

Husqvarna PPAP Requirements

Instruction

Husqvarna Group

Global



1 PURPOSE

This document describes the PPAP requirements for PPAP submissions to Husqvarna sites globally. The requirements are based on the AIAG standard except for a few minor adaptations to Husqvarna processes, but the PPAP definition and purpose remains the same.

1.1 PPAP Definition

Copied from AIAG standard:

"All customer engineering design record and specification requirements are properly understood by the supplier and that the process has the potential to produce product consistently meeting these requirements during an actual production run at the quoted production rate."

1.2 PPAP Purpose

Copied from AIAG standard:

The purpose of any Production Part Approval Process (PPAP) is to:

- i. Ensure that a supplier can meet the manufacturability and quality requirements of the parts supplied to the customer
- ii. Provide evidence that the customer engineering design record and specification requirements are clearly understood and fulfilled by the supplier
- iii. Demonstrate that the established manufacturing process has the potential to produce the part that consistently meets all requirements during the actual production run at the quoted production rate of the manufacturing process.

There might be minor local variations from this general instruction at certain sites.

The information and instructions in this document are an elaborated version of the former instruction HQAP.

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2 Abbreviations and Technical Terms

Below explanations to some of the technical terms and abbreviations in this document:

PSW	Husqvarna Part Submission Warrant (PPAP frontpage)
ECR	Engineering Change Request
ECO	Engineering Change Order
DS	Design Samples
EP	Engineering Pilot
MP	Manufacturing Pilot
SoP	Start of Production
TOk	Technical Ok, the technical verification on a part.
Product	The final complete product that is distributed to the market
Part	A single part or assy included in a product
BoM	Bill of Material
Top level part	A.k.a. Assy. The highest level part number in a BoM list
Supplier	1 st tier supplier, the supplier providing a part to Husqvarna
Sub supplier	2 nd tier or further
OEM	Original Equipment Manufacturer
Special Characteristic	A characteristic with a certain impact to the final product. The term "Special Characteristic" is never abbreviated as SC in this document:
CC	Critical Characteristic
SC	Significant Characteristic
IC	Inspection Characteristic
RML	Restricted Material List; a list containing the restricted substances. RoHS and REACH requirements are included in the RML.
IA	If Applicable
DP	Distribution Package, a package of specifications connected to an RFQ, ECR or ECO.
MCD	Mechanical CAD, initiation of file name for TeamCenter 2D drawings and 3D models.
3D PMI Model	"3D Product & Manufacturing Information". A digital 3D drawing.
Part number	Term for article number. Commonly used in this document.

3 Connected PPAP Processes

There are several connected processes affecting the PPAP process and the PPAP disposition. Below follows a description of the most significant processes affecting the PPAP process.

3.1 Change of PLM System – Connected Changes

Husqvarna is in the process of changing PLM-system from SmarTeam to Teamcenter (written 20250825). The PLM system change will be done over time where each Husqvarna business division has their own schedule. This means that during an overlapping time, a supplier may have to adapt a PPAP submission to Teamcenter for the divisions that have completed the transition, but also submit PPAPs according to SmarTeam setup for divisions that have not yet completed the transition. The workload for the changes are not regarded as significant and the key changes for supplier PPAP submissions are described below:

Term	SmarTEAM	Teamcenter
Article number: (part number)	“Article number” The reference number for connected specifications and documents. The article number is an extension of the drawing number.	“Part number” The reference number for connected specifications and documents defining the part. Same format as SmarTeam.
Drawing number:	“Drawing number” The document number to the part specification.	“Drawing ID” The term “drawing number” and “document ID” will be replaced by the term “drawing ID”. The drawing ID format is not similar to article number.
Drawing revision:	Letter based 2D-, 3D-drawings and 3D models are connected to the part number revision.	Numerical 2D-, 3D-drawings and 3D models have their respective revision state. Drawing revision is not connected to part revision.
Part report:	-	*New document* A document including references to connected part specifications and documents.
Structure report:	-	*New document* The document defining the part revision attributes and BoM list.
BoM list:	Defined in the drawing.	Defined in the “Structure report”.
Connected specs:	Referenced in the drawing.	Referenced in the “Part report”.
Part weight:	Defined in the drawing.	Defined as “Material mass” in “Part report” and “Structure report”.
Treatment:	Defined in the drawing.	Defined as “Material coating” in “Part report” and “Structure report”.

In short, the part number- and it's revision state format remains the same, but drawing number and connected revision state, BoM list and specifications references will change in Teamcenter.

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Below table illustrate examples of the PPAP related changes between the PLM-systems:

Item	SmarTEAM Format	Teamcenter Format
Article number: <i>Ex:</i>	A 9 digit number: <i>578554402 or 5785544-02</i>	Same
Revision: <i>Ex:</i>	A letter based format: <i>B</i>	Same
Part name: <i>Ex:</i>	Part name: <i>Wheel</i>	Same
Drawing number 2D: <i>Ex:</i>	7 digit number: <i>5785544</i>	"MCD" + a 9 digit number <i>MCD000000223</i>
Drawing revision 2D: <i>Ex:</i>	Same as part revision: <i>B</i>	Own revision state, a 3 digit number <i>004</i>
Design number 3D: <i>Ex:</i>	7 digit number: <i>5785544</i>	"MCD" + a 9 digit number <i>MCD000000458</i>
Design revision 3D: <i>Ex:</i>	Same as part revision: <i>B</i>	Own revision state, a 3 digit number <i>003</i>

For above part and in Teamcenter format, the PSW should be filled in according to below:

Husqvarna Part Submission Warrant

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Part Information

Husqvarna part number:	<u>578 55 44-02</u>	Part revision:	<u>B</u>	Part name:	<u>Wheel</u>
Husqvarna drawing number:	<u>MCD000000223</u>	Drawing revision:	<u>004</u>	Part weight (g):	<u>328</u>
Tool number:	<u>NA</u>	Tool cavities:	<u>NA</u>	Cores:	<u>NA</u>
Application / Project:	<u>P 007</u>				

- The drawing number and revision state is the version of the 2D MCD number.
- If only a 3D drawing (PMI), then that number and revision state should be filled in.
- The 3D design number (3D model) should never be filled in the PSW.

3.2 RML Compliance

Parts must comply to Husqvarna RML, which includes RoHS and REACH. Any RML compliance unclarities must be communicated to the Sourcing Compliance Coordinator and responded to accordingly.

The supplier providing the full part to Husqvarna is responsible to make sure the RML compliance documentation cover the part to be supplied (including BoM) and is submitted in good time prior to the PPAP submission to following email address:

material.declarations@husqvarnagroup.com

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3.3 Design Samples

During the development process Husqvarna R&D will request samples from suppliers. The most common type is design samples to be requested for evaluation and testing.

The DS is separate from the PPAP process, but the supplier is strongly advised to produce and evaluate DS in intended serial production equipment to contribute to the coming process assurance.

3.4 Technical Release

The technical validation process for a part is parallel to the PPAP process. When reviewing a PPAP, the technical evaluation data and status is part of the PPAP review. To approve a PPAP, the technical status of the part has to be approved.

Depending on type of part, a technical evaluation testing may be necessary to be conducted on both new project- and serial production PPAP samples.

The Husqvarna term for a part's technical release is TOk (Technical Ok).

3.5 Packaging

The common denominator in each site's packaging requirements is that the supplier must use durable and weather proof packaging. This is especially important for parts sensitive to corrosion, humidity and heat during transport. In these cases, the supplier is expected to provide packaging proposals aligned with the Husqvarna general packaging requirements. The receiving factory's production engineering has the most weight for packaging approvals.

The packaging requirements for Husqvarna production sites can be found in below link:

[Documentation | Husqvarna Purchase \(husqvarnagroup.com\)](https://husqvarnagroup.com/Documentation/Husqvarna-Purchase)

4 Supplier PPAP Responsibilities

The supplier providing the part to Husqvarna is responsible to make sure all the requested items are in order and included in the PPAP submission. In general, the supplier is responsible to process assure any tier sub suppliers and make sure the requested documentation is collected, in order and attached.

If PPAP discrepancies or nonconformities are found originating from any tier supplier, the supplier is responsible to complete or correct the PPAP.

PPAP responsibilities for appointed sub suppliers depends on the setup in the project and what has been agreed upon.

For serial production, the supplier is responsible for sub supplier part quality.

5 Mandatory PPAP Submissions Reasons

In general, any changes of design, production process or production equipment (including measurement equipment) at any tier supplier are subject for a PPAP submission. Below follows a short and general list of when a PPAP should be submitted:

- New part number.
- ECO implementation (design change).
- Tool maintenance (changed or refurbished tool).
- Tool replacement.
- Production process change.
- Transfer of parts to another supplier or production location.
- Corrective actions of a previous rejected- or interim PPAP (resubmission).
- If the part has not been produced in more than twelve months.
- Quality performance reasons.

If a change has been implemented without PPAP approval, the supplier is held accountable for subsequent consequences.

6 PPAP Content Description

This section describes the PPAP contents requirements and the Husqvarna adaptations differing from the AIAG standard. The Husqvarna adaptations are not specifically pointed out, but are not very significant. All Husqvarna specific templates can be downloaded from below site:

[Documentation](#) | [Husqvarna Purchase](#)

6.1 Basic PPAP Requirements

Below follows a short guide of the general basics for a PPAP submission to Husqvarna:

- 1) The **Husqvarna PSW** template is mandatory to use.
- 2) **The PSW** must represent the top level Husqvarna part number and revision state even if the reason for submission is a sub part change.
- 3) **The PPAP Level** is stated in the ECO or communicated by the responsible SQE.
- 4) **PPAP items** must be referenced to the part number it represents.
- 5) **PPAP samples** must be:
 - a) Produced in serial production conditions, equipment and operators.
 - b) Top level parts. Sub part samples will be specifically asked for if needed.
 - c) Sampled from a production trial run when requested.
- 6) **The “Production Trial Run”** template must be attached when a trial run is asked for. The Husqvarna template is not mandatory if the suppliers own template provides similar key data.
- 7) **Net Weight** must be noted in grams in the PSW:
 - a) Note the weight of the top level part number (including full BoM). Additional packaging, not part of the BoM, are not to be included in net weight.
 - b) If multiple tools or cavities, note the mean value based on samples from each origin.
- 8) **Special characteristics** must be clearly highlighted in:
 - (P)FMEA
 - Control Plan
 - Work- and inspection instructions
- 9) **Supplier designed parts** or parts without a Husqvarna drawing frame, have to be discussed in good time prior to the PPAP submission for how they should be evaluated and accounted for.
- 10) **Nonconformities** must be clearly highlighted in evaluation records or summarized in close connection to the PSW.
- 11) **Corrective actions** to nonconformities have to be attached.
- 12) **Supplier signature** means that the PPAP submission documentation is in order and that any nonconformities are accounted for.
- 13) **A PPAP approval** always assumes that all submitted parts conform to specifications or that any nonconformities have been accounted for. The supplier is always responsible for consequences of unaccounted nonconformities.

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6.2 PPAP Level

The PPAP level states which items that must be provided in a PPAP submission. All mandatory items are written by each PPAP level checkbox in the Husqvarna PSW. Any changes to the PPAP level items will be communicated in connected ECO or by responsible SQE.

Below table is a copy of the items by each PPAP level checkbox in the PSW. In case of differences between below table and the PSW, the PSW is always the reference:

Submission Item ↓	PPAP level →	0 ¹⁾	1	2	3	4 ²⁾	5 ³⁾	6 ⁴⁾
PSW		✓	✓	✓	✓	✓	✓	✓
Drawings		✓	✓	✓	✓	✓		IA
Flowchart					✓	IA		IA
(P)FMEA					✓	IA		IA
Control Plan					✓	IA		IA
MSA Studies					IA	IA		IA
Capability Studies					IA	IA		IA
Samples		✓		✓	✓	✓	✓	IA
Dimensional Results		✓		✓	✓	✓		IA
Laboratory and Functional Results				✓	✓	IA		IA
Packaging description					✓	IA		IA
AAR (Appearance Approval Report)				IA	IA	IA		IA
Production Trial Run Template					IA	IA		IA

¹⁾Level 0 is used by North American division for tool approvals from tool suppliers.

²⁾Level 4 is used when only the changed characteristics and the characteristics affected by the changes need to be accounted for (process- and design changes).

³⁾Level 5 is a PPAP level 3 where the PSW and samples are submitted but the remaining items are available for review at supplier location.

⁴⁾Level 6 is customized where requested items are stated in the ECO by the responsible SQE.

6.2.1 Item distribution for top level parts

The PPAP items for a top level part number are distributed a bit different compared to single part component PPAP. In general, the requested PPAP items for a top level part number should be provided according to the following:

- All applicable PPAP items by the specified PPAP level must be attached for respective top level- and sub parts.
- If requested; Flowchart, (P)FMEA, Control Plan, Trial run report and Packaging instructions are only to be provided for the top level part number.
- If fasteners are included, they must be accounted for by; drawings, dimensional results, laboratory- and functional results.
- If standard-, on shelf- or parts defined in data sheets or ISO standards are included, they must be accounted for by reasonable items.

Any changes to above are communicated either in connected ECO or by responsible SQE.

Ex: The PPAP items for a PPAP level 3 should be allocated according to below:

- The top level part number:
 - PSW and applicable PPAP level 3 items.
 - Sample quantity for evaluation evidence according to "PPAP Items" section.

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- Packaging description
- Sub parts:
 - Drawings (ballooned) and specifications.
 - Dimensional results.
 - Laboratory- and functional results (see “PPAP items” section).
 - IA, MSA studies.
 - IA, Capability studies for SC and CC.
 - IA, AAR

For part numbers with an extensive BoM such as SFP (Sourced Finished Products) and SPD (Sourced Product Development), the requested PPAP items are established case by case between Husqvarna and the supplier in good time prior to the PPAP submission.

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6.3 PPAP Items

The PPAP level items are described below:

Item	Description
PSW	Part Submission Warrant , the PPAP frontpage including key information about the PPAP submission.
Drawings	Drawings and specifications for part and sub parts. Ballooned drawings for dimensional results.
Flowchart	Process Flow Chart for the top level or main part.
(P)FMEA	(Process) Failure Mode and Effect Analysis for the top level or main part.
Control Plan	Control Plan for the top level or main part.
MSA Studies	Measurement System Analysis by Gage R&R have to be provided for the following: - All SC's and CC's (Significant- and Critical Characteristics). - Test equipment that is specifically designed for a part number or family. Ex. EoL test, leakage test, pressure test, pull out force etc. - When changing measurement equipment to a type less accurate or more difficult to handle. For destructive testing, the ANOVA method in Minitab can be used. If Minitab is not accessible, discuss with responsible SQE how to verify the equipment.
Capability Studies	C_{pk} and C_p studies for all SC's and CC's made by MSA approved measurement equipment. Present results in a graph that best fit the type of distribution. Include at least 30 pcs from each manufacturing origin (tools, cavities, lines etc) in separate graphs. The capability requirements are: C_{pk}>1,33 for two sided tolerances. C_p>2,0 for one sided tolerances or when tool wear is considered. For electric characteristics, the SQE will inform what has to be accounted for.
Samples	Samples of the top level part. Sample quantity is communicated in the connected ECO and/or the PPAP call off. The general requirement for sample quantity is: <i>5 pcs measured and tagged + 20 pcs for testing.</i> If multiple manufacturing origins of parts (tools, cavities production lines etc): <i>3 pcs per origin measured and tagged + X pcs per origin for testing.</i> In case of low volume parts or other odd cases, the responsible SQE and R&D engineer decide the sample quantity to the PPAP submission.
Dimensional Results	Measurement records of geometrical characteristics must be evaluated on tagged samples: - Measurement equipment noted for each characteristics. - Connect characteristics to ballooned drawing. 3D laser scanning must be aligned to drawing references/datums, NEVER aligned to "best fit". 3D scanning tolerances must be displayed by a color gradient between max and min tolerances. Attach clear visual pictures for each view. 3D drawings must have ballooning of characteristics in the same way as 2D drawings.

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Item	Description
Laboratory- and Functional Results	- In case of destructive method to evaluate part characteristics, parts from the same PPAP batch must be used for verification instead of the tagged samples. Evaluation samples are not needed to be attached in PPAP if not requested so. Evaluation results for non geometric- and electrical characteristics must be done on tagged samples. In case of destructive evaluation, samples from the same PPAP batch must be evaluated. Below follows examples of laboratory- and functional results: - Material certificate - Spectrometer analysis - EoL-test results - Software version verification - Pressure testing - Hardness and case depth - Plating- or paint thickness, adhesion etc. - Etc.
Packaging description	Packaging requirement verifications has to be accounted for by measurement records, drawings, pictures and quantity per box and pallet. Packaging requirements differ between Husqvarna manufacturing locations. If no specific requirements, the supplier must submit clear pictures, descriptions and measurements of the proposed serial delivery packaging.
AAR	Appearance Approval Report, if applicable, color evaluation records or other surface requirements verifications.
Production Trial Run Report	If Applicable: When requested, utilize and attach the "Husqvarna Production Trial Run Template" in the PPAP Production Trial Run.
Husqvarna RML	Husqvarna RML compliance is based on IEC 63000:2016, which includes RoHS, REACH and more.
RoHS Compliance	RoHS Compliance Declaration or material certificates must be attached for new parts or when changes of material. The first tier supplier is responsible to gather RoHS information for the full part, including sub parts.

6.3.1 Production Trial Run

Also known as "full run test", "significant production run", "PPAP trial run", "run at rate" etc.

The production trial run is a controlled production order of a limited quantity to verify serial production equipment and capabilities for a PPAP submission. Parts are sampled and data collected from the production trial run to be summarized and attached in the PPAP submission.

The trial run quantity must be consulted with the responsible SQE so it as far as possible can be balanced to what is deemed adequate to verify the purpose of the PPAP.

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7 PPAP Submission

Make sure all parts and documents are complete and in order before submitting the PPAP! If the submission is incomplete or contain easily corrected manufacturing discrepancies, the PPAP will not be handled until corrected by the supplier.

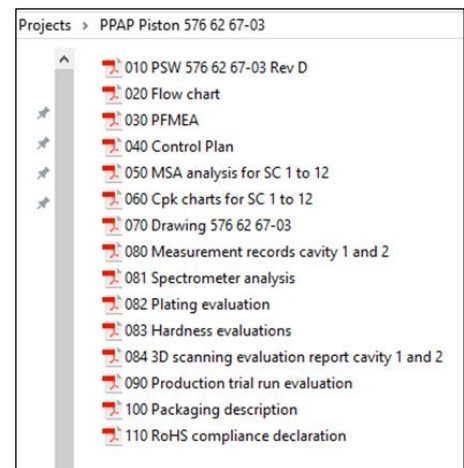
All PPAP submission documents must be included in paper format in the PPAP package and also submitted in digital format to Husqvarna.

All documents must be included in the same PDF-file, if not possible, the documents have to be well organized in a ZIP-file, similar to the picture to the right.

In case of extensive file size, divide the documentation between subsequent emails or available as DLC on a safe and well known 3rd part downloading site (ex. Sharepoint). This is to make sure that anyone that opens the package can be able to find out the purpose of it.

The physical PPAP submission must be packaged in a safe manner where the content is protected from weather and normal transport handling conditions.

The package must be clearly marked with "PPAP Samples" and submitted to the address communicated by Husqvarna. The address is normally communicated in the purchasing order or ECO, in special cases, it can also be communicated separately by the project or the SQE. If unclear or no address, contact responsible SQE.



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8 PPAP Review & Disposition

Depending on which business division and site the PPAP is submitted to, the PPAP can be handled by a dedicated PPAP department, local- or global SQE, but the process is still the same.

The lead time to handle a PPAP depends on the part complexity, part change and necessary evaluation methods. Furthermore, if the PPAP is incomplete or missing data, the PPAP handling will be delayed until completed by the supplier.

The PPAP disposition options (the PPAP review decision) are described in the internal document: "Husqvarna PPAP Dispositions".

Below follows the supplier related information about the three applicable dispositions for a PPAP submission:

Disposition	Explanation and Action
Approved	The PPAP meet the requirements, or the included discrepancies are insignificant, and is approved. If circumstances allow, the part can be delivered according to plans. For new parts, the project will communicate when the part should be delivered.
Rejected	The PPAP does not meet the specification- or technical requirements. The reasons behind the rejection is written in the PSW comments: 1) Specifications are not met: The supplier issue corrective actions and make a resubmission on their own expense. 2) Technical requirements are not met: Husqvarna redesign the part and issue a new ECO. A new PPAP will be called for.
Interim	The PPAP does not meet the requirements and can not be approved, but the circumstances does not allow a rejection. A time- and quantity limited approval (interim) can be issued. The interim class is for Husqvarna information. The nonconformities are handled the same as for a PPAP rejection.

An approval or interim approval of a top level part number always assumes that all included supplier designed parts or parts without a Husqvarna drawing frame are:

- According to specifications.
- Process assured by the supplier.
- Tested and verified in its form, fit and function.

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9 Connected Documents and Requirements

Below documents are connected to this document:

- Husqvarna PPAP Dispositions (internal use only).
- Husqvarna Part Submission Warrant_Template
- Husqvarna APQP Template
- Husqvarna APQP Template_Instruction
- Husqvarna Production Trial Run_Template
- Husqvarna Special Characteristics Requirements
- Husqvarna Color Reference Order Form
- Packaging instructions to receiving factories

All documentation can be found at this location:

<https://purchasing.husqvarnagroup.com/general-requirements>