

1 AREA OF APPLICATION AND PURPOSE

This company standard contains the fundamental elements and general basic requirements for the release of tooling manufactured and used from suppliers. It describes the process and the respective responsibilities, especially on the supplier side, and applies to all ITS KION business units and the suppliers affected by the process.

2 TERMS AND DEFINITIONS

- ETAP – External Tooling Approval Process
- PPAP – Production Part Approval Process
- RFQ – Request for quotation
- FOT – First Out of Tool
- SOP – Start of Production
- TSW – Tooling Submission Warrant
- Tooling – Equipment at supplier which is needed for manufacturing a finished part or assembly (eg jigs, mouldes, injection molding tools)
- RAPID – Decision-Making Model in complex environments
 - R – Recommend a decision or actionation
 - A – Agree to a recommendation
 - P – Perform a decisioon
 - I – Provide Input to a recommendation
 - D – Make the Decision

3 GENERAL

In case of ETAP relevant parts, the supplier shall follow the process steps below:

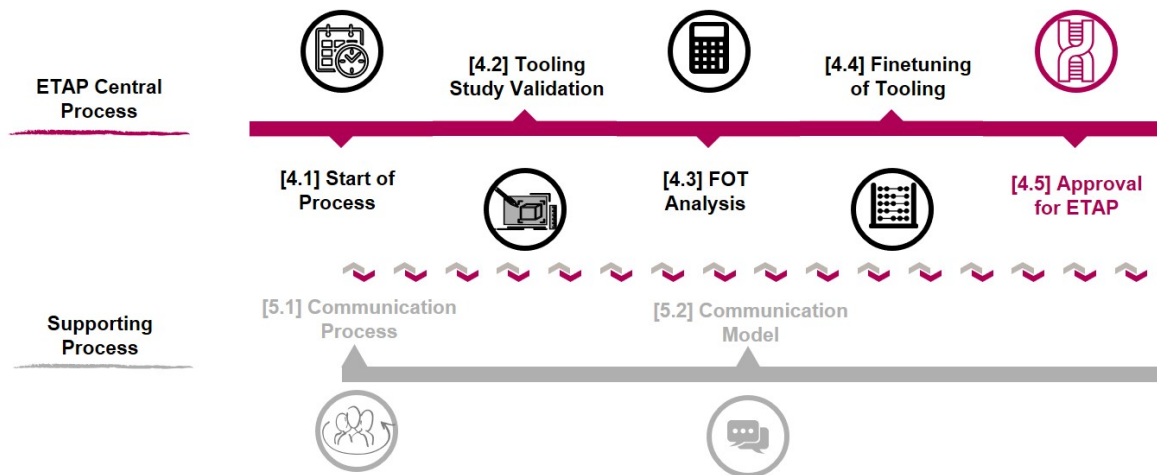


Fig. 1: Overview of ETAP central and supporting Process Steps

Not to be reproduced without prior permission

Continued on Page 2 of 4

4 REQUIREMENTS FOR THE ETAP PROCESS / PROCESS STEPS

The requirements in section 4 are mandatory for all tools covered by ETAP process.

4.1 Start of process

With the RFQ the supplier receives a drawing with the information that the part is ETAP-relevant. The text-field is arranged directly above the Title Block (see Figure 2).

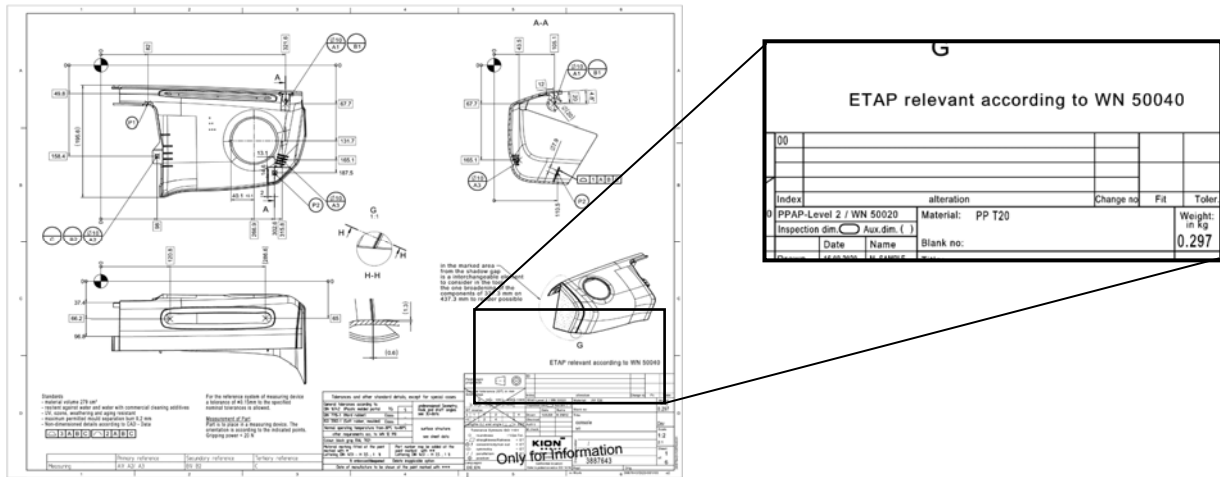


Fig.2: ETAP note on drawing

With the offer the supplier will then provide the following documentation concerning the tooling:

- Tooling concept to explain all necessary tools in the production process
- 1st feasibility study to evaluate the tooling concept
- Tooling Project Plan showing the tooling construction, production and implementation starting with the tooling order

4.2 Tooling Study Validation

The objective of this step is to determine if the tooling can manufacture products that fulfil the requirements of KION. The supplier shall provide the Tooling Study to KION on request.

If a technical unfeasibility is detected during the Tooling Study, the supplier shall contact KION immediately to define further actions.

Depending of the production process and in alignment with KION during the Kick-Off Meeting (if requested see section 5.1.1), studies shall specify all the tooling characteristics that could have an impact on the final part – see examples in table 1.

Note:

If agreed during the Kick-Off Meeting (see section 5.1.1) the supplier will receive the authorisation to start tooling manufacturing from KION.

Table 1: Tooling characteristics

Process	Examples of tooling characteristics for the tool study
Moulding: - Plastic Injection - RIM - Foundry	<ul style="list-style-type: none"> - Parting lines (main and secondary) - Injection points/gating system position - Riser/shrink-head, venting position - The tooling kinematic (spindle, slider, ejection system...) - solidification simulation (cast-iron, cast steel) - Variants management - Part critical parameter management - Other
Machining	<ul style="list-style-type: none"> - Locating/position of component - Clamping system - Variants management - Part critical parameter management - Other
Forging	<ul style="list-style-type: none"> - Number of tools/operations - Parting lines - Part orientation (up and down) - Critical parameters management - Other
Stamping Deep drawing	<ul style="list-style-type: none"> - Number of tools/operations - Cutting before or after stamping - Sheet metal locating operation per operation - Part critical parameter management - Other
Welding	<ul style="list-style-type: none"> - Locating/position of all components - Clamping system - Variants management - Part critical parameter management - Other

4.3 FOT Analysis

The supplier shall perform the FOT Analysis for each tooling and submit its analysis produced with the definitive tooling on request from KION (KION has the possibility to order FOT parts for internal analysis.).

If there are deviations detected on the tooling and parts, the supplier shall create a Tooling Action Plan to solve them. For this, the supplier shall define all necessary analyses, tests, dimensional reports, scanning, etc relevant for the action plan. The action plan shall be submitted to KION on request.

4.4 Finetuning of Tooling

In this phase the supplier shall optimize the tooling according to the results of the FOT Analysis. The respective optimizations are to be proven in the form of measurement reports according to available technical documents (e.g. drawings and standards).

To ensure and check the specifications, the supplier shall perform a Capability (Cpk) Analysis according to WN 50020 – PPAP. To verify the agreed capacity of the tooling the supplier shall perform a Capacity Analysis.

KION has the possibility to order parts to verify the optimization steps.

If project delays are up coming, supplier shall inform KION immediately with a risk mitigation plan.

4.5 Approval for ETAP

After fulfilling all the ETAP requirements, the supplier shall fill out the individual Tooling Submission Warrant [TSW] as cover sheet of the documentation. With this document the supplier confirms that the tooling is finalized and ready for series production.

The supplier shall submit all relevant documents to confirm that Finetuning of tooling is finished (see section 6 Table 2).

Note:

A separate TSW shall filled out for each individual tooling ordered by KION. If all requirements are fulfilled KION will approve the tooling by confirmation on the TSW.

5 SUPPORTING PROCESS

The requirements in section 5.1 are optional and only necessary if requested by KION.

Communication model in section 5.2 is mandatory for ETAP process steps acc. section 4.1 to 4.5.

5.1 Communication process**5.1.1 Kick-Off Meeting**

ETAP Kick-Off Meeting ensures common understanding between KION and nominated supplier about product requirements, project plan and deadlines with the aim to ensure SOP in quality, time and budget. A Kick-Off Meeting will only be held if explicitly requested by KION. Possible reasons for a Kick-Off Meeting are as follow:

- Part, or Assembly with special demands
- Complex manufacturing process of tooling/part
- Critical time planning for SOP
- ...

5.1.2 Working Agreement

Participants: Cross functional workshop participants from KION and Supplier (Project leader, Sales, Quality, ...) with the target of same understanding of product/tooling complexity.

The following topics shall be discussed and aligned during Kick-Off Meeting:

- Presentation project organisation (project management & project members)
- Discussing tooling concept
- Discussing project plan with the following subtopics if required:
 - Timing of Tooling Development
 - Risk Analysis (FMEA)
 - Timing of Tooling Study Validation
 - Start of Production (@Supplier)
 - Timing for FOT
 - Buffer for optimizations
 - Timing for Tooling Approval
- Coordination & alignment regular milestone tracking with supplier regarding early risk mitigation – time frame shall be aligned in Kick-Off Meeting

Supplier agreed on above project procedure with all relevant subtopics and deadlines.

The project plan is for each party valid and shall be followed without any delays and extra costs. If project delays are coming up supplier shall inform KION immediately with risk mitigation plan.

5.2 Communication Model (RAPID)

In the ETAP the following Role Concept shall be followed as shown in Figure 3.

WN 50040		Supplier	KION			Schedule
		Supplier	Quality	Procurement	R&D	
1	Starting Point		I	P	D	Supplier receives RFQ for ETAP relevant parts
A	Working Agreement	A	D	P	I	Commitment between KION and Supplier about requirements and planning.
2	Tooling Study Validation	P	D		A	Supplier provide Tooling Study
3	F.O.T. Analysis	P	D		A	Supplier provide the F.O.T. Analysis and Action Plan for improvements
4	Finetuning of Tooling	P	D		I	Tracking of Action Plan and C² Analysis
5	Approval for ETAP	P	D	I	I	The supplier has to submit all relevant documents to confirm fulfillment of the requirements

R	A	P	I	D
Recom.	Agree	Perform	Input	Decide

Fig. 3: RAPID Role Concept for the External Tooling Approval Process

6 DOCUMENTATION

In accordance to fulfil the External Tooling Approval Process requirements, the Supplier shall submit the following documents in the respective time frame.

Table 2:

Requirement	Submission	To-Do
1. Development Documents	S	together with Offer
2. Tooling Concept	S	together with Offer
3. Feasibility Study	R	before finalized Design and Tooling Study Validation
4. Tooling Project Plan (Timeschedule)	S	before finalized Design and Tooling Study Validation
5. FOT Analysis with Pictures of Tooling	S	before SOP by supplier
6. Capacity Analysis	R	before SOP by supplier
7. Tooling Submission Warrant	S	before SOP by supplier

S = The Supplier shall submit the items to KION and retain a copy of the records or documentation in suitable locations

R = The Supplier shall retain the items in suitable locations and make them available to KION upon request.

Documentation of Requirements 1 to 6 may be replaced by comparable forms in terms of design and content. The use of these replacements shall be confirmed by the representative of KION before the first submission.

NORMATIVE REFERENCES

WN 50020 PPAP - Production Part Approval Process