

**MAHLE Filter Systems Europe
Purchased Parts Product Approval
Handbook**



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> General definitions

This guideline defines the product approval process minimum requirements for MAHLE Filter Systems suppliers. PPAP (AIAG) and PPA (VDA) are used as synonymous for product approval in general in this guideline.

This document is representing an additional information and standard for MAHLE Filter Systems in region Europe.

> Submission level and language

Standard submission levels for A, B, C+ and C components is

- VDA PPA Volume 2 Level 2
- AIAG PPAP Level 3

plus additional MAHLE-content according this guideline.

All documents need to be submitted in **English language**.

> Documents for submission for Product Approval

1. PSW / PPA Coversheet

- Alternatives for suppliers: use official VDA PPA template, use official AIAG PPAP template or use MAHLE-template
- Standard submission level (According to Chapter III)
- Include IMDS materials reporting (number) to indicate reporting status.
- PO-Number for PPAP parts should be mentioned on coversheet
- For carry over to other MAHLE plants the supplier needs to submit a coversheet with "new" MAHLE plant address; PPAP release will be carried over to second plant; if PPAP release is older than 1 year then coversheet with requalification is necessary.

2. Feasibility Study

- Must contain the MAHLE Project Name, part number, drawing version and drawing release date, RFQ-Reference (if not available attach the RFQ-request to the feasibility)
- Lead times need to be provided
- Must full fill the feasibility document, including SPC, timeline, potential deviations and improvement

3. Drawing (ballooned)

- All requirements need to be ballooned with single number (not one number for all text-requirements) (ex. **Figure 1**)
- When MAHLE is the design owner of sub-components these drawings must be ballooned and included in the dimensional report.
- Drawings must be "Design Released", Minimum design level 5 and status 50.
- When a dimension has various positions, then mark with the same number but additional index a, b, c etc. (ex. 6a, 6b, 6c, 6d)

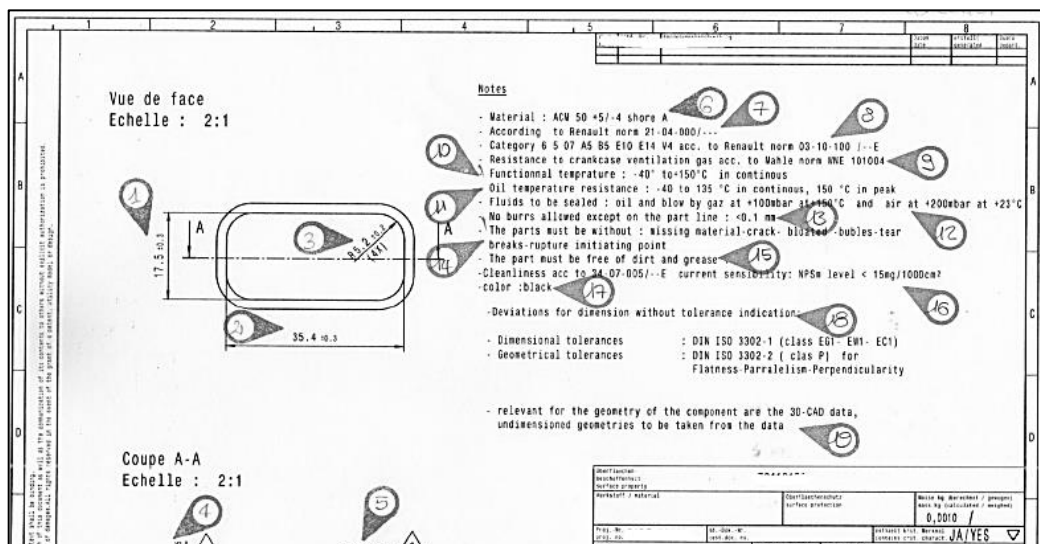


FIGURE 1: Explanation of how to balloon text-requirements on drawings

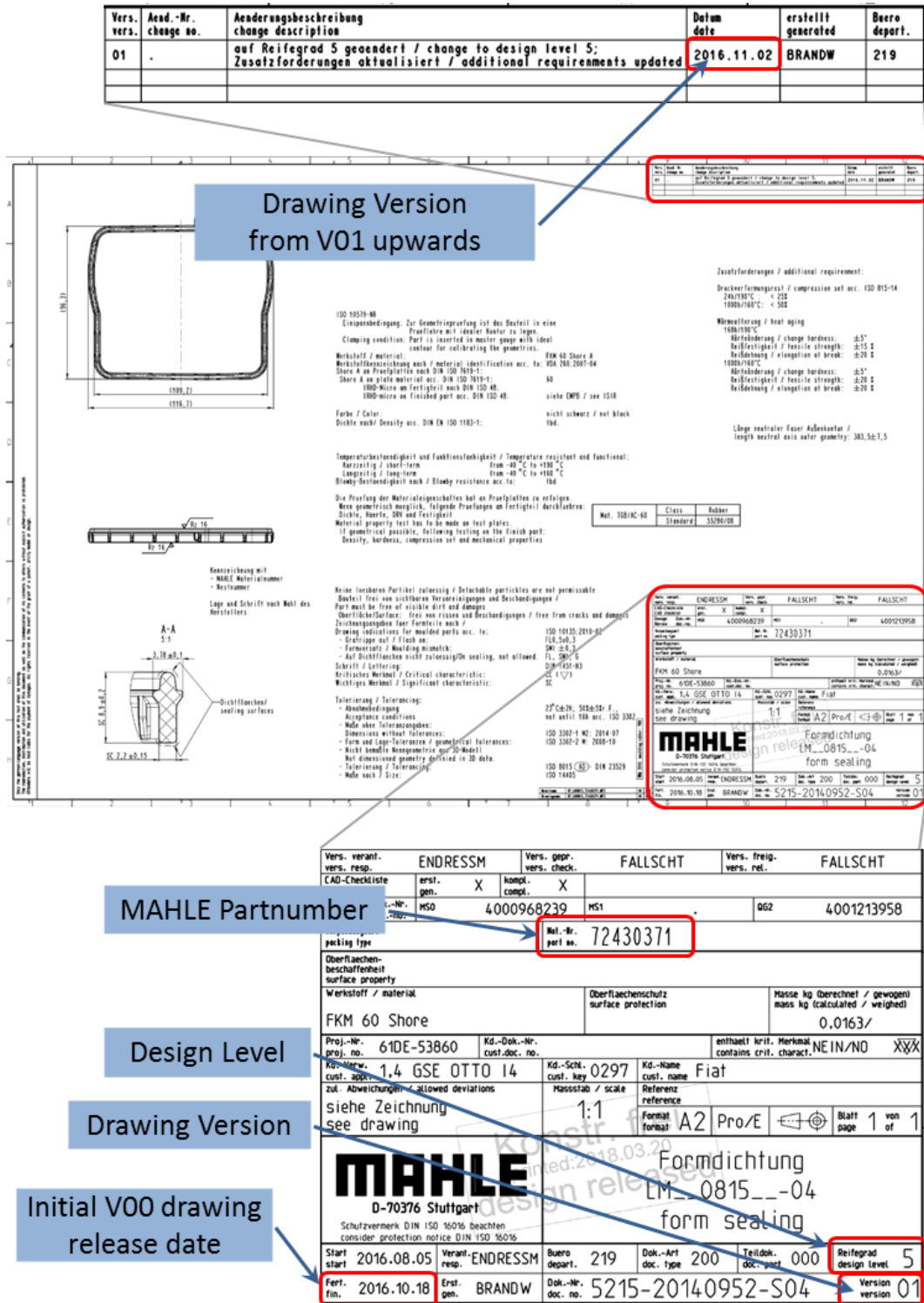


FIGURE 2: Explanation of how to get general information in MAHLE drawing

4. Measurement Report

- Correlation between measurement report and drawing (must contain Part Number, Drawing Version, release date of the drawing, date of the measurement report)
- Measurements for all ballooned dimensions
- Confirmation status for all non-measurable requirements or external reports (example: cleanliness, material, acoustics, pores & shrink holes). Provide external reports and clearly refer to them in the measurement report.
- A complete material report must be included that shows the correct material/substances composition in compliance with the specification.
- Perform tests for all parts and product materials when chemical, physical or metallurgical requirements are specified by drawing, design record or control plan.
- Perform tests for all parts or products when performance or functional requirements are specified by drawing, design record or control plan
- Number of measured parts
 - Standard: 5 pieces per process variant (Ex. cavities, machine fixture, assembly line, etc.). Exceptions must be officially requested by the supplier to MAHLE SQE in the early APQP phase.

5. Samples

- PPAP measured parts (measurement report) must be stored at supplier in safe conditions.
- Number of samples to be submitted to MAHLE:
5 pieces per process variant or, in case of more than 5 process variants, 1 piece per process variant (Ex. cavities, machine fixture, assembly line, etc.). Number of parts can be increased based on plants needs and is to be agreed on before PPAP submission.
- PPAP samples must be clearly identified as PPAP parts.

6. List of special characteristics

- Applicable only for part numbers with special characteristics defined in the drawing.
- A list of special characteristics must be created including as minimum:
 - Header (as per other points)
 - Characteristics and tolerances
 - Type of special characteristic.
 - Minimum capability requested
 - Measurement method
 - Capability results
- MAHLE template is available if needed

7. Process capability studies

- All special characteristics must have a capability study submitted in the PPAP documentation. Deviations must be agreed before nomination.
- Cmk and Cpk requirements need to be aligned with the customer specific requirements.
- If deviating OEM requirements or special requirements for the project are not defined then the requirements contracted with MAHLE apply.
(e.g. SC: $cmk \geq 1,67$; $cpk \geq 1,33$ / CC: $cmk \geq 2,00$; $cpk \geq 1,67$)
- sample size for Cmk/Ppk:
 - parts from 1 production batch
 - minimum 50 parts per process variant. When the capability study per process variant is not feasible due to the measurement effort or process variants identification, the situation must be raised up by the supplier and any exception must be approved by the SQE.
- When the minimum capability is not achieved or capability study is not possible an action plan and 100% inspection must be implemented.

8. Process Flow

- Must include PN and version, facility reference (production location), document revision number and revision date.
- All flow must be detailed, from receiving, incoming inspection to shipping, including storage, external processes, rework processes must be included and marked.
- Include Machine Name, number/type (either in process flow or in control plan)

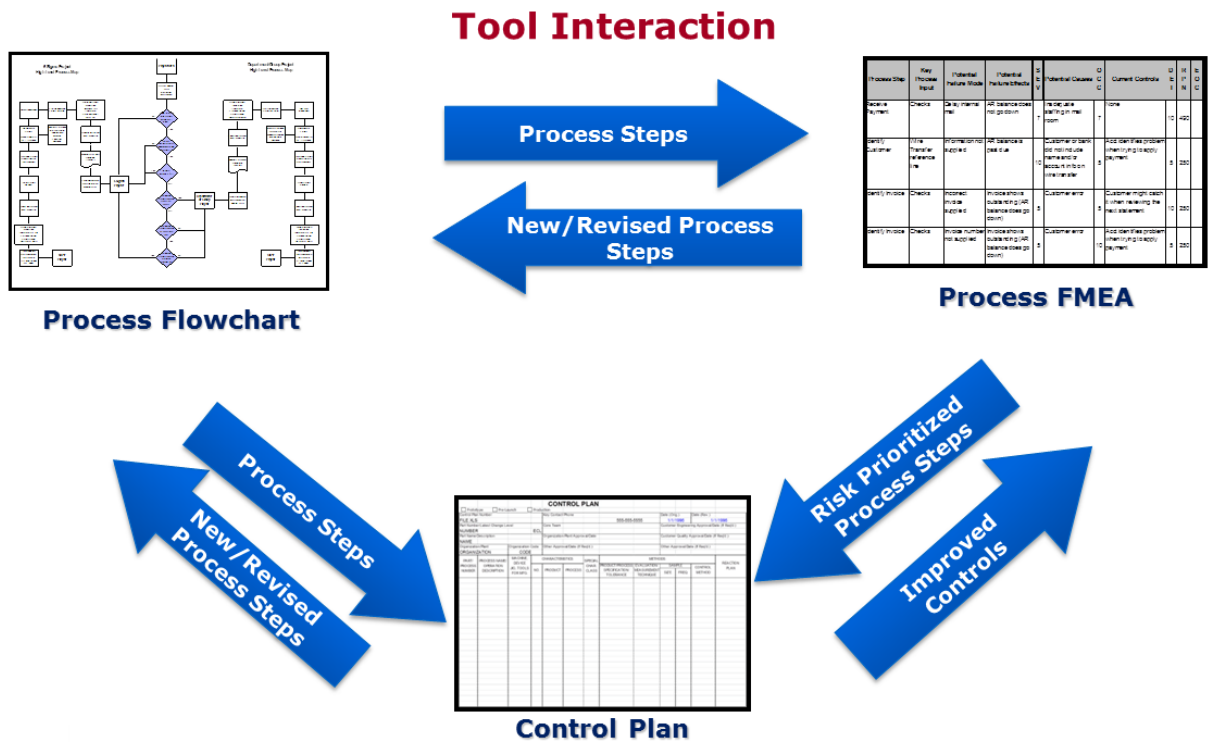
9. P-FMEA coversheet

- To be done with P-FMEA coversheet attached or similar supplier template

10. D-FMEA

- When the supplier is design responsible proceed same as P-FMEA

11. Control Plan



- Control plan must contain
 - MAHLE data: part number, part name and latest drawing version
 - Supplier data: control plan version, last update date, for which phase the control plan is valid (prototype, pre-series, series)
- Needs to contain the dimensions and tolerances or process parameters and tolerances, frequency, number of parts, measurement method and devices, record, reaction plan, if the dimension is under SPC.
- Control plan needs to consider requalification cycles once per year
- Include Machine Name, number/type and clamping force etc. (or in flowchart)

CONTROL PLAN												
<input type="checkbox"/> Prototype <input type="checkbox"/> Pre-Launch <input type="checkbox"/> Production												
Control Plan Number FILE.XLS				Key Contact/Phone 555-555-5555				Date (Orig.) 1/1/1996		Date (Rev.) 1/1/1996		
Part Number/Latest Change Level NUMBER ECL				Core Team				Customer Engineering Approval/Date (If Req'd.)				
Part Name/Description NAME				Organization/Plant Approval/Date				Customer Quality Approval/Date (If Req'd.)				
Organization/Plant ORGANIZATION			Organization Code CODE			Other Approval/Date (If Req'd.)			Other Approval/Date (If Req'd.)			
PART/ PROCESS NUMBER	PROCESS NAME/ OPERATION DESCRIPTION	MACHINE, DEVICE JIG, TOOLS FOR MFG.	CHARACTERISTICS			SPECIAL CHAR. CLASS	METHODS				REACTION PLAN	
			NO.	PRODUCT	PROCESS		PRODUCT/PROCESS SPECIFICATION/ TOLERANCE	EVALUATION/ MEASUREMENT TECHNIQUE	SAMPLE			CONTROL
									SIZE	FREQ.	METHOD	

FIGURE 3: Example Control Plan

12. Checking aids

- All special measurements equipment (customized) or gages shall be listed and the document submitted with the PPAP. As minimum information must contain:
 - Header:
 - MAHLE data: part number, part name and latest drawing version
 - Supplier data: control plan version, last update date
 - Picture
 - Equipment number
 - Quantity
 - R&R result

13. Measurement System Analysis Studies

- The organization shall have available Measurement System Analysis studies e.g., R&R, bias, linearity and stability, for all gages, measurements and test equipment (according to AIAG Measurement System Analysis manual or VDA Vol. 5 each in latest version available).
- R&R for all special characteristic (critical or significant) and others previously defined by SQE-D must be submitted.

14. Tooling documentation

- Tooling label and documentation according to the template attached

15. PPAP of sub suppliers

- All components or operations (sub-contracting) provided by sub-suppliers must be PPAPed.
- All PPAP documents of sub suppliers must be accessible for MAHLE for evaluation; the approved coversheet must be submitted to MAHLE.

16. Packaging Data Sheet

- Supplier must submit the MAHLE Standard Packaging Data Sheet (PDS) fulfilled to be approved by MAHLE production plant logistic responsible. Submit signed document with PPAP.
- Packaging and labeling must be in accordance to MAHLE Logistic Guideline in latest version available on: <http://www.mahle.com/en/purchasing/general-guidelines-for-suppliers/>



Logistics guideline of MAHLE Filtersysteme GmbH and its European subsidiaries



Implementation guideline GLOBAL TRANSPORT LABEL (GTL)

17. Material Certificate

- Supplier must submit Material Certificates and Datasheets for raw material needs to be submitted

18. Material data sheet to IMDS

- Material reporting must be entered into the IMDS (International Materials Data System). IMDS is available through <http://WWW.mdssystem.com/index.jsp>
- IMDS according to MAHLE doc: <http://www.mahle.com/en/purchasing/general-guidelines-for-suppliers/>



Supplier information

MDS verification in IMDS [PDF; 185 KB]

- MDS report must be extracted and submitted as part of the PPAP documentation.

19. Contingency plan

- MAHLE requires the supplier to create and maintain a production contingency plan that combats production interruption, including but not limited to, natural disasters, fire, equipment shutdown, labor strike, supply interruption, or other force majeure type events. Documented information in this plan shall be submitted to MAHLE for all Level "A" and "B" components.

20. Appearance Approval

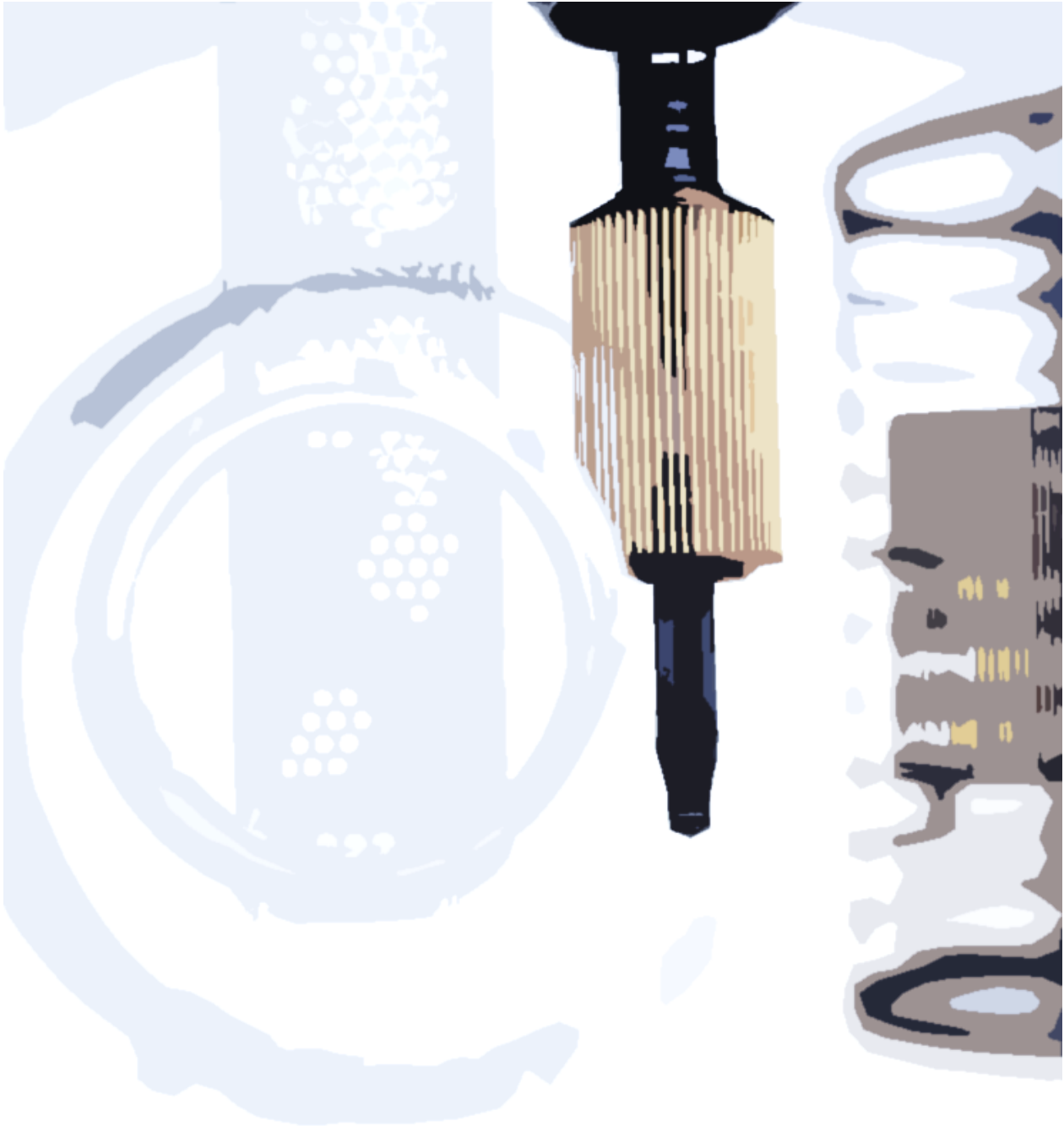
- The Appearance Approval Inspection (AAI) is applicable for components affecting appearance only. Specified appearance in the drawing must be according to a defined standard or reference.
- The appearance requirements could include information regarding the color, textures, surface appearance, etc.

21. Run@Rate

- MAHLE standard run at rate sheet must be used to evaluate the results.
- Each single production operation from process flow must be included.
- The maximum annual volume contracted in the supply agreement must be considered.
- Run@Rate is just required for A and B components, for C+ and C components the necessity of Run@Rate is to be defined in the Tech. Reviews

22. Part History

- A Part History must be created including as minimum:
 - Header (as per other points)
 - Reason for change
 - Description of change
 - Agreed with (Supplier)
 - Agreed with (MAHLE)
 - Drawing Index
 - First delivery
 - Supplier change request No.
 - PPAP release date (if applicable)
 - Remarks
- MAHLE template is available if needed



Valid for all European MAHLE Filter Systems Companies

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