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Title Procedure :	PRODUCTION COMPONENT APPROVAL (PPAP)	Revision :	02

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CHANGE LIST		
Rev. No.	Date	Description
00	15/03/2023	First issue
01	30/01/2024	Insert new chapter. 8.4
02	31/05/2024	Modified PPAP levels according to the functional class of the product

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1 GENERALITY

The development of a new product or the implementation of a modification to an existing one, takes place in two fundamental phases:

• TECHNICAL DEFINITION OF THE PRODUCT

During this phase, together with the external supplier, all the technical analysis activities, trials and tests, prototypes and pilot, aimed at verifying and validating the design of the detail are planned and activated.

• APPROVAL OF COMPONENTS FOR SERIES PRODUCTION

This phase begins when the design of the component is final with release of the relative technical drawing and has the purpose of verifying that its mass production satisfies all the quality requirements of both design and process and therefore also relating to product control, the measuring system used, the internal handling of the product, the definition of the packaging and the conditions of transport.

BERCO entrusts the industrialization of the component in question to a supplier who is qualified on the basis of the **PS_002_PSM** procedure.

The supplier in question must carry out all the activities envisaged by this document; BERCO subsequently verifies the effectiveness of the same by requesting the supplier to send samples and/or part of the documents produced on the basis of the PPAP level previously defined and communicated.

2 SCOPE

The purpose of production component approval is to determine whether all specifications and design requirements have been appropriately understood by the supplier and that the manufacturing process has the potential to continuously produce components in compliance with these requirements. and volumes required

3 FIELD OF APPLICATION

This procedure applies to all direct components for production and spare parts, purchased externally, characterized by a BERCO code; as regards the commercial components, the application of this may be omitted on the basis of a decision by the Purchasing Department.

4 DEFINITIONS

This procedure refers to the definitions given by the ISO 9001 standard and the "PPAP" reference manual 4th edition, Production Part Approval Process (AIAG).


5 RESPONSIBILITY

Purchasing Department

- Activate the activity of PPAP;
- Convene and participate in the PPAP level definition team;
- Take care of the issue of the relevant PPAP order.

Designer:

- Join the PPAP Level Identification Team

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Quality Acceptance:

- Prepares and carries out checks on samples sent by suppliers;
- Check the quality registration documentation sent by the suppliers;
- It grants or not the approval to the PPAP practices related to all levels, compiling and issuing the related approvals directly at an IT level;
- Archive all PPAP documents.
- Participates in the PPAP level identification team when involved by the Purchasing Department;
- It is the interface to suppliers for reports, requests for corrective action plans and to notify suppliers of the need to submit the PPAP.

Quality Assurance

- It monitors the activities by intervening on spot to verify their effectiveness or in cases of dubious evaluation;
- Performs, with the support of Acceptance Quality, the monthly analysis of PPAPs not granted and unsuitable.

6 PPAP REQUIREMENTS

6.1 Significant batch of series production

Samples for PPAP must be taken from a significant lot of series production contemplating a minimum of 300 consecutive pieces; in cases where such a production would be economically inapplicable (e.g. complex castings, forgings, etc.) Berco may authorise, upon specific request, the taking of samples from smaller quantities produced. The components obtained from each position of molds with multiple cavities, shells, cores or specific equipment must be verified: the measured characteristics must be representative of the components tested; the documentation must indicate which figures, models, (number, letter or combination) it refers to.


6.2 DOCUMENTARY REQUIREMENTS OF THE PPAP

The following documents or tasks must always be completed by the supplier and together make up the PPAP file; each document must include references to the component codes, the reference standards, the supplier concerned and must necessarily bear a signature or stamp which gives evidence of a formal issue and the relative date; any deviation from the normal procedure must always be authorized by BERCO through a derogation document that the supplier must attach.

Documentation and approval samples/masters must be maintained as long as the component remains active for serial and/or spare parts production, plus one year.

NB Pay attention to the fact that the supplier must always complete the documents listed below regardless of the fact that the PPAP level communicated to him authorizes him to send only a part of them to BERCO.

- 1 document "**Part Submission Warrants**": (PSW) standard format prescribed by the PPAP; the document in question must necessarily report the weight of the component supplied net of packaging and must be drawn up for each code supplied (ref. annex 1);
- 2 One sample component or as defined in the order for PPAP;
- 3 A master component must be kept traceable by the subcontractor at his factory; if the components derive from molds or multiple cavities, 1 sample is required for each distinct realization;

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- 4 All customer and supplier drawings (CAD/CAM drawings, component drawings, specifications, etc.);
- 5 Any authorization to modify drawings not yet included in the technical documentation itself (modification of technical documentation through a "request for derogation/concession" document);
- 6 Dimensional results evidencing fulfillment of drawing requirements, other design documentation, or control plan. The supplier must check all characteristics to verify their compliance.
- 7 Inspection aids (jigs, templates, special tools, etc.) specific to the component to be submitted for approval, used in verification or control; if the supplier intends not to satisfy this requirement, he must agree it with the managerBERCO of the approval of the PPAP in question.
- 8 Materials, performance and durability test results as specified in the drawing / design or control plan;
- 9 Process flow diagram;
- 10 FMEA (Failure Mode Effect Analysis)
 - 10.a Process FMEA
 - 10.b Project FMEA (required if the supplier is responsible for the project);
- 11 Control Plan which includes at least all the controls relating to the characteristics significant measurements made to monitor the process. The control plan for "product families" is considered acceptable only if approved by BERCO;
- 12 Pre-Process capability results (minimum 100 reads) demonstrating at least feature compliance than significant to the Ppk 1.67 requirement, as defined by the AIAG manual Statistical Process Control (SPC). If the supplier does not obtain compliant results or intends to satisfy this requirement differently, he is required to agree on the appropriate actions to be taken with BERCO (usually 100% checks).
- 13 Repeatability and Reproducibility studies (R&R studies) or equivalent for all measurement systems used to verify the special characteristics.
- (14) Appearance Approval Report (AAR) standard format for components with "appearance criteria" such as color, grain or surface requirements; when applicable it is expressly requested byBERCO to the supplier.

6.3 PPAP STEELS

The supplier must send Berco a complete certification required by the required PPAP level including at least one sample of bar (L=300 mm) to be delivered before or together with the shipment of the entire material.

The conformity of the material, requirement 8 defined in paragraph 6.2, must always be objectified through a 3.2 certificate.

In the case of steel supplied with specific dimensions, but identical type of material, only dimensional conformity must be verified if the supply of the material appears to have been continuous in the last two years; otherwise, a new 3.2 certificate and the relative dimensional conformity certificate must be produced.


The PPAP procedure does not apply in the case of the purchase of standard steels compliant with the reference UNI standards

For further details relating to the documents/requirements listed above, it is advisable to refer to the Reference Manual "Production Part Approval Process (PPAP)" or, in case of doubts, to contact the BERCO manager for PPAP approval based on level (cf. . chap. 4).

Once the PPAP approval has been received, all the following deliveries will have to be compliant to Berco Standard:

CTF100, for the dimensional requirement, integrity, etc..

CTF001 for metallurgical requirements.

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7 PPAP LEVELS

BERCO does not always request the sending of the entire PPAP file to its suppliers but notifies them of the level of evidence required (PPAP level); the level is communicated to the supplier by the Purchasing Department by sending the purchase order; depending on the PPAP level communicated, the supplier is required to send BERCO only a part of the PPAP file and/or to make it available for consultation by BERCO personnel at its plant. The PPAP level to be used is chosen by BERCO on the basis of the supplier-component combination taking into account factors such as the status of the Supplier's Quality System, the functional class of the component, the criticality of the component, the supplier's experience for the specific product class or for previous samplings.

There are 5 PPAP levels:


LEVEL 1	Presentation to the customer of only the completed "Part Submission Warrant" (PSW) form
LEVEL 2	Introducing the "PSW" with sample components and limited documentation
LEVEL 3	Introducing the "PSW" with sample components and full documentation
LEVEL 4	Presentation of the "PSW" and other requirements specified by BERCO
LEVEL 5	Presentation of the "PSW"; sample components and complete documentation are reviewed at the supplier's location by BERCO personnel

For more details on the evidence that the supplier is required to send to BERCO based on the level assigned to him for a given component, please refer to attachment number 1 to this document "EXHAUSTIVE TABLE OF EVIDENCE REQUIRED OF PPAP REQUIREMENTS".

7.1 REQUIRED PPAP LEVELS

- **Level 2** is considered the default level, unless otherwise communicated or requested by BERCO;
- For components of functional class **"S" Safety**, the level required by Berco is 5, with an accompanying Process Control Plan Audit (PCPA);
- For components of functional class **"F" Functionality**, the PPAP level will be defined by Berco on a case-by-case basis.

The above requirements are also applicable to components already in production that are subject to a modification (Revision) or a supplier change.

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In the case of a modified part, the characteristics to be verified are those affected by the modification itself (quoting the previous approval documentation).

Suppliers who are responsible for the project, or who have developed the subsystem or component in co-design, regardless of the classification of the characteristic, are not authorized to make modifications without the prior approval of BERCO's Technical Management with the exception of those contemplated in chap. 8.3.

8 BERCO NOTIFICATION, UPDATE AND PPAP SUBMISSION REQUIREMENTS

This chapter defines the methodology that the supplier must follow for the management of PPAP files; the following three paragraphs will deal with the situations in which the supplier must consult BERCO to find out whether he is required to send the PPAP file or not, those in which he is required to send it automatically and finally those for which he is required to update his file without not even notify BERCO.

8.1 Notification of project/process changes to BERCO

In the cases listed below, the supplier must notify the project and/or process changes to BERCO which will decide from time to time whether the presentation of the PPAP is necessary or not (in cases concerning components considered safety, the presentation must always be requested);

1. Use of material or manufacturing method other than that relating to the product previously approved by BERCO: for example a modification accepted by way of derogation or registered on the drawing at note level but which does not lead to a variation of the code or literal index (such variation is dealt with in point 8.2.1);
2. Production with new or modified tools/equipment (excluding perishable/perishable tools), including moulds, patterns, dies etc. including, updates, replacements or remakes; the equipment must be understood as specific in terms of form and/or function and therefore intimately connected to the quality of the component it manufactures, standard tools such as measuring devices or screwdrivers are therefore excluded (ref. 8.3.3);
3. Production from equipment or equipment that has been moved to different manufacturing locations or has come from different manufacturing locations; movements inside the plant that do not involve disassembly activities are excluded (ref. 8.3.2);
4. Change of sub-suppliers of components, materials or services (e.g. heat or surface treatments) capable of influencing dimensions, functionality, duration or in any case design requirements;
5. Series production from equipment that has been inactive for 12 months or more (the exception is components affected by low production volumes such as spare parts or specific versions);
6. Variation of the methods to test/verify the conformity of the supplied components (the supplier must be sure that the new method is at least as effective as the previous one);
7. Correction of important non-conformities related to problems emerged on previously approved components (through PPAP grant) and deemed potentially critical for the quality of the final product.

8.2 Automatic presentation of the PPAP AT BERCO

In the cases listed below, the supplier must always present the PPAP, prior to the delivery of the first production batch, even if BERCO does not expressly request it.

- 1 Start of supply: new/modified component or product (component, part, material never previously supplied to BERCO) characterized by a new code or literal index;

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- 2 Correction of NCs found on components or documentation sent to BERCO for PPAP approval (i.e. a NC during a PPAP must be corrected and the PPAP must be resubmitted).

8.3 Project/process change notification not required

In the cases listed below, the supplier must always update its PPAP file based on the changes that have occurred but notification to BERCO is not required.

- 1 Minimum design variations such as not to cause the variation of the code or literal index of the component, therefore excluding materials and manufacturing methods (ref. 8.1);
- 2 Handling of production equipment within the production plant without disassembling them and without altering the process flow;
- 3 Replacement of tools and equipment with others based on similar technology but different in size or other aspects such as operator safety but not capable of altering the process capability, process flow or manufacturing technology/method (ref. 8.1).

8.4 PPAP sending address

All suppliers are required to send PPAP documentation always and only to the following email address:

ppap.berco@thyssenkrupp.com

9 APPROVAL

Suppliers are not authorized to ship production components prior to approval unless expressly permitted/requested by BERCO in writing. Verification of PPAP compliance is carried out by analyzing the compliance of the documentation and components sent or by carrying out process audits at the supplier (Process Approval) for level 5 PPAPs.

Following the analysis of the PPAP, BERCO reports the outcome of the checks:

Approval granted: The supplier is authorized to start production according to the requested schedule.

Approval not granted: The supplier is not authorized to start the supply and must present yet another PPAP demonstrating the correction of the non-conformities found. In this case, the supplier can exceptionally send the components only after presentation and approval of the "request for derogation / concession" document. In case the request for derogation/concession in question causes the modification of BERCO's technical specifications, the possibility of granting the approval of the PPAP in question can be evaluated.

In the event of approval not granted or approval granted but PPAP not suitable, or not perfectly compliant with the requirements (sending documentation only after repeated reminders, production delays, repetition of checks, etc.), BERCO reserves the right to make a rate of 250€ charge to be paid by the supplier who has created problems.

In the event that the PPAP is not approved on second submission, Berco will suspend the orders relating to the unapproved part with this supplier for one calendar year.

10 REFERENCES AND LIST OF ATTACHMENTS

This document refers to the following documents:

- UNI EN ISO 9001 standard and point 8.3.4.4 IATF 16949 standard
- PPAP Reference Manual, 4th Edition, AIAG
- P4_IO.Acquisiti "Procurement process organizational instruction"

The following are attached to this document:

- Comprehensive table of required evidence of PPAP requirements
- QAM_IL.Mod-PPAP "PSW"



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Attachment 1

COMPLETE TABLE OF REQUIRED EVIDENCE OF PPAP REQUIREMENTS

REQUIREMENTS	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5
1. PSW extension	S	S	S	S	S
2. Samples	T	S	S	*	T
3. Master's degree	T	T	T	*	T
4. Drawing	T	S	S	*	T
5. Approval documents changes	T	S	S	*	T
6. Dimensional checks	T	S	S	*	T
7. Supports for control	T	S	S	*	T
8. Test results	T	S	S	*	T
9. Flowchart of process	T	T	S	*	T
10. (a) Process FMEA (b) Project FMEA	T T	T T	S S	* *	T T
11. Control plan	T	T	S	*	T
12. Capacity studies of the process	T	T	S	*	T
13. Systems studies measure (R&R)	T	T	S	*	T
14. Appearance Approval Report (AAR) <i>If applicable</i>	S	S	S	*	T

LEGEND


S = the Supplier submits to the Customer and keeps a copy of the documents in appropriate locations

T = the Supplier keeps a copy of the documents in appropriate locations and makes it available to the Customer upon request

***** = The Supplier keeps a copy of the documents in appropriate locations and presents them to the Customer upon request


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Attachment 2

PART SUBMISSION WARRANT



Part name: _____ Part number: _____

Safety and/or _____

Government YES NO Engineering drawing Change level _____

Additional Engineering Changes _____

Shown on Drawing No. _____ Purchase order No. _____

Dated _____

Dated _____

Weight _____ Kg

SUPPLIER INFORMATION

Supplier name _____ Supplier code _____

Street/Address _____

City/State _____

SUBMISSION INFORMATION

Dimensional Materials/Function Appearance

Customer name/division _____

Application _____

Buyer/Buyer code _____

REASON FOR PPAP

Initial submission (new supplier/part)

Engineering change(s)

New/charged tooling

Correction of Discrepancy

Last supply dating back to more than 1 year ago

Other – please specify _____

Change to Optional Construction or Material

Sub-supplier or Material Source Change

Change in Part Processing

Parts produced at Additional Location

REQUESTED PPAP LEVEL

Level 1 "Part Submission Warrant" (PSW – "Appearance Approval Report" (AAR)

Level 2 PSW, Samples, Drawings, Inspection results (dimensional, material, performance, etc. tests) AAR

Level 3 At Customer Location - PSW, Samples, Drawings, Inspection results (dimensional, material, performance, etc. tests) AAR, Process Capability Studies, Process Capability Values, Control Plan, Studies on Measurement Systems, FMEA, Process Flow Diagram

Level 4 "Part Submission Warrant" (PSW) and specific requirements

Level 5 At Supplier Location - PSW, Samples, Drawings, Inspection results (dimensional, material, performance, etc. tests) AAR, Process Capability Studies, Process Capability Values, Control Plan, Studies on Measurement Systems, FMEA, Process Flow Diagram

RESULT

The results for dimensional measurements material and performance tests appearance criteria

statistical process control

These results meet all drawing and specification requirements: YES NO (If "NO" – Explanation required)

DECLARATION

I affirm that the samples represented by this PSW are representative of our parts and have been made to the applicable customer drawings and specifications and are made from specified materials on regular production tooling with no operations other than the regular production process. I have noted any deviations from this declaration below:

Explanation/comments _____

Name and surname _____ Title _____

Phone no. _____ Supplier Authorised Signature _____

BERCO SECTION (FOR APPROVAL)

Approved Rejected Other _____

Result notified with form no. _____

Name and surname _____ Signature _____ Date _____

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