

# WITTUR PRODUCTION PART APPROVAL PROCESS



(PR)	WHQ_SQD_PR005_WPPAP	WHQ	SQD	11	2018-10-05	EN
Type	Code	Belonging	Process	Edition	Issue date	Language

## PURPOSE

**WPPAP**'s purpose is to provide the evidence that all engineering design record and specification requirements are properly understood by the organization and that the manufacturing process has the potential to produce product consistently meeting these requirements during an actual production run at the quoted production rate.

## SCOPE

A WPPAP is required anytime a new part or a change to an existing part or process is being planned. Quality reserves the right to request a PPAP submission for a variety of reasons including all of the following:

- New part or product development
- Changes to existing product
- New Supplier
- New process or technology
- New, additional or modified tools
- Tooling, production, or equipment transferred to a different site
- Changes in CTQ parameters
- Changes at safety critical processes: welding, fastening, riveting
- Changes at safety components → safety component definition according EN81 and functional class A
- Change in test or inspection method
- Bulk material: New source of raw material
- Change in product appearance attributes

## REFERENCE

ISO 9001

## RESPONSIBILITY

**PROCESS OWNER**  
Corporate  
Local

Corporate HSEQ  
Corporate HSEQ is responsible to define and deploy the standard  
Local HSEQ is responsible to deploy and follow the standard

## RELATED DOCUMENTS

Procedures  
Instructions

FR001 [WHQ\_SQD\_PR005] WPPAP PSW  
FR002 [WHQ\_SQD\_PR005] WPPAP Levels  
FR003 [WHQ\_SQD\_PR005] WPPAP Manufacturing risk assessment  
FR004 [WHQ\_SQD\_PR005] WPPAP Material risk assessment  
FR005 [WHQ\_SQD\_PR005] WPPAP Drawing  
FR006 [WHQ\_SQD\_PR005] WPPAP PPAC  
FR007 [WHQ\_SQD\_PR005] WPPAP CTQ  
FR008 [WHQ\_SQD\_PR005] WPPAP Flow Chart  
FR009 [WHQ\_SQD\_PR005] WPPAP Control Plan  
FR010 [WHQ\_SQD\_PR005] WPPAP PFMEA  
FR011 [WHQ\_SQD\_PR005] WPPAP R&R Attributes  
FR012 [WHQ\_SQD\_PR005] WPPAP R&R Variables  
FR013 [WHQ\_SQD\_PR005] WPPAP Process capability  
FR014 [WHQ\_SQD\_PR005] WPPAP Sample check result  
FR015 [WHQ\_SQD\_PR005] WPPAP Raw material requirements  
FR016 [WHQ\_SQD\_PR005] WPPAP Surface treatment requirements  
FR017 [WHQ\_SQD\_PR005] WPPAP Appearance approval report  
FR018 [WHQ\_SQD\_PR005] WPPAP Validation tests  
FR019 [WHQ\_SQD\_PR005] WPPAP Packaging requirements

## Forms

## Other

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Issue history	Date	Ed.	Description of change	Editor	Approvers
<b>First</b>	2017-06-14	01	First draft released	V.Vovkanets	V.Bruno
	2018-01-31	07	Changed paragraphs position	M.Ursida	V.Bruno
	2018-03-20	08	Paragraph 1.2 added sentence below PPAP Level Matrix	M.Ursida	V.Bruno
<b>Current</b>	2018-04-23	09	Paragraph 1.2 added additional sentence below PPAP Level Matrix and defined CPK/PPK targets; added linked forms	M.Ursida	V.Bruno
	2018-07-16	10	Modified paragraph 4.5	M.Ursida	V.Bruno
<b>Current</b>	2018-10-05	11	Updated paragraph 4.2 mentioning local and international material regulations	M.Ursida	V.Bruno
<b>Effective from</b>	2018-04-23				
<b>Planned revision</b>	2019-04-23				

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## 0. TERMS AND DEFINITIONS

**APPROVED MANUFACTURERS LIST (AML)** list of approved manufacturers

**BULK MATERIAL** is a substance (e.g., non-dimensional solid, liquid, gas) such as adhesives, sealants, chemicals, coatings, fabrics, lubricants, etc. A bulk material may become production material if issued a customer production part number:

**CALIBRATION** is a set of operations which compares values taken from a piece of inspection, measuring and test equipment or a gage to a known standard under specified conditions.

**PROCESS CAPABILITY (Cpk)** is a statistical analysis which measures the stability and control of a process, relative to the natural variability of the process and specification limits. The larger the score, the less likely it is that any item will be outside the specs.

**CONTROL PLAN (CP)** are written descriptions of the system for controlling production parts or bulk materials and processes. They are written by organizations to address the important characteristics and engineering requirements of the product. Each part should have a Control Plan, but in many cases, "family" Control Plans can apply to a number of parts produced using a common process.

**CRITICAL TO QUALITY (CTQ)** are product characteristics or manufacturing process parameters which can affect safety or compliance with regulations, fit, function, performance or subsequent processing of product. Refer to customer-specific requirements.

**FAILURE MODE AND EFFECTS ANALYSIS (FMEA)** is a systematic group of activities intended to: (a) recognize and evaluate the potential failure of a product/process and the effects of that failure, (b) identify actions that could eliminate or reduce the chance of the potential failure occurring, and (c) document the entire process. It is complementary to the process of defining what a design or process shall do to satisfy the customer. Refer to Potential Failure Modes and Effects Analysis reference manual.

**FIRST ARTICLE INSPECTION (FAI)** "First Article" always means a quantity of parts that are produced in Manufacturer's serial process. These parts should be representative of how the manufacturer will produce in serial production and in sufficient quantity to properly qualify the capability of manufacturer to produce.

**PART SUBMISSION WARRANT (PSW)** is an industry-standard document required for all newly-tooled or revised products in which the organization confirms that inspections and tests on production parts show conformance to customer requirements.

**PROCESS FLOW DIAGRAM** is a schematic representation of the process flow.

**PRODUCTION PART APPROVAL PROCESS (PPAP)** is Wittur procedure for defining rules of new parts release.

**PRODUCIBILITY ANALYSIS** is the written confirmation that manufacturer can meet Wittur design requirements or Witten communication that manufacturer can't meet Wittur design requirements.

**PRODUCT CREATION PROJECT (PCP)** project where completely new product developed

**PROTOTYPE SAMPLE INSPECTION** a quantity of parts that are produced in Manufacturer's pre-serial process, where main production equipment and testers might be still missing. Prototype submitting only confirms that supplier understood the requirements and design is feasible to manufacture.

**RUN AND RATE** is the agreed upon number of parts produced in a planned time period to meet customer assembly or manufacturing plant production volume requirements - with consideration of other product mix and machine availability.

**STATISTICAL PROCESS CONTROL (SPC)** is the condition of a process from which all special causes of variation have been eliminated and only common causes remain.

**SUBMISSION LEVEL** refers to the level of evidence required for PPAP submission

**STEERING COMMITTEE** can approve, conditionally approve or reject Gates of PCP by the based on reported data

**SUPPLIERS** are providers of production materials, or production or service parts, assemblies, heat treating, welding, painting, plating or other finishing services directly to an organization supplying the OEM or other customers requiring this document.

**TOOL** is defined as the portion of process machinery which is specific to a component or sub-assembly. Tools (or tooling) are used in process machinery to transform raw material into a finished part or assembly.

**VALIDATION** is confirmation, through the provision of objective evidence, that the requirements for a specific intended use or application have been fulfilled.

**VERIFICATION** is confirmation, through the provision of objective evidence, that specified requirements have been fulfilled

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## 1. STAGE 1: PPAP SUBMITTING

### 1.1 Types of Wittur materials:

Based on Wittur standard there're 3 types of materials defined. For materials and purchased parts, categorization is visible in the material database (Indication done via flag or circle).

1	261296	R216
POS.	ERP Code WAT	TYPE
POS.		
IM1	A	Anti
ISO1302	ISO1101	Ant
1		

#### Class A:

- Core parts of safety components: Safety components (assemblies) which are certified according to elevator standards. Damage, failure, miss-function or early deterioration of the part or assembly may result in dangerous situations. Proper function of the safety component is not provided anymore. Passengers, services installation personal, can get harmed e.g. lock latch of landing door lock.
- Reliability critical parts: Parts, defined to be critical resulting from D-FMEA. In case of damage, failure, miss-function or early deterioration the reliability and quality of the part or assembly is not provided anymore. Call out may not cause serious or dangerous damage, but expensive call-back and negative reputation e.g. hanger roller.

#### Class B:

- Parts with increase requirements to dimensional accuracy, material and manufacturing process e.g. car door lock base plate complete
- Non- safety critical assemblies

#### Class C:

- Parts with no special requirements. Even though a component is not categorized to be a key component, all specifications and requirements on the part drawings to be fulfilled.

### 1.2 PPAP Level assessment

There are three severity levels of PPAP, depending on the type of items and their critical aspects in the making process; according to these levels, the manufacturer is required to submit specific documentation that will be verified and approved before the starting of serial production. Quality is responsible for PPAP level assessment based on product and process associated risks. PPAP Submission Levels define which elements are required to be submitted, which are optional per each Level and specific case. The levels are used for different reasons and applications. There are three submission levels:

- Level 1** FAI only.
- Level 2** PSW with limited supporting documentation.
- Level 3** PSW with Wittur process validation and complete supporting documentation.

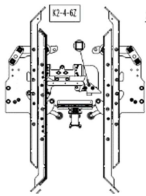



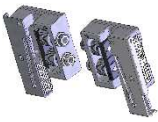
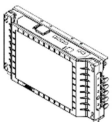
Decision on PPAP level can be done based on Functionality class A, B or C.

PPAP Level	Critical	Part List					
Level 1	Low	Any item purchased from catalogue not specified in levels 2 or 3.					
		Class C parts					
		Accessory bags 	Synchronisation rope 	Covers 	Labels 		
Level 2	Medium	Any item managed just in Local Units not specified in level 3					
		Customized for Wittur production part					
		Class B parts					
		Non-complex electronic parts					
		Panels 	Fixing angles 	Base Plates 	Mechanical Release 	Door Frames 	Light curtains 

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Level 3	High	Any item produced by critical manufacturing processes or critical for safety.					
		Class A parts.					
		Complex electronics parts					
		Car door lock mechanism	Pulleys	Guide shoes	Lock coupler	Safety gear	Controller
							

If decision can't be taken based on Part functional class, quality shell use PPAP Level decision matrix which is taking into account component risk and manufacturer risk. Please note that for finish good and sub-component might be requested different PPAP levels(For example: Elevator door might be submitting PPAP Level 3, but some parts like screws might be submitting Level 1).

Application: -new design -design or process change -new tool or machine -Inactive tooling (> 12 months) -change in source of subcontracted materials or services -transfer or re-arrangement of tooling or equipment -correction to discrepancy of a previous submission		Component Criticality / Risk		
		Low	Medium	High
Supplier Risk	Low	PPAP Level 1	PPAP Level 2	PPAP Level 2
	Medium	PPAP Level 2	PPAP Level 2	PPAP Level 3
	High	PPAP Level 2	Level 3	Level 3

In the case of carryover from one Wittur factory to a another Wittur factory, the PPAP process will not be repeated. The activities developed by the first Wittur factory will be taken as valid by the second Wittur factory. It's at the discretion and freedom of the receiving Wittur factory to make assembly tests or other tests they consider needed.

For components approved before WPPAP Procedure go-live it's at factory discretion and freedom to evaluate to open a PPAP activity.

- For external PPAPs**

RFQ package to be submitted with prior signed: Annex PM, Q Annex, PPAP Level sheet etc. If following not respected supplier can't be awarded to new business. Either local purchasing or Commodity purchasing prepare BUSINESS AWARD DECISION SHEET and organises BUSINESS AWARD COMITEE where decided final conclusion on supplier selection based on price, location, quality level etc. When decision is taken BUSINESS AWARD DECISION SHEET is signed by representatives of different departments. Following communication to supplier is done by purchasing department.

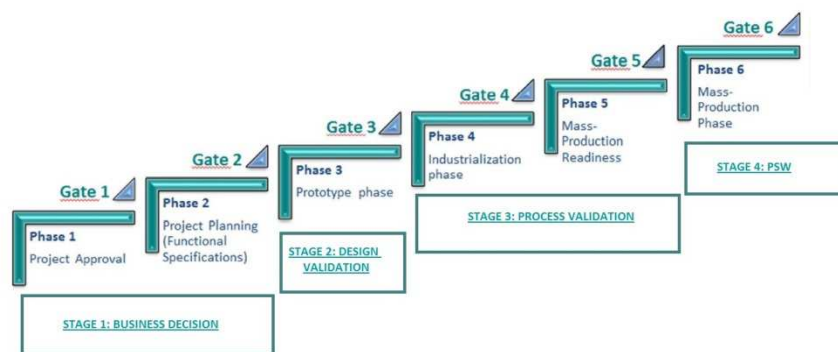
- For internal PPAPs**

- o In case of new product WPPAP schedule and deliverables to be aligned with WST-00298:EN Product development projects Procedure PCP with prior market analyses and business case study completed. Gates of PCP should be aligned with PPAP stages:

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- In case of change to existing product or process WPPAP should be aligned with GPMP tool states.

## 2. STAGE 2: DESIGN VALIDATION

### 2.1 Drawings approval

Final drawings to be frozen and signed by manufacturer and R&D prior to process and sample validation. Without signed approved drawings further PPAP steps couldn't be taken. Drawings can include following info:

- Dimensions with tolerances
- Appearance features
- Functionality
- Chemical characteristics
- Physical and mechanical properties
- Class categorization
- Electrical characteristics

### 2.2 Producibility analysis

The manufacturer shall analyse part specific customer requirements (*Drawings and other product or product group specific requirements*) and:

- confirm that all specification requirements are understood
- parameters which cannot be fulfilled in a capable way are communicated to and released by Wittur Quality
- This document shall be used for each new drawing parts and in for major drawing changes.
- Not applicable for Class C parts.

Wittur organisation will ask manufacturer for the filled in document. After manufacturer submitting Wittur R&D is responsible to approve the Producibility analysis and document should be signed off by both sides.

### 2.3 List of CTQs

Critical Characteristics are features that have greater significance and most affect the outcome of a product or process. Manufacturer have to address all CTQ's in the Control Plan and that robust process controls are in place to ensure product conformance. Wittur R&D is responsible for defining list of D-CTQs. Manufacturer is responsible to set up for each CTQ: 100% control, Poke-Yoke, Go-no-Go gauge or at least SPC control. List of CTQs and inspection method should be signed off by both sides. Critical to Quality characteristics are defined as:

- A critical design requirement
- A critical process requirement
- Directly represents safety, regulatory or primary functional performance requirements by the end customer
- Requires documented evidence of process control

### 2.4 Prototypes submitting

In order to verify if manufacturer understood design requirements, and in case if long life prototype testing is required. Manufacturer should submit prototype samples which aren't representative for process validation as at this stage important production equipment is still missing: tooling, gauges, test equipment etc.

## 3. STAGE 3: PROCESS VALIDATION

### 3.1 Process flow chart

The purpose of Process flow chart is to document and clarify all the steps required in the manufacturing of the part. Process flow shell include entire manufacturing process from receiving to shipping. The process flow diagram should also include all key steps in the process and all offline activities. The flow of non-conforming parts such as scrap, parts for rework, should also be included.

### 3.2 Control plan

A Production Control Plan is a documented summary of the steps needed to control a process and the variations in a process within the acceptable limits. It describes actions required to maintain the 'desired state' of the process and minimize process and product variation. A Control Plan provides a single point of reference for understanding process characteristics, specifications, and standard operation procedures. The Control Plan shell clearly state each step in the process and the applicable specification or standard. It should describe the function of the process in terms that can be measured. Measurable include all end product and in-process requirements specifically, a Control Plan should address the following:

- Identification of CTQ characteristics
- Identification of CTQ characteristics controls
- Identification of any measuring and monitoring devices. If the device is identify by a specific number (i.e. gage number, etc.) the gage number is required to be included on the Control Plan.

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- Process equipment at each operation
- Test equipment used to measure each characteristic
- Specifications, sampling strategy, control and reaction methods used
- Periodic conformance testing and product verification

## 3.3 Process Risk Identification

According to WHQ\_IMS\_PR004 RISK ASSEMENT MANAGEMENT Risk is exposure: to the consequences of uncertainty. In a project context, it is the chance of something happening that will have an impact upon objectives. It includes the possibility of loss or gain, or variation from a desired or planned outcome, as a consequence of the uncertainty associated with following a particular course of action. Risk thus has two elements: the likelihood or probability of something happening, and the consequences or impacts if it does. Risk management: refers to the culture, processes and structures that are directed towards the effective management of potential opportunities and adverse effects, process and structures that are directed towards the effective management of potential opportunities and adverse effects, includes processes for identifying and taking advantage of opportunities and benefits. The risk processes failure must be identified and evaluated through the standard methodologies:

Methodology	Description	Why perform FMEA
<b>Design FMEA</b>  <b>Refer to standard</b>  <b>AIAG</b>	DFMEA is a methodical approach used for identifying potential risks introduced in a new or changed design of a product/service. The Design FMEA initially identifies design functions, failure modes and their effects on the customer with corresponding severity ranking / danger of the effect. Then, causes and their mechanisms of the failure mode are identified. High probability causes, indicated by the occurrence ranking, may drive action to prevent or reduce the cause's impact on the failure mode. The detection ranking highlights the ability of specific tests to confirm the failure mode / causes are eliminated. The DFMEA also tracks improvements through Risk Priority Number (RPN) reductions. By comparing the before and after RPN, a history of improvement and risk mitigation can be chronicled.	<p>Risk is the substitute for failure on new / changed designs. It is a good practice to identify risks on a program as early as possible. Early risk identification provides the greatest opportunity for verified mitigation prior to program launch.</p> <p>Risks are identified on designs, which if left unattended, could result in failure. The DFMEA is applied when:</p> <p>There is a new design with new content</p> <p>There is a current design with modifications, which also may include changes due to past failure</p> <p>There is a current design being used in a new environment or change in duty cycle (no physical change made to design)</p>
<b>Process FMEA</b>  <b>Refer to standard</b>  <b>AIAG</b>	PFMEA is a methodical approach used for identifying risks on process changes. The Process FMEA initially identifies process functions, failure modes their effects on the process. If there are design inputs, or special characteristics, the effect on end user is also included. The severity ranking or danger of the effect is determined for each effect of failure. Then, causes and their mechanisms of the failure mode are identified. The assumption that the design is adequate keeps the focus on the process. A high probability of a cause drives actions to prevent or reduce the impact of the cause on the failure mode. The detection ranking determines the ability of specific tests to confirm the failure mode / causes are eliminated. The PFMEA also tracks improvements through Risk Priority Number (RPN) reductions. By comparing the before and after RPN, a history of improvement and risk mitigation can be chronicled.	<p>Risk is the substitute for failure on new processes. It is a good practice to identify risks for each process step as early as possible. The main goal is to identify risk prior to tooling acquisition. Mitigation of the identified risk prior to first article or Production Part Approval Process (PPAP) will validate the expectation of superior process performance.</p> <p>Risks are identified on new technology and processes, which if left unattended, could result in failure. The PFMEA is applied when:</p> <p>There is a new technology or new process introduced</p>

The Design FMEA is under responsibility of R&D Department

The Process FMEA must be done by a Inter functional team: R&D / Industrialization / Quality / Manufacturing

The evaluation should be done or updated in case of:

- New product line release
- Drawing update characterized by relevant modification with possible impact on quality and safety of the product.
- Most critical and repetitive claim.

The evaluation of processes performance shall be based on the consideration of the followings items:

Method: procedures or methodology of process operative controls available, and implemented.

People: human resources available and adequately skilled, organization defined.

Tool: instrument for activities available, suitable for the processes management.

Material / info: resources fiscal and not input for the processes, suitable for the processes management.

Measure: availability of data performance and KPI for performance deviation controls.

Each system processes must be evaluated and risks related to the factors risk managed

The risk assessment shall be updated in case of:

Bad performance

Audit issue

Organization change



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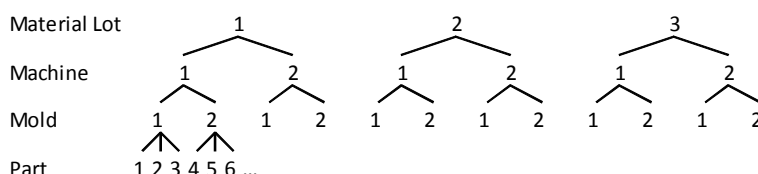
## 3.4 MSA/GR&R

**Measurement system analysis (MSA)** is a method of determining how much the variation within the measurement process contributes to overall process variability. MSA is used to ensure the use of a valid and reliable measurement system. It is the mathematical method of determining how much the variation within the measurement process contributes to overall process variability. A **Gage Repeatability and Reproducibility Study (GR&R)** is used to ensure that measurements used in the manufacturing process are reasonably consistent regardless of how many times they are performed, or by who they are performed by. GR&R studies can be useful to manufacturer in that they can identify equipment that is in need of service or operator who may need additional training on the equipment. GR&R should be submitted for gauges use for CTQs measurement. A total tolerance for tools should be less than 10% to have acceptable result. Marginal gates with 10-30% error need an action plan to address and improve the method of measurement.

<b>GR&amp;R<sub>TOL</sub>% &lt; 10</b>	Pass - Gage System is Useable
<b>10 ≤ GR&amp;R<sub>TOL</sub>% ≤ 30</b>	Gage System is useable but marginal
<b>GR&amp;R<sub>TOL</sub>% &gt; 30</b>	Fail - Gage System is Unstable

## 3.5 Process Capability Study

The purpose of the **Process Capability Study (Cpk)** is to determine if the manufacturing process is capable of producing parts that will meet requirements. Initial process studies (capability) are necessary for all CTQs sampling process to assess stability using control charts. The purpose of this step is to assist with identifying an appropriate sampling plan to assess process stability. To estimate a process Cpk, the process should be in a state of statistic control "In control" is defined by absence of special causes, shifts or drifts in the process. If a part is produced by different molds, cavities, machines, etc, (simultaneously or not) the systematic effects should be noted and the Cpk calculations should consider it. A Cpk should be calculated for each one and evaluated separately. The data to be collected across the sources of variation that will be present in the ongoing production. Random sampling does not provide context to the data. Sampling plan to be documented and submitted with data for all capability studies. Process mapping is recommended to promote critical thought and understanding of the process.



CP is a measurable property of a process to the specification, expressed as a process capability index (Cpk). According to WITTUR standard, CPK should be greater than or equal to 1.67 for a short term capability and greater than or equal to 1.33 for a long term capability (PPK).

## 3.6 Process audit

In order to confirm process capability and ability to produce parts based on Wittur expectations manufacturer process audit can be performed by Wittur Quality in accordance to Wittur process audit questionnaires or technology based specific questionnaires. During the audit manufacturer should provide evidences of: process capabilities, capacity study, machine capabilities, training program, maintenance program, quality documentation system etc.

## 4. STAGE 4: PSW

### 4.1 Dimensional report

As minimum requirement manufacturer submit serial First Article samples with attached dimensional report in order to cover list of CTQs. If CTQs are not defined – manufacturer is responsible to cover with dimensional report most significant characteristics as per experience. Manufacturer shall provide evidence that dimensional verifications required by the design record have been completed and results indicate compliance with specified requirements. All results to be recorded into Dimensional report sheet and submitted to Wittur Quality.

### 4.2 Raw material certificate / 4.3 4.4 4.5 test results

Material / Performance Test Results and is a broad category for all other test results that are not dimensional, including surface coating certificate, appearance approval report, validation test report). Material Test Results should be provided in the form of a Certificate of Analysis (or Certificate of Compliance, though not preferred). The manufacturer should provide evidence if the Raw Material has been manufactured in accordance of the required standard. Performance Tests should meet the specific test(s) required, i.e. electrical, and show evidence of conformance, material test results, material laboratory verification or conflict minerals restriction confirmation, safety and regulatory certificate etc.

In addition to the above requests, the manufacturer should provide evidences of the material which is compliant with Local and International regulations and norms requirements. Declarations below should be provided at the PPAP level:

- REACH & ROHS conformity.
- SVHC (Substances of Very High Concern) free or in limits.
- Material chemical analysis.
- MSDS documents.
- The recycled content usage.
- Any other requirement that may be requested by Wittur Customers.

Suppliers shall confirm the validity on a yearly basis even if no changes have occurred.

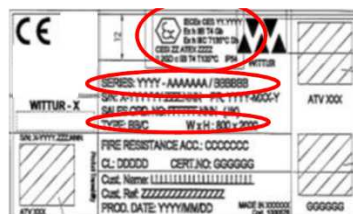
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## 4.6 Packaging & traceability requirements

Manufacturer need to develop traceability system as per requirement: WHQ-IMS-PR012-Traceability system. Manufacturer should have sufficient production record data and provide production history as per request. Marking or product should provide possibility to trace part back to component batch. Evidence of traceability to be submitted to PPAP package and submitted to Wittur Quality. Manufacturer should define suitable for product transportation packaging and prior agree with Wittur Quality.



## 4.7 FAI serial samples

When FAI samples ready Quality technician should confirm dimensional measurement results and cross check submitted by the manufacturer. During FAI Quality technician will verify label traceability and contain and packaging method to be suitable for product safety and avoid any risk of damage during transportation. If the manufacturer FAI pass Quality technician should inform organisation that result is ok and samples been approved. If the manufacturer didn't meet requirements it will then be the decision of Wittur whether to reject the PPAP and require resubmittal with satisfactory results prior to production shipment or to grant conditional approval while the corrective action plan for the discrepant condition is performed.

IF FAI wasn't performed at Wittur trial installation/trial build positive feedback report from customer would be also valid as approval.

## 4.8 PSW

When all previous steps passed successfully and samples been approved – PSW will be signed in order to confirm PPAP release.

Result	Description
<b>Approved</b>	The items or materials fulfil all requirements and specifications. Approved for serial production.
<b>Conditionally approved</b>	Requirements and specifications are not fully satisfied. Manufacturer obliged to identify all non-conformances that prevent to get Approved status and should arrange an action plan for those non-conformances and apply a reinforced control on serial production.
<b>Rejected</b>	The items or materials don't satisfy requirements and specifications.