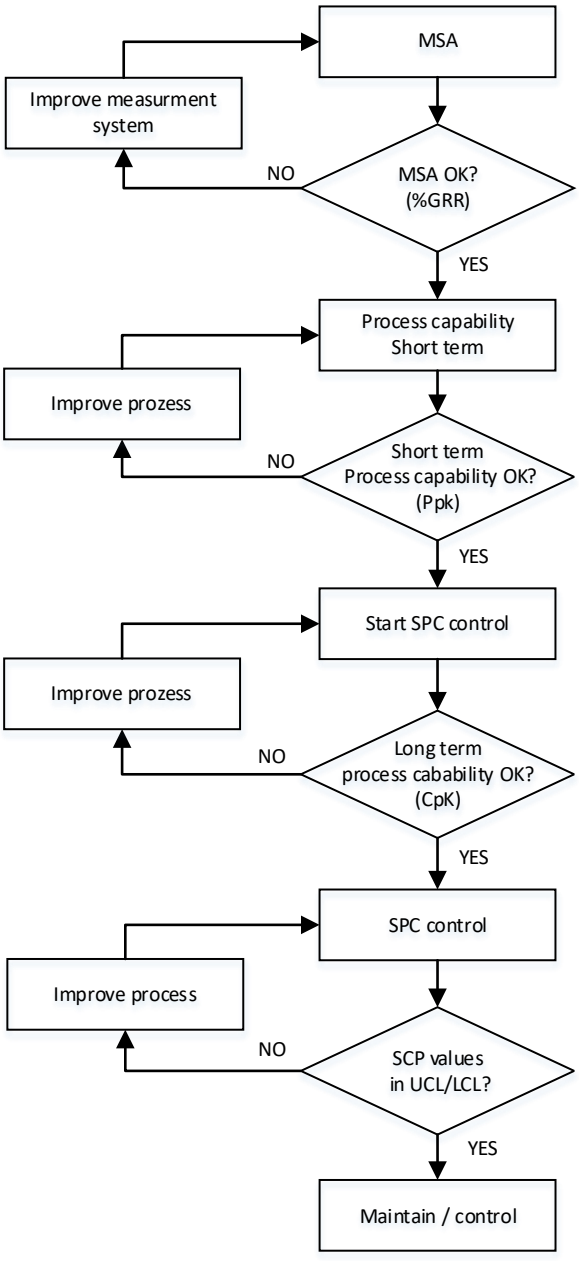
9-Process FMEA

The supplier shall develop a process FMEA in accordance with the AIAG Potential Failure Mode and Effects Analysis Reference Manual. A single process FMEA may be applied to a family of similar parts or materials. Characteristic traceability is required from the DFMEA through the PFMEA to the Control Plan and to the process instructions. All Key characteristics (SC/CC) from CLAAS technical specification or drawing must be identified in the PFMEA in the dedicated process steps that can have influence on the characteristic.

10-Initial process capability

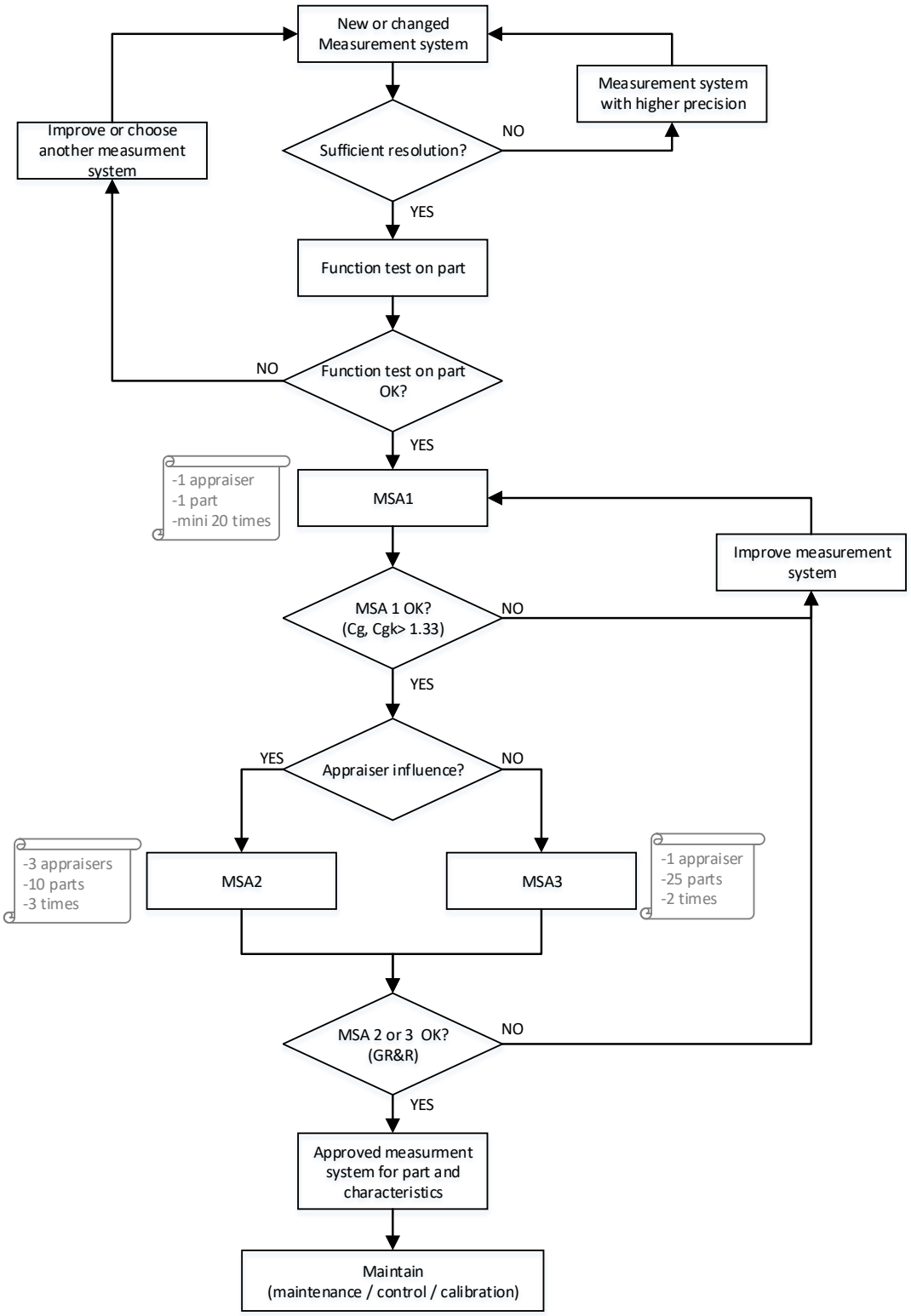
The level of initial process capability or performance must be acceptable prior to PPAP approval, as required. Process capability studies shall at a minimum be performed on all features or processes that have been identified as critical. Where the part does not have any CLAAS designated critical characteristics, the supplier shall if requested, select the critical characteristics for which process capability is to be demonstrated, and include the selected characteristics in the Control Plan. Gauge R & R (Measurement System Analysis) studies must be performed prior to data collection to understand how measurement error is affecting study measurements. For processes not achieving capability, a 100% inspection of parts may be required along with the submission. As a minimum an action plan addressing capability improvement must be created. The supplier must use the following acceptance criteria for evaluating the initial process study results

Basic requirements:
Process capability / short term capability - Ppk≥1.67
Process Capability / long term capability – Cpk ≥ 1,33



11-Measurement System Analysis

Measurement System Analysis must be available for all gauges, measurement and test equipment used for measurement of SC/ CC characteristics. In general, gauge error > 30% of part tolerance is not acceptable. Gauge errors with reading between > 10% and < 30 % must have either acceptance from CLAAS or action plans in place to achieve required gauge error. Gauge errors < 10% are in general acceptable



12-Extended

Additional evidence may be required as requested by CLAAS Quality:

- **Sub-Supplier PPAP Warrants**

The supplier is responsible for all sub-suppliers and outsourced processes. To demonstrate this control, on specific CLAAS request the supplier may submit the PPAP warrants to CLAAS as part of the PPAP package.

- **Others**

Based on CLAAS decision further documents or information can be required:
Master samples
Qualified lab documents
Checking aids
Labelling of material
Packing of materials
Transport of materials
Storage of materials
Shelf life of materials

12 List of abbreviations & related documents

Abbreviations:

CN	CLAAS Norm
FMEA	Failure Mode & Effects Analysis
MSA	Measurement System Analysis
PPAP	Production Part Approval Process
SPQ	CLAAS Supplier Portal Quality
PSW	Part Submission Warrant
IS	Initial Samples
i.a.	If applicable
SC / CC	Significant Characteristic / Critical Characteristic
QAA	Quality Assurance Agreement

Related documents:

CN 01 0402 Sample Stage Definition
QAA: CLAAS Quality Assurance Agreement (Appendix of the Basic Supplier Agreement)