



SUPPLIER QUALITY MANUAL

Version 3.5 (July 2023)

I -ADVANCED QUALITY PLANNING for Product & Process (AQP.pp)

Advanced Quality Planning for product and process is a structured method of defining and establishing the necessary steps, which supplements supplier quality policy and rules implemented to ensure that a component will comply with Detroit Thermal Systems (DTS) requirements.

The DTS AQP.pp is included in the Appendix 1.

DTS AQP.pp shall apply to all DTS suppliers listed here below:

Supplier Type	Definition
Designer	Design components which will be fit for DTS project specific purposes and will meet DTS specifications. The supplier-designer is responsible for the definition and as the case may be responsible for the supply of the components.
Manufacturer	Develop a manufacturing process and manufacture a component designed by DTS
Contractor	Manufacture a component designed by DTS using manufacturing processes defined by DTS
Outsourced Process	Perform a specific process on a component manufactured by DTS or by a DTS' Supplier according to DTS standards
Pass Thru Supplier (Handling Component)	Deliver a component directly to DTS Customer or deliver DTS Customer through a warehouse

I.1 AQP.pp Procedure

The Advance Quality Planning procedure is a process which supplements supplier quality policy and rules and aims at conducting a thorough validation of the design – product and process, in order to ensure that the supplier will be in a position to deliver, as of the Start Of Production, the expected level of quality in line with DTS requirements.

The Advance Quality Planning procedure includes 7 stages (excluding the stage 0 consisting in the supplier pre-selection). These stages apply to all customer application projects and to components already used in production (product process changes).

The documentation corresponding to these 7 stages is followed-up in the Supplier Quality Module (Supplier PPAP List) in PLEX ON LINE System.

The PQA process is initiated in PLEX by the DTS buyer by creating the new component number and assigning the responsibility for the management of this project to the supplier identified contacts.

From this moment the supplier is required fulfill each of the 7 stages deliverables in PLEX.

Concerning car-maker application projects, the 7 stages are integrated into the 5 phases of the DTS project development process and are planned as shown below:

DTS PROJECT PHASES AND SUPPLIER AQP.pp STAGES								
DTS Project Phases	Phase 0	Phase 1		Phase 2	Phase 3		Phase 4a	Phase 4b
	Competition phase	Product/Process Design		Detailed Design and Design Validation	Production/Process Validation		Launch and Process Stabilization	Volume Production
Supplier AQP.pp Stages	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7
	Supplier preselection	Supplier selection	Supplier nomination	Design Validation	Process validation	Initial Sample validation	Start Of Production / Probationary period	PQA Management

The AQP.pp is divided in 2 categories:

- First category - Non DTS Specific Component : dedicated to validation of standard components and catalogue components – as defined in the matrix below. As of July 2023, DTS will accept ONLY IATF 16949 / ISO 9001 certification:

Type of component	Situation
Raw materials	Raw (steel, additives, plastic granulates, etc.) and standards
Electronic components (excluding critical components)	Components not considered critical
Other components	Catalogue sold by a supplier site
	Catalogue sold by a distributor (retailer)
Packaging	Safeguard product integrity (impacts, scratches, bad weather, etc.)

- Second category - DTS Specific Component : dedicated to validation of components that are specifically developed to satisfy DTS needs – as defined in the matrix below:

Type of component	Situation
Raw materials	Raw (steel, additives, plastic granulates, etc.) / DTS Specifications
	Processed (semi-machined: cast components, tubes, etc)
Safety / regulatory components Critical* specific or Critical* standard components * Critical component = component with at least one safety or regulatory characteristic	Non catalogue Electronic or Non Electronic sold by a supplier site
	Non catalogue Electronic or Non Electronic sold by a supplier of the supplier site
	Catalogue Electronic or Non Electronic sold by a supplier site
Other components	Non catalogue sold by a supplier site
Outsourced Process	Examples: Coating, Painting, Balancing, Heat Treatment
Packaging	Following DTS specifications and delivered to the customer

► Specific Case - Component belonging to a Technology Family

A Technology Family is a set of components manufactured for DTS by the same supplier site achieving the same technical function, and which rigorously follow the same flow using same specific tooling. The list of components belonging to a Technology Family shall be provided by supplier to DTS for validation.

A component belonging to a Technology Family will follow the non DTS Specific Component category of the AQP.pp attached in SQA-T0001.

► Specific Case - Pass-thru components

A pass-thru component will be managed as a DTS specific component and therefore shall follow the DTS Specific Component AQP.pp category.

► Specific Case - Safety / regulatory components

For all Safety / Regulatory components, purchasing from distributors is prohibited.

► Specific Case - Other components

AQP.pp approach has to be deployed by the supplier for components sold by a supplier of the supplier site.

► Specific Case – Standard components requiring a specific validation

These components will follow the DTS Specific Component AQP.pp category.

The following pages are describing the content and the specificity of each AQP.pp stage.
The AQP.pp matrix is attached in SQA-T0001.

I.2 AQP.pp Stage 0 – Supplier pre selection

The purpose of this stage is to validate that the performance of a potential supplier complies with DTS expectations.

Supplier must:

- guarantee the reliability of processes and keep records
- have a process of continuous improvement
- have a process to continuously capture what has been learned

It is based on:

- a clearly defined quality policy
- an organization capable of assuring quality at all stages of the component life, in line with DTS project development phases
- the willingness to work with DTS in a spirit of partnership and continuous improvement and problem solving attitude

► Assessment of potential suppliers

A Supplier intending to be part of DTS Supplier panel for a given segment has to meet the following conditions. For each and every new supplier, for any new production site of a supplier already belonging to DTS panel or for a Supplier intending to deliver components for a different segment than previously validated by DTS.

- **IATF 16949 / ISO 9001 certification** obtained through a certification office, with a valid date
- **EVAL assessment** conducted by DTS Purchasing and SQA according to the EVAL procedure with a score of at least 80%, and with each of the mandatory questions answered satisfactorily.

The purpose of the EVAL is to identify all process management related risks at the potential supplier, along a full day evaluation (of its current processes) – this assessment will be conducted by Purchasing and SQA representatives.

This EVAL assessment is not scheduled periodically with all DTS panel suppliers – only new suppliers and suppliers belonging to the Supplier Quality Improvement Program will be assessed.

- **Commodity Check List assessment** conducted by DTS SQA – performed for each and every new supplier as well as current suppliers intended to deliver components part of a commodity not previously assessed – with a minimum score of 80%. Any supplier rated below 100% will be requested to demonstrate a full compliance with the requirements checklist (i.e. rating 100%) within 3 months after the initial assessment.

EVAL and Commodity Check list assessments performed by DTS Joint Venture partners are also applicable and valid for DTS.

- The signature of the **DTS Requirements File** (Appendix 2)

►► For each project and each component to be purchased, DTS Purchasing will define the list of approved suppliers which will receive the RFQ for such business.

<i>Deliverable of the stage</i>	<i>List of relevant suppliers to send a Request for Quotation (RFQ)</i>
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I.3 AQP.pp Stage 1 – Supplier selection

The purpose of this stage is to define the DTS requirements that shall be addressed to the supplier.

► Definition of DTS requirements

In order to specify adequately the DTS requirements to its suppliers – the DTS project team under the responsibility of the DTS buyer will establish the DTS Requirements File (DTSRF) (Appendix 2). The DTSRF (PUR-T004.2) will include:

- the product specifications: set of functional, technical and general specifications including the SPPC (SPECIAL PRODUCT and PROCESS CHARACTERISTICS)
- the target costs,
- the quality and logistics targets,
- applicable terms and conditions.

DTS Sourcing Committee will:

- compare pre-selected supplier's performance and answers versus the DTS Requirement File
- review quality of the answers and robustness of the quotation received
- analyze strengths and weaknesses of the suppliers
- select the supplier representing the best choice.

<i>Deliverable of the stage</i>	<i>Defined DTS Requirement File</i>
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I.4 AQP.pp Stage 2 – Supplier nomination

As soon as supplier selection is decided by DTS, component specifications and drawings have to be updated if necessary and released, and DTSRF updated accordingly.

- DTSRF has to be agreed and signed by supplier, including SPPCs.
- THEN and ONLY then the Nomination Letter can be sent to the selected supplier

<i>Deliverable of the stage</i>	<i>Pre Sourcing DTS Requirement File signed by supplier Nomination letter sent after DTSRF signed off</i>
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I.5 AQP.pp Stage 3 – Design validation

Purposes of this phase are (i) to review and approve supplier deliverables to ensure that product and process quality expectations are reached and (ii) to prepare Tool Launch. Upon DTS request, a design review may be organized with the supplier.

The documents listed in the AQP.pp attached in Appendix 1 are prepared by the supplier.

Once these documents have been examined and approved by DTS, the supplier undertakes to comply with them. Any proposal for modifying or improving the product or process, including proposal related to transfer of production or move or relocation of the production equipment, must be approved by DTS on the basis of the documents modified by the Supplier respecting the Product and Process modification section of the present manual.

► First-off tool: the component produced out of the first off tool has to be evaluated and approved by DTS in terms of dimensional and assembling. If the component is approved at this stage of the project phase, it is not a final approval of the component: the final approval will be given after Initial Samples submission (in stage 4), out of the Full Day Production Run in serial conditions.

► FMEA study – Special Product Process Characteristic (SPPC) management Supplier will have to follow the SPPC rules for FMEA (design and process) according to Appendix 3.

For each Special Product Process Characteristic (SPPC) identified after FMEA review, the supplier will have to implement the relevant control according to the above referenced rule.

The supplier will have to list both:

- Customer SPPC characteristics: either customer interfaces or characteristics impacting DTS or / and OEM assembly – visual aspect – product performance and / or reliability (the aim is to ensure common understanding between Supplier and DTS)
- Internal SPPC characteristics: fundamental supplier product characteristics that could impact supplier manufacturing process and / or non respect of supplier internal standards

►► This list will be approved and signed by DTS team (SQA – Purchasing – R&D – Project Quality - Production).

► Validation plan:

The validation plan template to be used by the supplier is attached in Appendix 4 section. The validation plan is defined by the supplier on the basis of:

- the VRF requirement
- the DFMEA analysis
- the lessons learned.

This validation plan will list all the testing required:

- to validate the component along the stage 3 and ensure the validation of the design.
- on the initial samples collected during the Full Day Production Run and approved by DTS, in order to validate the process impacts on the product.

This validation plan will be reviewed and signed at least by the:

- quality representative of the supplier
- engineering representative of the supplier
- project coordinator of the supplier
- DTS R&D

► Design validation results:

The supplier will conduct the design validation on prototypes.

The validation results compliant with the approved plan will be reviewed and signed at least by the:

- quality representative of the supplier
- engineering representative of the supplier
- project coordinator of the supplier
- DTS R&D

► Design Review:

Designer Suppliers are responsible to conduct the Design Review with DTS R&D and SQA following the DTS standards (Design Review Checklist -Supplier, attached in Appendix 13) to ensure the robustness of the Design with regards to the Supplier manufacturing constraints, the DTS & Customer interfaces, Customer specifications and SPPC requirements.

Upon validation of End of Stage 3, the supplier shall be authorized to kick-off tooling.

<i>Deliverable of the stage</i>	<i>DTS Requirements File updated and signed by supplier Validated AQP.pp deliverables of stage 3 (Quality Assurance File) Tooling launch</i>
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I.6 AQP.pp Stage 4 – Process validation

The purpose of this stage is to ensure that the process developed by supplier is capable to produce the defined components in compliance with DTS requirements, that the targets are defined for the Full Production Day, and consequently to demonstrate the following:

- run at rate : proving that all committed volumes for DTS and other customers can be met on shared equipment at all operations of the process
- capability of the process
- build correct product in accordance with DTS approved work instructions and control plan.

► Preparation of DTS FDPR at supplier plant:

The supplier is required to perform a preliminary Full Day Production Run (Appendix 5)

The FDPR readiness matrix (Appendix 6) shall be used and the supplier will need to fully comply with the requirements in order to schedule the Full Day Production Run performed by DTS Team.

► Preparation of DTS process audit at supplier plant:

The supplier is required to perform a self process audit evaluation based on the DTS standard (Appendix 7) prior to DTS official audit.

The self process audit should be achieved with a score of 80% without any critical CAR (Corrective Action Request) prior requesting DTS SQA to attend to the Process Audit.

► DTS FDPR & process audit at supplier plant:

The audit is valid only if the process audited is the one that will be used in mass production (equipment and conditions):

- the duration must be sufficient to assess the stability of the process (minimum 3 hours of production and 300 components) – However depending on the nature of the component DTS reserve the right to require the supplier to run longer and more components than here referred.
- the FDPR must include one or several change over of version (include change of production shift)
- for non audited shift(s), supplier will have to provide training reports and evidence of compliance at run at rate target.

Following the full day production run, the following reports must be issued:

- full production day report (Appendix 5): conditions, quantities produced and rejected, analysis of defects, speed of the production line, Total Line Reject to be calculated (Appendix 8), with decision accepted or refused
- process audit report (Appendix 7) including capabilities ($Cmk \geq 2$, $Cpk > 1.67$, target $Ppk \geq 2$) if requested.

►► Each SPPC will require a capability study performed on at least 30 components.

The results will lead to:

- Confirmation of a statistically Normal distribution of the process followed parameters and Ppk results above 2 (Ppk: preliminary capability study calculated on components from the FDPR) or Cpk results above 1.67 (Cpk: capability study calculated on components when in serial production). Then process must be monitored through SPC when in production.
- Reminder:
 - If the normality of the process distribution data cannot be demonstrated (Henry test – Khi2 – Kolmogorov test) the capability calculation result is therefore statistically not sound and the process has to be considered not capable (Appendix 9 Cpk calculation sheet).
 - In case capability is not demonstrated, supplier will have to adapt specific control plan, including Poka Yoke, 100% automatic control in order to demonstrate its ability to stick to characteristics under control.
- DTS SQA will check on supplier site that the control plan:
 - integrates the countermeasures listed in the PFMEA
 - is respected on the shop floor.

►► Attitude to be observed along the FDPR:

Supplier is expected to have a method to track issues encountered along the FDPR and a method to react to problems – Quick Response Quality Control.

This method will be challenged by DTS supplier quality for any issues encountered.

It is expected that this method of tracking and reacting to issues will be also applied while in serial production.

►► The process is qualified by DTS if the FDPR is accepted, and audit results are satisfactory (Procedure SQA-P0001 Process Audit). Otherwise, the supplier must draw-up an action plan and a follow-up audit will be performed by DTS.

►► Case of rejection of a FDPR by DTS:

An action plan will be submitted by the supplier on each opened CAR (Corrective Action Request). DTS will conduct a new FDPR after release of each supplier CAR.

Action plan must be implemented within 10 days and must be sponsored by the Top Management of the supplier.

►► Traceability:

Along the process audit, DTS supplier quality will verify the supplier system to control traceability and the respect of the product coding. The supplier is required the ability to trace any component back to the origin batch of material used.

► Initial samples and DTS FDPR

Initial samples must be taken during the validated full day production run and delivered in serial production packaging together with full documentation as specified in the DTS Requirements File.

At least 5 initial samples must be kept at the supplier for the entire life of the component plus ten years, and must be accessible by the supplier and DTS at any time.

In the case of several processes at the supplier (e.g.: several cavities inside a plastic injection tool) – the supplier is requested to keep 5 initial samples per process and have them properly saved and identified.

► DTS validation on Initial Samples :

DTS will perform a production trial along with the DTS FDPR approved initial samples in order to measure the conformance of the supplier components in the DTS manufacturing process.

The validation results, in compliance with the approved validation plan defined during stage 3, will be reviewed and signed at least by the:

- quality representative of the supplier
- engineering representative of the supplier
- project coordinator of the supplier
- DTS R&D
- DTS Supplier Quality.

►► The supplier validation plan is considered completely executed when DTS have completed their share of the validation respectively of the DTS product and of the vehicle utilizing a component supplied by DTS supplier.

►► Therefore the supplier validation is deemed to be successful when DTS and DTS customer have passed their share of the validation respectively of the DTS product.

► Process audit frequency

While in production - Periodic audits of the process must be performed by the supplier at the intervals defined in the Control Plan.

Audit reports and corrective action plans must be available for consultation by DTS at all times.

To ensure continuous validity of the process audit - DTS reserves the right to perform process audits every 2 years and to carry out new audits whenever DTS consider the need.

<i>Deliverable of the stage</i>	<i>Process Audit validated by DTS FDPR validated by DTS</i>
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I.7 AQP.pp Stage 5 – Initial sample validation

The purpose of Supplier Initial Samples (IS) validation is (i) to check that the component (performance, characteristics, reliability, capability, etc) comply with DTS requirements and (ii) that the process developed by supplier is capable to produce the defined components in compliance with DTS requirements.

Mass production components must be in compliance with Initial Samples approved by DTS: no change on product, nor on process nor on packaging.

Master samples and initial samples file will be archived at the supplier plant during 10 years after the end of lifetime of the manufactured product.

► Condition of initial sample acceptance

Initial sample report is validated by DTS team if at least the items listed below are approved:

- process audit – validated by DTS
- Full Day Production Run validation – validated by DTS
- dimensional report
- SPPC Characteristics capability
- raw material Conformity
- test on DTS production Line to confirm no assembly issue on DTS line
- functional tests
- packaging validation
- report on subjective requirements (appearance – aspect – Buzz Squeak and Rattle noise) if applicable
- IMDS Database data entry completed

If all the initial sample deliverables have been qualified, DTS SQA will release the Part Submission Warrant (PSW) and ISR signed (optional) (Appendix 10 Initial Sample Report – ISR) to the supplier

<i>Deliverable of the stage</i>	<i>Initial Sample Report (ISR) validated</i>
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I.8 AQP.pp Stage 6 – Start Of Production & probationary period

As soon as the Initial Samples have been accepted by DTS, the supplier is allowed to deliver components to DTS according to the needs as well as to the requirements of this chapter. This is the serial production phase.

In the case of a deviation required for the components, the supplier will remain responsible of the quality of the components delivered and will raise a deviation request to DTS Supplier Quality using the Supplier Deviation Submission Request format (Appendix 14).

The supplier is fully responsible to deliver according the specifications and in line with the accepted ISR.

► Probationary period

DTS requires in this stage the implementation of a Reinforced Control Plan (RCP) by increasing the frequency of the control plan following the requirements outlined on the SPPC tracking sheet.

In addition, a ramp up Control Shipment Level 1 (CSL1) activity at the supplier plant must be implemented during 3 months-period following the Start of Production (SOP) (6-months in the case of a pass-thru component). This must be made out of the production line area in a dedicated zone following a specific CSL1 Instruction.

Both, CSL1 Instruction and RCP have to be approved by DTS Supplier Quality.

The conditions to exit the Probationary period are:

- No C1 / C2 incidents
- No defects detected in CSL1
- TLR (Total Line Rejects) performance is not increasing during the last 3 months
- TLR performance is not increasing by more than 20% for 1 month versus FDPR TLR results.
- Capability of each SPPC has been verified in accordance with the control plan (number of components measured – frequency) and/or SPPC to be under 100% automatic control.
- All suppliers' 8D's must be closed.

►► If the conditions above are achieved within a 3-months period (6-months in the case of a pass-thru component), the PQA status is granted and DTS will give to the supplier a notification of PQA status achievement allowing the supplier to deliver to DTS with no additional inspection.

►► If the conditions above are not achieved within a 3-months period (6-months in the case of a passthru component), DTS will request to supplier to implement a Control Shipment Level 2 (CSL2) activity for 1 month. This activity will be handled by a DTS panel approved sorting company. If the CSL2 activity is implemented to a component belonging to a Technology Family, Supplier shall provide DTS with the references of all components belonging to such Technology Family and the CSL2 activity shall also apply to all these components.

<i>Deliverable of the stage</i>	<i>Product Quality Assurance Status granted</i>
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I.9 AQP.pp Stage 7 – Product Quality Assurance management

When a component is granted the Product Quality Assurance (PQA) status, the component is no longer subjected to a probationary control period.

PQA Management Flow purpose is to ensure that supplier fulfills DTS requirements and supplies quality secured purchased components along all the production period.

Any Non Conformity related with the delivery of parts without respecting the requirements agreed must be formalized by the supplier by sending a Supplier Deviation Submission Request (Appendix 14).

Initial Samples are re-validated on a yearly basis and shall be presented by the supplier to the DTS Site at least 1 month prior the anniversary date of Initial Samples approval (the year before).

The deliverables requested by DTS for the Yearly re-qualification of the initial samples are outlined in the stage 7 of the AQP.pp matrix attached in the Appendix 1.

In the frame of yearly initial sample re-validation DTS will verify that the Product Quality Assurance Management Flow (Appendix 11) are and have been respected since the previous year submission. DTS will especially look for evidence of the:

- Respect of the control plan at the defined and agreed frequencies – especially capability of each SPPC has been verified in accordance with the control plan (number of components measured – frequency).
- Monitoring of supplier total line rejects (measured in PPM).
- Respect of rules of escalation as defined in PQA Management Flow Control Shipment (CSL1 or CSL2) implementation if the supplier process for manufacturing the component has been drifted more than acceptable by DTS, as defined in the PQA management workflow
- Declaration from the supplier of continuous compliance to DTS requirements.

Non respect of the above mentioned rules will trigger from DTS to place the supplier in Alert for New Business On Hold (Alert NBOH) and supplier delivery will continue through a Control Shipment Level 2.

Upon request, the supplier must provide DTS with the results of inspections carried out for each batch delivered in line with the requirements of the AQP.pp (Appendix 11 PQA Management Flow).

DTS has defined 3 different Product Quality Assurance Management flows:

- DTS non specific component workflow: for components such as raw materials / catalogue components / standard electronic components / non specific packaging as defined in the AQP.pp definition section of the present manual.
- DTS Specific component workflow: for components falling in the definition of the AQP.pp definition section of the present manual.
- Pass-Thru component workflow: for components as defined in the section Definition of supplier categories of the present manual.

All PQA component deliveries must be identified with a PQA label on each container box.

Upon request, the supplier shall inform DTS of the results of the inspections carried out for each batch delivered in line with the requirements of the PQA management flow.

►► Case of PQA status suspension

Supplier PQA status follows the rules defined in the Product Quality Assurance Management Flow (Appendix 11). After analysis of the causes, loss of PQA is confirmed for:

- the technology family of component, if it is the generic process that is at fault.

- the component involved if a specific process and/or design is found to be at fault.

In all cases, DTS will give the supplier written notification of the date for resumption of PQA status after the problem has been solved and a new probationary period has been completed.

When PQA status is lost – the supplier must identify with a label on each box and container, the level of control shipment (1 or 2) the supplier is shipping under (Appendix 11 PQA Management Flow).

►► Case of a product or process modification or transfer of a supplier production line (see Chapter II.5) – the PQA status is therefore lost and the PQA status will need to be re-granted going through the stages 2 to 6 of the AQP.pp as decided by DTS supplier quality.

<i>Deliverable of the stage</i>	<i>PQA Status maintained</i>
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II -CONTINUOUS QUALITY IMPROVEMENT

A Quality Improvement Plan (QIP) is required from suppliers to achieve the level of PPM (Parts Per Million) that the automotive industry requires. This plan will focus on:

- preventive quality
- eradication of problem root causes
- learning from mistakes with Lessons Learned Cards.

This QIP is initiated by the supplier at start of serial production. Its implementation is reviewed every year by DTS.

The DTS Requirements File (DTSRF) is giving the details of suppliers' objectives in terms of Quality and Delivery Performances.

The development of new business between DTS and a supplier depends on the achievement of the performance levels and on the definition and the deployment of a formal Quality Improvement Plan (QIP) by the supplier to achieve "Zero defects".

This chapter will focus on:

- the incident processing
- the quality performance indicators
- the supplier Quality Improvement Plan
- the supplier development and follow up
- the product and process change management rules to be respected by the supplier
- the audits and audit schedule.

II.1 Incident processing

Supplier undertakes to use for incident treatment exclusively the 8D methodology.

► Definition of Quality incidents

Category	Signification	Example
C1	The problem affects DTS external customer or end-user	Car makers line or end of line rejects (C1). Warranty return (C1WR).
C2	The problem is discovered in DTS plant	DTS end-of-line rejects. Sorting, rework, and line disruption. Non-conformance identified in the manufacturing process.

Costs generated in case of non-conformity

DTSRF provisions related to financial compensation to be paid by Supplier to DTS in case of quality incidents shall apply.

►► Incident Category 1– **C1 & C1WR incident**

Any line or end of line reject at the customer or customer complaint that is caused by a component delivered by a supplier is recorded as a C1 incident.

Any reject occurring “in the field” that is caused by a non-conformity on a component delivered by a supplier is recorded as a C1WR incident.

►► Incident Category 2 – **C2 incident**

Any single component rejected from DTS plant that is caused by a component delivered by a supplier is recorded as a C2 incident.

►► Recurrent incident:

►►► C1 or C2: a recurrent incident is on the same component number, the same failure mode, the same reason (suspected root cause or identified root cause) coming from parts belonging to a batch produced after CA validation of the equivalent incident previously declared.

►►► C1WR recurrent incident: occurs on the same component number, the same failure mode, and the same reason (suspected root cause or identified root cause) and for which production date is after implemented action plan.

Potential reasons for a recurrent incident:

- Containment was not effective
- Root cause was not properly identified.
- Action plan on root cause was not effective.

► Definition of Logistic incidents

Category	Definition	Location of the logistic perturbation and example of incidents
L1	The logistic incident affects the DTS external customers or end users	Customer Service Rate impacted due to shortage of part deliveries leading to have a risk of line customer shutdown
L2	The logistic incident affects the DTS production lines	Production line shutdown at DTS due to shortage of part deliveries
L3	The logistic incident affects the Incoming Logistics (Receiving/Warehouse) organization	<p>Perturbation detected at DTS receiving:</p> <ul style="list-style-type: none">• Parts received at DTS plant are not compliant with supplier's promise, according to the DTS Pick-Up Order (VRO: Visual ReOrder)• No respect of delivery window.• Errors on delivery documents or missing (written or electronic information (ASN), handling unit identification• Damaged delivery

Logistics department will be responsible for opening logistics incidents based on the definitions mentioned in the above matrix and based on the Top Worst Delivery Rate reported in the score cards of each month from PLEX. Logistics department will be the pilot of the logistics incidents while Purchasing department will be involved and support to identify the solution of the root cause.

► Incident processing

When a defective component is identified, DTS will notify the supplier responsible of the incident using the PLEX (Problem Log Module).

All suppliers are required to install broadband Internet and to systematically consult and make use of the PLEX incident Management Module. Their response time is measured and recorded according to DTS Reactivity requirements:

- Within **24 hours** of the notification: **1stD – 3rdD (Containment)**
- Within **5 days** of the notification: **4thD (Root Cause)**
- Within **10 days** of the notification: **5thD – 8thD (Corrective, Preventive and Verification)**
- After **30 days** if not re-incidence occurs: **Closure**

In the case of a C1 and C1WR, the supplier shall come to DTS plant in order to present the analysis and all answers (QR, PD, CA & LLC) must be formalized in English.

A process audit may be conducted by DTS supplier quality prior to incident closure.

►► Cancelled incident:

If the Plan Do analysis concludes the supplier non-responsibility then the supplier incident is cancelled.

► Sorting activity:

For any sorting activity requiring a sub-contractor, the Supplier will have to select a sorting company approved by DTS. Supplier shall ensure that the organization of the sorting shall enable an immediate communication of any relevant information (including especially the sorting results) obtained by the supplier and/or the sub-contractor during the sorting. All costs linked with the sorting, including costs to be paid to the subcontractor, will be borne by the Supplier.

►► Sorting at DTS plant: the Supplier shall mandate a sorting company within the first 2 hours following the incident notification in order to ensure that DTS is secured at the latest 4th hours following the incident notification to the Supplier. In case of delay DTS will contract directly a sorting company and shall charge back to the supplier all the corresponding costs incurred by DTS.

II.2 Quality, Logistics and Cost performance indicators

► Quality indicators

The Quality performance of the suppliers will be measured with the following indicators based on 3 months rolling:

	3 Months Rolling: (M + (M-1) + (M-2)) = C3M
Quality	<ul style="list-style-type: none">- Number of total incidents (C1+C1WR+C2)- Number of incidents C1, WR and recurrent incidents- % of Reactivity: 1-3 D within 24 hours, 4D within 5 days & 5-8D within 10 days- Parts Per Million (PPM)- Supplier IATF 16949 / ISO 9001 achievement

► Delivery rate indicator

This indicator measures the number of deliveries made on time to DTS compared to the DTS releases in PLEX

► Supplier Index

The Supplier Index reflect the performance of the supplier in regards of piece price improvements compared to the last year (December) prices

The above indicators will be reported to the Suppliers once per month using the PLEX Score Card Module

II.3 Supplier Quality Improvement Plan (QIP)

In order to achieve the objectives defined in the DTSRF, the supplier has to define and deploy a formal Quality Improvement Plan (QIP) based on a continuous improvement strategy.

For each DTS supplier performance tracking indicators defined (C1, C3M, recurrent, reactivity, Delivery Rate) and non-conformity declared by DTS as well as for each internal supplier Quality objective that can impact the performance of DTS (Supplier Total Line Rejects ppm, supplier scrap), the supplier will analyze with facts and data the performance and situation on the previous period based on the following questions:

- What was the performance reached in the previous year compared to the objective?
- What improvement actions were done and what efficiency obtained?
- What is the root cause explaining the gap to the objectives?
- What needs to be done in the next period to reach the objectives?

This analysis will take into account the development of Lessons Learned from the previous incidents as well as the weak points in the manufacturing process and in the management at the supplier's.

Based on this analysis, the supplier will define the strategy and the detailed action plan to be deployed for the commencing year, specifying solution, milestones and names of the assigned leaders in charge of the implementation of countermeasure to close the gap to objectives.

II.4 Supplier development & follow-up

DTS has developed a tool box to develop and to follow-up the supplier according to their quality performance:

- When the supplier Quality performance is worsening, the following activities may be launched by DTS: CSL1 / CSL2, TopWorst Suppliers meeting, NBOH Alert / NBOH Status

► Supplier follow up

- DTS will notify the Supplier Top Management (Plant General Manager)
- Quarterly follow-up to challenge Quality Improvement Plan on supplier Genba – DTS has the option to check the efficiency of corrective actions by visiting at least the supplier's facility within 3 months
- This program will last at least 3 consecutive months.

The exit of the Supplier Quality Improvement Program will be decided by DTS upon satisfactory achievement of the targets agreed at the initiation of the program with the supplier.

► Control Shipment Level 1 and 2 (CSL1 and CSL2):

CSL1 and CSL2 will be required to the supplier in order to assure certified deliveries while awaiting the full recovery of the conformance on the production process or /and the product.

►► CSL1 – Following a request from DTS, the supplier will implement a CSL1 in addition to the sorting of his production.

The CSL1 and the sorting activity will be operated out of the production line in a dedicated zone and in accordance with a specific control instruction approved by DTS – Supplier will make available the evidence that sorting operators have been trained to the sorting and CSL1 Instructions – the performance of the sorting activity will be monitored on a daily basis by the supplier. The supplier formally guarantees the conformance of goods delivered for each delivery that takes place while CSL1 is in the process of implementation. The cost of sorting will be borne by the supplier.

When the supplier fails to meet the commitments stipulated by CSL1 after 3 months-period, CSL2 is then required to be implemented.

►► CSL2 – the supplier is required to put in place a sorting activity by an external company, validated by DTS, in line with criteria defined along the CSL1. The cost of sorting will be borne by the supplier. Sorting results will be communicated to both DTS and the supplier.

►► Exit of CSL1 or CSL2: status can be lifted only after formal acceptance from DTS in accordance with exit criteria defined in the CSL notification letter.

►► In case of recurrent non-conformance, where the supplier clearly does not have sufficient control of his production process, the Control Shipment Level (CSL) procedure will be applied.

► Alert NBOH and NBOH status (NEW BUSINESS ON HOLD):

DTS can decide to raise an Alert NBOH to the supplier:

- If the supplier quality performance is worsening during 6 consecutive months after CSL1 implementation

- or in case of a critical quality situation

If no improvement is demonstrated during 6 consecutive months after CSL1 implementation, a NBOH status can be decided by DTS.

- ▶▶ A supplier meeting the targets given by DTS to exit the CSL2 or Alert NBOH or NBOH – will then get back to CSL1 status for a period of three months, with the objective to maintain a containment activity and confirm the improvement.

▶ Phase OUT:

If the supplier is not showing improvements, DTS may decide to phase out the Supplier.

II.5 Product & Process Change Management

The supplier has the obligation to communicate to DTS and in a written form, any product or process change intention (design, manufacturing process, material, color ...) **prior to** its implementation, in order to obtain a written approval from DTS relevant people. DTS will advise the supplier on the validation to be performed by the supplier to proceed with the change – shall the validation be successful. Upon reception of written agreement from DTS, the supplier is authorized to implement the change.

The following chart is giving some examples of product and process changes – the list is not exhaustive:

4M	Definition	Examples of Product Process Changes
Material	Changes to be made to what is used in the components or raw materials or to the component or raw material source	<ul style="list-style-type: none"> – Material change from Polyamide to Polypropylene – Packaging material from 3 ply cardboard to 2 plies – Shape of packaging – Label – Change supplier or sub-supplier
Method	Changes to be made in how we produce or test or control components	<ul style="list-style-type: none"> – Packaging operation conducted at end of line to packaging operation moved to the warehouse – Automatic process to manual process – Single component processing to batch processing – Temperature in heat treatment furnace – Control frequency change from 100% to 5 at start of production, or vice versa
Machine	Changes to be made in the machines, gauges or tools used to produce or test or control components	<ul style="list-style-type: none"> – Change layout of production line, but no change in equipment – Stop supplying DTS from a production site in France, and start supplying from a production site in China – Purchase new press in order to increase capacity – Renovation of old mold – Purchase new test equipment

Man

Changes to be made in the organizational of the workforce involved in the manufacturing of the goods

- Activity of Line rebalance from 4 operators to 3 operators
- Lower skill set of the operators to reduce direct labor costs
- New shift has to be constituted at the supplier to extend capacity

►► Implementation of a Product or Process change by a supplier with no DTS written agreement will be reported to the IATF 16949 / ISO 9001 registrar by DTS. DTS will require from the supplier to be placed under CSL2.

II.6 Audits & Audit schedule

During serial production, supplier sites may be re-evaluated by DTS through EVAL and Process audit on a regular basis (see chart below)

A new process audit may be scheduled at any time by DTS.

A yearly product audit will be performed by supplier in accordance with the control plan approved along the Initial Sample approval stage of the AQP.pp process.

The product audit will include a review of:

- DTS needs and technical specification adjustment in the light of the gained field experiences
- Field performance surveys, or new technology.

The quality system of the supplier will ensure that any production return of experience involving a product or process change(s) is fed-back for a post mortem analysis.

Type of Audit	Validity Period	Leader	Where
EVAL	New suppliers and suppliers entering in Top Worst Management program	DTS Purchasing and SQA	At supplier's plant
Process Audit	DTS reserves the right to perform process audits every 2 years (after IS validation)	DTS SQA	At supplier's plant
Product Audit (*)	1 year	Supplier	At supplier's plant
CCL	No limit except in case of new incident or entering in the Supplier Quality Improvement Program or along Process Audit when it has to be reassessed	DTS SQA	At supplier's plant
C1 Process audit	For C1 or C1WR occurrence	DTS SQA	At supplier's plant

SECOND PARTY AUDITS	As needed based on performance/risk of the supplier: Specific processes that require an expert participation or involvement.	2 nd party auditor	At supplier's plant
IATF 16949 / ISO 9001 (latest valid Edition)	3 years	IATF 16949 / ISO 9001 Accredited bureau	At supplier's plant

(*): Supplier to provide results of the yearly Product Audit with the Yearly Initial Sample submission to DTS.

III -END OF MASS PRODUCTION LIFE MANAGEMENT (EMPL)

End of mass production life management cycle starts when the OEM production needs the product to be stopped and when OES production and Aftermarket needs this product to remain still available.

All along the life of the component, supplier has to ensure that the process developed by the supplier is able to manufacture components according to DTS specifications. Whereas, the previous chapters of the manual deal with serial production, the purpose here is to define how supplier make sure that the process is still capable when (and after) switching from mass production to end of life production.

III.1 Evaluation of potential changes:

6 months before the departure point of the 'End Of Life' period, the supplier has the responsibility to fill-in the EMPL changes evaluation check list (Appendix 12 EMPL – Section: Potential Changes Evaluation). This document aims at listing any process changes that are planned to be executed by the supplier before or while entering the 'End Of Life' period.

This end of mass production life change evaluation checklist is then submitted by the supplier to DTS. The listing being counter-checked by DTS does not mean an approval from DTS. Supplier will still need a formal approval from DTS to launch changes and have to respect the Product and Process change management section described in the present Supplier Quality Manual (Appendix 12 EMPL changes evaluation checklist)

III.2 Supplier self process-assessment:

One month before departure point of 'End Of Life' period, the supplier has the responsibility to self assess its process through EMPL process assessment check list.

The EMPL process assessment check list with an updated ISR will be then submitted to DTS for approval. (Appendix 12 EMPL - Section: Process Assessment)

PQA status has to still be managed in accordance with PQA management rules.

No more systematic yearly initial sample submission is then requested the year following the end of the OEM life and no more systematic periodical DTS process audit will be performed.

DTS process audits and initial sample submission will be nevertheless required following a product or process changes occurring at the supplier.

IV- SUPPLIER QUALITY POLICY

The supplier, a professional in its field, is perfectly aware of the demands and requirements of the Automobile Industry, in particular in terms of quality. It is supplier responsibility to define and implement a quality policy in compliance with this Industry's standards and customary practices, as well as with laws, regulations and standards in force. This SQM shall supplement supplier quality policy.

Nothing under this SQM may be interpreted as relieving the Supplier from any of its obligations towards DTS and especially its responsibility to deliver the Components in compliance with all documents that govern the relationship between DTS and the Supplier in connection with the supply of the Components.

Activities performed by each Party under this SQM and especially, inspection, audit, validation, testing and/or approval made or granted by DTS under this SQM as well as DTS decision not to enforce all or part of this SQM shall not affect Supplier responsibility concerning the quality and reliability of the Component and compliance with its contractual obligation.

V- ACRONYMS

AQP.pp	ADVANCED QUALITY PLANNING for product and process: aim of AQP.pp is provide DTS with all the guarantees concerning the means to achieve product quality. The AQP.pp includes: DTS Requirements File (DTSRF), Quality Assurance File (QAF), Initial Samples File (ISF) and a Quality Monitoring File (QMF)
CAR	CORRECTIVE ACTION REQUEST
CCL	COMMODITY CHECK LIST
CERTIFICATION	Notice given by an OFFICIAL organization on the basis of the appropriate procedures or documents by which the component is recognized as being in compliance with STATUTORY requirements
CONFORMITY	Fulfillment of a requirement. Note: The term "CONFORMANCE" is a synonymous but deprecated. (IATF 16949 / ISO 9001)
CONTROL PLAN	Documented description of the systems and processes required for controlling component. (IATF 16949 / ISO 9001)
CSL	CONTROLLED SHIPMENT LEVEL 1 and 2 : CSL1 and CSL2 are provisional procedures implemented with a view to guaranteeing certified deliveries while awaiting the reestablishment of the conformance of the production process.
DTSRF	DETROIT THERMAL SYSTEMS REQUIREMENTS FILE. defines generic and specific commitments of suppliers concerning Quality, Logistics, Purchasing, Environment, etc.
EVAL	DTS supplier evaluation tool taking into account key criteria concerning operational and strategic performances of the suppliers. This grid is used to select as well as to evaluate suppliers (present and potential suppliers).
FDPR	FULL DAY PRODUCTION RUN: Production run to validate the "full capacity / quoted rate" conditions. A sufficient quantity of components shall be manufactured during this day to be considered statistically significant. It shall extend for a period between 1 hour and 8 hours (one shift). At least 300 components shall be manufactured unless a specific quantity is specified in relation to the rate of manufacture.
FMEA	FAILURE MODE and EFFECT ANALYSIS: Deductive method and tools used to identify potential failure modes, their causes and effects, and assess criticality of these failure modes, based on severity, occurrence and detection probability criteria. Generic FMEA is applied on Product Design (DFMEA), Process Design (PFMEA), and Equipment. It can also be applied on Product functions (Concept FMEA)
IS	INITIAL SAMPLES: Units manufactured by final production methods and under "full production conditions". IS approval shall validate the production equipment. After approval, they are used as reference for the volume production.
ISR	INITIAL SAMPLE REPORT
PLEX	DTS ERP System
PDCA	PDCA (PLAN, DO, CHECK, ACT): is a methodology to settle and solve problems effectively. Based on continuous improvement, PDCA comprises four different steps: Plan: grasp the problem, analyze causes and effects and set objectives. Do: investigate solutions, identify the most effective one and implement it. Check: check the result in comparison to the objectives. Act: set a new standard to consolidate the result and take action to prevent the re-occurrence of the problem.
POKA YOKE	ERROR PROOFING (POKA YOKE): Product and manufacturing process design and development to prevent manufacture of non conforming components. (IATF 16949 / ISO 9001)

PPM	<p>PARTS PER MILLION: measures the ratio of defective supplier production parts detected at reception, in production and at the customer. It includes technical defects as well as packaging and labelling errors.</p> $PPM\ C3M = \frac{3\ months\ sliding\ number\ of\ nonconforming\ parts}{3\ months\ sliding\ number\ of\ parts\ received} \times 1.10^6$ <p>Notes:</p> <ol style="list-style-type: none"> 1. Only parts that have entered the site; consignment stocks awaiting reception are not included. 2. For raw materials, replace number of parts by number of delivery units, i.e. unit of weight in most cases. <p>Non conformance is determined in terms of specifications: identification, size, aspect, function, mix, error in quantity, etc. Non conforming parts formally accepted by DTS are not included in the measurement of defective parts; batches of products that have been destroyed or returned will be recorded as non conforming.</p> <p>In the event that sorting operations have to be carried out at DTS to which the supplier has agreed and paid for, only the defective parts will be recorded as non conforming. In all other cases, the whole batch is recorded as being defective.</p>
SPC	<p>STATISTICAL PROCESS CONTROL: Consists of monitoring a process by the statistical measurement of key parameters to detect process variations that impact the components ability to meet a required function. The use of this method of control can therefore prevent the production of non-conforming products. SPC can only be used for capable processes (see also "capability").</p>
SPPC	<p>SPECIAL PRODUCT and PROCESS CHARACTERISTICS: and measurable characteristics of a component, System or assembly which may have an adverse or degrading effect on the function, quality or reliability if an out of tolerance condition occurs, Measurable elements of the process used to manufacture or assemble a component that have significant impact on the function, quality or reliability of that components.</p>
TOOLING LOAN AGREEMENTS	<p>A document attesting to DTS ownership when tooling has been placed at supplier premises for the production of components. This document must be signed by the supplier receiving the tooling or equipment. This agreement addresses the following major aspects: Ownership of tooling, term and termination of the agreement, conditions on the use of the tooling, maintenance and insurance.</p>

VI- APPENDIX LIST

Appendix 1	SQA-T0001	DTS Advanced Quality Planning for product and process - AQP.pp
Appendix 2	PUR-T004.1 & PUR-T004.2	DTS Requirements File
Appendix 3	SQA-T0004	FMEA Guideline (SPPC Identification Procedure)
Appendix 4	SQA-T0005	Validation Plan
Appendix 5	SQA-T0007	Full Day Production Run Report
Appendix 6	SQA-T0008	FDPR Preparation Form
Appendix 7	SQA-T0009	Process Audit Questionnaire & Report
Appendix 8	SQA-T0019	Total Line Reject calculation
Appendix 9	SQA-T0010	Cpk calculation sheet
Appendix 10	SQA-T0011	Initial Sample Report Form
Appendix 11	SQA-T0013	PQA Management Flow
Appendix 12	SQA-T0017	EMPL Changes Evaluation checklist and EMPL Process Assessment checklist
Appendix 13	SQA-T0006	Design Review With Supplier
Appendix 14	SQA-T0012	Supplier Deviation Submission Request