SPECIFICATION REVISIONS

REV.	ISSUE DATE	FILLED IN BY	VARIATION AND/OR MODIFICATION	APPROVED BY
1	25.07.2014	D. CANZIAN	Translation of the italian version, revision 1	M. DALLA CIA
2	17.10.2016	N. PONGILUPPI	Transl. – Mod. Title, par. 2, 3, 4, 5, 6, 7, 8, attachment	M. DALLA CIA
3	12.05.2023	Y. ZANNIER	Transl. – Modif. par. 1, 2, 3, 4, 5, 6, 7.11, 8	M. DALLA CIA

NOTICE: DOCUMENT AVAILABLE IN THE WEBSITE

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1 SUBJECT

This specification *describes the approval process to which the series production is subjected according to the Production Part Approval Process (PPAP) method.*

2 SCOPE

The approval process of series production generates at completion a PPAP dossier representing the collection of documented information of the Supplier's quality assurance and quality control and of its supply chain. This documented information certifies that the product and the process realized by the Supplier satisfies all the applicable requirements (compliance with the technical documentation, specifications and drawing) determined directly and indirectly by the contract/order.

3 APPLICABILITY

The PPAP method applies *the series production both of finished product and production materials (raw material and components) including bulk materials*, used in the automotive sector or other sectors if required specifically by the Customer in the cases listed below:

1) new product;
2) correction of a discrepancy surveyed on the material previously submitted to a PPAP;
3) modification to an existing process (specifications, type of material, drawing);
4) modification to the Supplier's manufacturing process (tools, machines, equipment);
5) change of Supplier's manufacturing site;
6) new Supplier;
7) manufacture relating to the product item code not active for more than a year.

NOTE:

1) PPAP *also* applies to standard catalogue materials except otherwise indicated by the Customer.
2) PPAP *also* applies to *bulk materials* only on Customer's specific request.

4 REFERENCE DOCUMENTS

AIAG - PPAP 4th edition Production Part Approval Process (AIAG)

5 GENERAL

Production material
Material which has been issued a production part-number and which are directly shipped by the Supplier to the Customer to be used in the product.

Bulk material
It is a substance (e.g. non-dimensional solid, liquid, gas) such as adhesives and sealants (solders, elastomers), chemicals (as waxes, diluents, colors/pigments, solvents), coatings (primers, phosphates, surface treatments), engine coolants (antifreeze), fabrics, ferrous and non-ferrous metals (bulk steel, aluminum, coils, ingots), foundry (sand/silica, other minerals), fuels, glass, lubricants (oils, greases), monomers, pre-polymers, polymers (rubbers, plastics, resins), etc.

PPAP

The PPAP consists of a *dossier/*set of documents useful to demonstrate that the Supplier's manufacturing process fulfills the Customer's requests, including safety *and regulatory and statutory* requirements, with reference to a specific code of product or material/component.
The required documentation shall refer to production parts which represent the actual manufacturing process, and which are realized with standard equipment.
The different submission levels are indicated in the table below:

PPAP submission levels	Description
Level 1	PSW and for materials with aesthetical requirements, also the Appearance Approval Report (AAR)
Level 2	PSW with product samples and limited supporting documentation (see scheme)
Level 3	PSW with product samples and complete supporting documentation (see scheme)
Level 4	PSW *only as defined* by the Customer
Level 5	PSW with product samples and complete supporting documentation reviewed at the Supplier's

LEGEND
PSW = Part Submission Warrant

The "submission level" to be presented shall be the one requested by the Customer. If there are no explicit indications by the Customer, level 3 shall be the default level and the documents to be submitted are all the ones listed in the following table.

PPAP Requirement	Documents	PPAP PPAP submission levels				
		1	2	3	4	5
1	Design records	R	S	S	*	R
2	Engineering Change Notice (if any)	R	S	S	*	R
3	Customer Approval, if required	R	R	S	*	R
4	Design FMEA	R	R	S	*	R
5	Process Flow Chart	R	R	S	*	R
6	Process FMEA	R	R	S	*	R
7	Control Plan	R	R	S	*	R
8	Measurement System Analysis (Gage R&R)	R	R	S	*	R
9	Dimensional results	R	S	S	*	R
10	Material, Performance Test Results	R	S	S	*	R
11	Initial Process Studies (Ppk, Cpk)	R	R	S	*	R
12	Qualified Laboratory Documentation	R	S	S	*	R
13	Appearance Approval Report, if required	S	S	S	*	R
14	Sample Product	R	S	S	*	R
15	Master samples	R	R	R	*	R
16	Checking aids	R	R	R	*	R
17	Records of compliance with Customer-Specific Requirements	R	R	S	*	R
18	Part Submission Warrant (PSW)	S	S	S	S	R

LEGEND
S = the Supplier submits the *documents* to the Customer and keeps a copy in appropriate places
R = the Supplier keeps a copy of the *documents* in appropriate places and on request makes it available to the Customer
* = The Supplier keeps a copy of the *documents* in appropriate places and on request submits it to the Customer

The documents shall be submitted to the Customer for approval when dispatching the first series production (*pre-production*).

After the analysis of the documents by the Customer, the PPAP may get the following statuses:

- **Approved or "Full Approval"**: it means that the product/part fulfills all Customer requirements;

- **Interim approval:** it allows the product/part dispatch for a limited period of time, allowing to undertake the right corrective actions;
- **Rejected:** it means that what has been submitted does not fulfill what required by the Customer. In this case it is necessary to correct any anomalies, and to undertake the right corrective actions in order to submit a new PPAP again.

The PPAP documentation shall be archived according to the procedure Q.DOC 910.

*The start of the series production, namely the SOP, can only occur in case of status **Full Approval** or **Interim Approval with the acceptance of the deviations shared with the Customer.***

6 RESPONSIBILITY

In *case the recipient of this specification is ZOPPAS INDUSTRIES HEATING ELEMENT TECHNOLOGIES*, the responsibility for collecting the various documents required by the Customer belongs to Product Quality. The responsibilities for the filling in of the various PPAP documents are instead reported in the table below.

	PPAP documents	SALES	TD	IND ENG	PQC	OQC	LAB	ICQ
1	Design records	C	R	C				C
2	Engineering Change Notice, if any	C	R	C				
3	Customer Engineering Approval	C	R					
4	Design FMEA (DFMEA)		R	C	C		C	
5	Process Flow Diagram		C	R	C	C		
6	Process FMEA (PFMEA)		C	R	C		C	
7	Control Plan		C	C	R	C		
8	Measurement System Analysis, Gage R&R				C		R	
9	Dimensional Results				C	R		
10	Records of Material, Performance Test Results (DVP&R)		C				R	C
11	Process capability studies (Ppk, Cpk)/ Initial Process Studies		C	C	R			
12	Qualified Laboratory Documentation						R	
13	Appearance Approval Report (if required)					R		
14	Sample Production Parts		R			C		
15	Master Sample		C		R			
16	Checking aids			C			R	
17	Customer-Specific Requirements	C	R	C	R			
18	Part Submission Warrant (PSW)				R			

LEGEND
R = Responsibility; C = Cooperation
SALES = Sales; TD = Technical Dept.; IC = Incoming Quality; OQC = Outgoing Quality; PQC = Process/Product Quality; LAB = Laboratory; IND ENG = Industrial Engineering

In case the recipient of this specification is the Supplier, the responsibility for the collecting the documentation required by ZOPPAS INDUSTRIES HEATING ELEMENT TECHNOLOGIES belongs to the Supplier which shall send the dossier to Supplier Development.

For the collection of the documentation, the form Q.167 can be used if the Customer's form or the Supplier's form is not available.

7 PPAP DOCUMENTS

7.1 Design Records

The design of the product and of its components shall be made available to the Customer with indication of the reference designer.
All materials/components foreseen in the drawing and/or in the worksheet and/or in the bill of materials shall be compliant with the Customer's requests.
If required by the Customer, it is necessary to provide evidence of the fact that what has been used fulfills the requested requirements.
Likewise, upon Customer request, this information may be uploaded in the **International Material Data System (IMDS)**.
If applicable, in case of polymeric components, these shall be marked according to the following criteria:

- Plastic parts weighing at least 100 g according to ISO 11469/1043-1;
- Elastomeric parts weighing at least 200 g according to ISO 11469/1629.

7.2 Engineering Change Notice

Any changes brought to the design (drawing, worksheet) shall be recorded by the Designer both in the drawing and in the engineering software according to the usual procedures.
Each design change shall be authorized by the Customer and implemented in the design documents.
If the change has not been recorded, *it is necessary in any case to draw up a document authorizing this change.*

7.3 Customer Engineering Approval

It is necessary to have evidence of the Customer's engineering approval.

7.4 Design FMEA (DFMEA)

The Design FMEA shall be developed also in accordance with the Customer requirements. If possible, the DFMEA shall also consider the problems at the end of the product life cycle. If the design has been made by the Customer, it is its duty to forward the component critical characteristics to the Supplier's Design, so that they can be considered in the DFMEA and subsequently in the PFMEA (Process FMEA) and in the Control Plan.

7.5 Process Flow Diagrams

All of the process phases shall be represented according to the flow diagram logic.

7.6 Process FMEA (PFMEA)

The Process FMEA shall be developed according to the Customer specifications and any other information defined by Design dept./Industrial Engineering.

7.7 Control Plan

The Control Plan shall be developed according to what required by and agreed with the Customer and according to the PFMEA results.

7.8 Measurement System Analysis

The Supplier shall apply the Measurement System Analysis (e.g. Gage R&R) both for the measuring instruments used (new or modified ones) as well as for the testing instruments.

7.9 Dimensional Results

The dimensional results required by the drawing and control plan shall be recorded in order to provide evidence of the compliance with what required.
The record shall clearly indicate: organization name, part number, reference drawing with revision and date, any other documents. For each part verified it is necessary to indicate: dimension/characteristic, design rated values, test date, surveyed values, results of the control.

7.10 Records of Material / Performance Tests (DVP&R)

Test surveys of product performance and/or materials shall be recorded (e.g. chemical, physical, metallographic analyses, life tests, etc.) in a test report in order to demonstrate the product conformity. Unless otherwise required, this record shall report the company name, the part number, the reference drawing with revision and date and the following information:

- Test type;
- Reference specification;
- Acceptance criteria;
- Test responsible;
- Test start and estimated duration;
- Sample quantity and type;
- Test results OK / KO.

7.11 Initial Process Studies (Ppk, Cpk)

In order to demonstrate that the critical characteristics agreed with the Customer are stable, suitable process capability studies shall be performed through the Ppk e Cpk indexes.
The acceptable thresholds for the automotive sector are defined by the Customer while the acceptable one for the other sectors are indicated in the following table:

CHARACTERISTICS	***CAPABILITY (PRE-PRODUCTION)***	***CAPABILITY (SERIES PRODUCTION)***	***SAMPLE SIZE***
IMPORTANT	*Ppk ≥ 1.67*	*Cpk ≥ 1.33*	*min 30 pieces*
CRITICAL (for SAFETY/ CONFORMITY TO REGULATION)	*Ppk ≥ 2*	*Cpk ≥ 1.,67*	*min 30 pieces*

If the process is not stable (process capability indexes below the limits reported above), it is necessary to undertake suitable corrective actions in order to eliminate the root causes. The corrective actions shall be defined upon agreement with the Customer and shall be communicated to him.

If the process is still unstable before any declaration, the Corrective Actions Plan and the modified Control Plan shall be submitted to the Customer for approval, foreseeing a 100% check.
Any deviation request can be forwarded to the Customer according to the procedure Q.MANUF 580.
Unless otherwise requested by the Customer, attribute studies are not valid for the PPAP.

7.12 Qualified Laboratory Documentation

If the tests are carried out externally, they shall be carried out by a Laboratory qualified according to ISO/IEC 17025: the test reports shall report the relevant Laboratory's name, test date, and reference standards used. In any case, the Laboratory (internal or external to the company where the tests are carried out shall have all documentation necessary to demonstrate that the Laboratory can carry out the required test types.

7.13 Appearance Approval Report, if required

The aesthetic aspect shall be considered only if the Customer deems it as a critical feature for the product/material.

7.14 Sample Production Parts

In agreement with what defined by the Customer, product samples shall be provided in the quantity required.

7.15 Master Sample

A master sample approved by the Customer shall be kept according to the PPAP documentation, that means up to the production of an eventual new sample for Customer approval.
The date of Customer approval reported in the PSW shall be indicated on the sample itself. This sample may be used as a reference for the training of the production operators.

7.16 Checking aids

If tools such as templates, gauges, etc. are used for the product control due to Customer requests or due to internal needs, these shall be calibrated.
Upon Customer request, the calibration report shall be attached to the PPAP documents.

7.17 Customer Specific Requirements

If the Customer has specific requirements, the compliance to these shall be documented.

With regard to environmental protection, those requirements may be:

- Creation of product/component MDS (Material Data Sheet) in the International Material Data System (IMDS) in order to guarantee a correct disposal of end-of life vehicles by observing the limits of the hazardous substance which may be contained in the product/component in compliance with standards, laws and regulations applicable at national and international levels (e.g. GADSL list);
- Declaration of conformity in accordance with ELV/RoHS Directive, REACH regulation, etc.;
- Declaration regarding hazardous substances contained in the product/component in accordance with the Customer's Restricted Materials List (RML)

Other requirements may be for example the filling in of the form Q.254 regarding the feasibility commitment *towards the Customer.*

7.18 Part Submission Warrant

Upon completion of all PPAP documents, the Part Submission Warrant (PSW) shall be filled in.
The PSW is a document containing:

- information necessary to identify the product/part;
- information regarding the manufacturing plant;
- Customer references;
- indication of materials;
- reason of submission;
- submission level required;
- result of submission;
- signature of *company's authorized person* (organization representative)

8. ATTACHMENTS

Form Q.254 – Feasibility Commitment

ANNEX

Zoppas Industries Heating Element Technologies	**FEASIBILITY COMMITMENT**

Document Ref.	Q254_aaaammgg	**Date**	
Project No.		**Project Name**	
Project Type	☐ New ☐ Change	**Customer**	
Part Number		**Part Name**	
Drawing Code		**Drawing Rev.**	
Cust. Part Number		**Cust. Part Name**	
Cust. Drawing Code		**Cust. Drawing Rev.**	

Considerations
The drawing, 3D model and/or specifications provided by the customer have been used as a basis for analyzing the organization's ability to meet all specified requirements. All "no" answers are supported with attached comments identifying concerns and/or product changes to enable the organization to meet the specified requirements.

No.	Questions regarding the feasibility	YES	NO	N/A	Notes/Comments
1	Does the product conform with the Zoppas technical documentation (drawings, technical specifications), documentation made according with customer's requirements ?	☐	☐	☐	
2	Are all the design and development documents available (PFMEA, control plan, work instructions, etc.)?	☐	☐	☐	
3	Zoppas technologies and know-how guarantee necessary experience for the production of the product?	☐	☐	☐	
4	Can the product be manufactured according to the local safety standard rules for workers and environment?	☐	☐	☐	
5	Are all the special step process approved, evaluated and monitorized? Special characteristics included?	☐	☐	☐	
6	Can the product be manufactured with process capability that meet the requirements?	☐	☐	☐	
7	Is there adequate manufacturing capacity to produce the product?	☐	☐	☐	
8	Does the design allow the use of efficient material handling techniques?	☐	☐	☐	
9	Can the product be manufactured within normal cost parameters?	☐	☐	☐	
10	- Costs for manufacturing?	☐	☐	☐	
11	- Costs for tooling?	☐	☐	☐	
12	- Alternative manufacturing methods?	☐	☐	☐	
13	Is all the measuring equipment capable for the product realization?	☐	☐	☐	
14	All the processes necessary for the production of product run in Zoppas plant?	☐	☐	☐	
15	Can external processes guarantee the necessary capability?	☐	☐	☐	
16	Does the Logistics organization guarantee the correct management of the finished products (transport, stock, etc.)?	☐	☐	☐	

Conclusion		
☐	**Feasible**	Product can be produced as specified with no revisions and with actual manufacturing processes
☐	**Feasible**	Changes recommended both to the product or to the process and/or investiments are required (see attachment, Deviation List)
☐	**Not Feasible**	Design revision required to produce product within the specified requirements

Approval			
Surname and Name	**Function**	**Date**	**Signature**