QUALITY FILE

"Gear Shifter Unit "

From

TATA Motors Limited (TML), Pune, India

Issue No	Date	Issued By	Description
1	04/12/2018	FMQ	New Release

List of Abbreviations

TML	Tata Motors Limited
TS	Tata Standard
APQP	Advanced Product Quality Planning
SQI	Supplier Quality Improvement
CTQ	Critical to Quality
PPM	Parts per million
SOP	Start of Production
FMWB	Failure Mode Work book
DFMEA	Design Failure Mode Effect & Analysis
PFMEA	Process Failure Mode Effect & Analysis
TGR	Things gone right
TGW	Things gone wrong
TBD	To be decided
Hard Failure	Product ceases to perform its ideal function (breaks)
Soft Failure	System performs its function but at a reduced (degraded) performance level

Part Quality Maturation Process:

1. Technical Signoff Procedure – Annexure I

TML development teams will track the entire development of the product as per the 16-step SQIG process. Within the SQIG process, TML FMQ team will monitor the progress as per the technical signoff procedure spread over three reviews.
The process of the reviews along with the sufficiency expected at each review is document in the "TECHNICAL SIGNOFF PROCESS" which will be received by the supplier along with the quality file as an annexure.

2. CTQ CASCADE Process*** - Annexure II

The CTQ CASCADE process will form the backbone of FMQ drivers in the development of the product. This unique process will establish a link between OE DFMEA, Supplier part level DFMEA, supplier PFMEA and supplier control plans (down to the child part level)
CTQ CASCADE process is a mandatory PPAP requirement and has to be fulfilled taking the "CTQ CASCADE PROCESS" document as a reference.
The supplier has to fill and share process parameters (process characteristics) in CTQ loop 2. The TML representative will witness the CTQ loop 2 during part development phase & further CTQ Loop 3 process validation during PPAP visit.
TML FMQ Engineers will work closely with the supplier Quality team, purchase quality / Vendor development teams, project management team and the sub-suppliers to ensure the CASCADE is completed in entirety.

3. Agreement of Inspection (AOI) – Annexure III

At the culmination of the development activity and before the PPAP commences a draft AOI will be made as the "AGREEMENT OF INSPECTION PROCESS" document. This AOI will be used by Incoming inspection teams at TML's manufacturing locations to check the in warded parts.
At the time of PPAP trial run this AOI will be signed off and 5 samples from the PPAP lot will be inspected as per the AOI.

Quality Requirements

As a part of the internal product development policy and practices, TML expects the supplier to abide by standard work procedure of product development keeping focus on the quality in entirely. The supplier should demonstrate the implementation of best industry practices for development, which may include the implementation of APQP & SQI processes.

The use of above tools should include the techniques such as:

- Benchmarking
- FMWB
- TGR/TGW analysis (Based on In-house rejection data and warranty complaints)
- DFMEA
- PFD
- PFMEA
- CP

Certification to quality systems may be an added advantage.

Benchmarking is a globally acceptable way of learning and improvement. TML believes in the same and requires the supplier to submit exhaustive benchmarking reports of competitors to arrive on final specifications and judge the market trend.

Also required are the warranty and rejection complaints for the component from the existing customer. This may help us in identifying the potential issues in the new product development and obstacles in achieving our reliability and warranty targets.

A consistent mass production with desired quality of the aggregate is essential to support the plant activity with ease. As a part of the same, the supplier have to submit Sustenance Plan and the activities to assist the same.

Parts always to be send with dimensional inspectional report/ test report & report to be specific with respect to the part batch code. The inspected part/parts should be send with the identification in the same lot

The Supplier has to demonstrate his understanding of the historical quality of their component in regard to:

1. Failure definition and root causes of current component in the field, obtained through
   i. 4 year/160K Km Base Warranty
   ii. High Mileage (Increasing Failure Rates) failure modes occurring within the useful life (e.g. 10yrs/220K)
   iii. 8D Assessments and Lessons Learned Data Bases
   iv. Campaign able Events (Campaign Prevent process)
   v. Fleet data and data obtained from returns from the Parts Recall Center

2. Things Gone Wrong (TGW) reported by Customers, both short term (3MMA) and long term (3YIS), and Impact (i.e. positive and negative) of new product on Customer Satisfaction.

3. The use of engineering tools such as:
   i. Fault Tree Analysis (FTA)
   ii. Cumulative Hazard Analysis of Warranty Data
   iii. Review of historical test (DVP) data

The DFMEA is the primary engineering discipline that documents the summation of all quality performance. Therefore, the engineering team is required to review/assess all previous DFMEAs for historically identified failure modes.

Reliability Requirements

1. Supplier shall furnish a reliability, durability and robustness plan. The plan shall mention:
   - The aggregate requirement definition-benchmarking, target setting, ensuring reliability, durability considering his experiences with respect to safety, fitment, function, performance of other his customers & TML experiences
   - Design verification plans-analytical and or simulation methods during development.
   - Product validation plan.
   - Reliability estimation and growth plans.

   TML shall provide desired system functional performance, Environmental & and reliability / quality requirements as part of RFQ / Tech Specification. Supplier shall come up with plan for all related parts addressing above points In reply / Compliance.

2. Supplier shall share the achieved level of functional performance mapped against relevant noise factors as defined by TML & supplier. External Noise factors for particular Aggregate / Part shall be discussed and agreed upon as a part of RFQ Discussions. Supplier shall furnish the performance & functional details level existing / currently observed for applications other than TML.

3. The Aggregate shall consistently perform its intended function in the presence of noise factors as agreed jointly between TML & Supplier. These noise factors must be included in test used to demonstrate reliability, few Examples are:
    - Piece-to piece variation in manufacturing.
    - Change in product characteristics over useful life.
    - Customer usage pattern – as per TML NPI requirement.
    - External environmental factors like climate, road condition and electrical environment.
    - System interaction with interfacing components.

4. To identify the applicable noise factors, Supplier shall provide:
    - A consistent reliability metric to measure the consistency of design.
    - Plan to select size of the testing sample in development phase.
    - All Pre-DFMEA documents related to Aggregate, like boundary diagram, Parameter diagram (P-diagram) should be developed and maintained. This document shall be made available in response of RFI/RFQ. Refer AAIG DFMEA template. (As per AIAG –June 08 STD) for details of Pre DFMEA
    - Supplier DFMEA, PFD (Process flow Diagram) and process failure mode effect Analysis (PFMEA) related to aggregate.

5. Recommended counter measures to avoid the specific failure in System & Product DFMEA (CTQs) shall be captured on Product drawing /specification. TML shall be responsible to identify System level CTQs & same shall be mentioned in Technical Specification / drawing / Quality file for system. Supplier shall capture CTQs for his product and shall capture on his part specification /drawing. These CTQs shall be tracked as a part of development validation.

6. Change History during development -Supplier shall maintain history of variations in functional performance to address TML expectations, hard failures and deterioration / degradation of performance & functional failures for the prototype samples supplied to TML.
   Change history shall address Issue list created during development as a part of program management. TML & Supplier both shall contribute to maintain and update issue list.
   Change history shall consist of hardware change, software change, fitment /packaging Change, interface change. This shall discussed in communication between TML & Supplier once in a week or issue based.

7. As a policy, TML has decided to check effectiveness of countermeasures using virtual prototyping methods at upfront level. Hence the supplier has to demonstrate the capability of using CAE i.e. simulation / analytical tools and predicts reliability, durability life of component at early stages of development. Supplier shall furnish the details of virtual verification and analysis methods and shall demonstrate its effectiveness to optimize the design in virtual verification.

8. The test plans of the component & the system should be identified according to the every failure modes to measure the effectiveness of countermeasures on realized product / proto. The supplier shall evaluate the aggregate for minimum / maximum level of part tolerance for all parameters against an extreme set of External Noise factors, which have agreed jointly.

9. System & Product DFMEAs shall reviewed at each major mile stone e.g. alpha, beta & PP validation for changes if any to capture design change / validation change.

10. The Supplier has to ensure that the Design-Verification-Plans (DVP), Validation and In-progress tests are updated and enhanced, if required, to reflect:
    - The range of critical noise factors that would affect during component Useful life.
    - Key life tests.
    - TATA Motors failures on similar models

11. PPAP-To ensure the process, validation testing is required. The testing report should provide all necessary information regarding the process validation scheme which includes:
    - A short description of the manufacturing process in a schematic drawing or flow chart.
    - A summary of the critical processes, control variables and justification for their selection.
    - Batches used for validation.
    - Acceptance criteria.
    - Sampling plan – where, when and how samples are taken.
    - Tabulation of the test result.
    - Evaluation of data, and where applicable, including statistical process control analysis.
    - Evaluation of data including comparison against acceptance criteria.
    - Discussion on deviation and out of specification results.

12. The supplier shall maintain and demonstrate historical quality of this aggregate in regard to:
    - Supplier internal quality and capability.
    - Zero KM PPM data.
    - Failure definition and root-cause analysis using 8D for all returned aggregate from line quality and warranty.
    - Things gone wrong reported by TML both zero km and field return.

13. Production Readiness/SOP-The supplier shall present their design and production readiness status with the TML Team at appropriate checkpoints, with supporting Quality data including the history, drawings / models, Design and Process FMEA, System Design Specifications (SDS), DVP, Process Layouts, Control Plans, Functional Performance characteristic study status, QA matrices etc.
    These documents shall made available w.r.t Development time cycle as defined by TML Design process.
    These documents shall made available w.r.t development time cycle as defined by TML Design process.

14. Aggregate supplied by the supplier shall conform to the requirements tracked on following parameters as applicable :
    - IPTV for first 4 years [TBD]
    - Warranty Life.
    - B10 Life.
    - Useful Design Life.

15. Supplier shall conduct the periodic **accelerated durability test** at defined frequency, mutually agreed by Supplier & TML, based on the nature & criticality of the part. These tests are required to predict the useful life of the parts (i.e. 10 years / 160000 kilometers for vehicle / 300000 kilometers for Engine). Supplier shall work out & get approval from TML ERC for the periodic accelerated durability test. TML may verify the test results during subsequent audits at supplier. Supplier to inform TML about the failures in accelerated durability test along with appropriate corrective preventive actions.

16. Tier I suppliers shall be responsible for the management and approval of parts quality and associated documentation for all sub-supplier's

Tier I supplier shall abide to the following Tier II development requirements of TML

a. Shall develop adequate infrastructure as per the below mentioned requirements at Tier I to monitor the quality performance of the Tier II suppliers

i. Model line
ii. Quality Gate
iii. CTQ Station
iv. Red- Bin Analysis
v. CAPA monitoring methodology
vi. Customer end performance tracking
vii. Tier II Support Organization at Tier I
viii. Achieve 60% Process audit score on model line.

b. Shall improve the Tier II suppliers in terms of infrastructure, implementing the Tier II development plan & achieving the process excellence.

- Mistake Prevention

The prevention of mistakes is primarily a matter of vigilance. It therefore requires continuous effort throughout the product life cycle (from concept design through to manufacturing). APQP in Product Development intend to manage the activities around mistake prevention by promoting the use of disciplines, which measure the quality of execution of critical engineering work. These measures are converted into metrics at specified program milestones to form a judgment as to the health of the program.

These engineering disciplines include, but are not restricted to:

- *Fault Tree Analysis*
- *Design Failure Mode & Effects Analysis (DFMEA)*
- *Process Failure Mode & Effect Analysis (PFMEA)*
- *Manufacturing Control Plans*
- *Design Verification Plan & Report*
- *Fresh Eyes reviews aimed at campaign prevention*
- *Engineering Design Reviews*

The FMEA is the primary "mistake prevention" engineering discipline as it identifies all known and potential failure modes. The FMEA intend to:

- Describe the intended function(s) of a design (DFMEA) and/or process (PFMEA) in specific engineering terms which can be measured;
- Identify ALL potential hard/soft failure modes, and their effect to the "customer", associated with not performing the intended ideal function (Failure modes & effects should align with the part/process quality history);
- Identify potential and confirm Critical and Significant Characteristics (to be addressed by either the design and/or process) required for reducing the likelihood (occurrence) of a high severity failure modes.
- Evaluate the adequacy of proposed Detection methods/ controls and the further need to mitigate risk by changes to the Design Verification Plan (DVP), the Manufacturing Plan, or product/ process countermeasures.

Suppliers shall comply with TML FMEA requirements, as per AIAG Manual of FMEA 4th edition, when they create FMEAs for TML systems, sub-systems, and components, as applicable.

- Robustness Tools

Incorporate Robustness Tools into System and Component Design Process

1. Functional Block Diagrams & Boundary Diagrams (to define system function, scope & interactions)

2. Parameter Diagrams (P-Diagrams to identify the ideal functions& Noise factor error states & failure modes). P-diagrams must include the following 5 categories of noise factors:

- Piece-to-piece variation
- Product changes over useful life (e.g. wear, fatigue)
- Customer usage and duty cycles
- External environment (e.g. climate, road surfaces)
- System interactions with adjacent components

3. Robustness Checklist - Documents and evaluates the linkage between noise factors (causes), error states (failure modes) and DV tests. It also illustrates strategies for noise factor management

4. Design & Process FMEA

- Action plan must be identified the FMEA for any failure mode that has a severity rating of 9 or 10 (potential Critical Characteristic), or a severity rating of 5-8 AND occurrence of 4-10 (potential Significant Characteristic)
- All Design FMEA's must be reviewed by TML periodically in accordance with Vehicle Program Plan timing or program needs. TML approval is required for all FMEA's (Supplier FMEA's)

5. Implement a strategy for managing & reducing the effects of the identified Noises. Apply one or more of the following strategies for each noise:

- Change Technology/concept
- Parameter Design techniques for making the product robust in terms of noise
- Upgrade Design specifications or strengthen design
- Reduce/remove impact of noise, such as through tolerance design and process control
- Add compensation device for noise(s)
- Disguise/mask/divert noise(s)

NOTE: The lead depends on the scope of the system analysis. For example, System level DFMEA led by JLR, while sub-system/ component level DFMEA led by the supplier. The supplier should support in all system level activities

- Campaign Prevention Process

The Design Responsible Supplier is expected to understand and document in FMEA, the failure modes related to their systems/ commodities that have led to vehicle campaigns, recalls and near misses in the auto industry.

The Design engineer shall also provide a campaign history list to ensure that TML information is included in the review.

The Design Responsible Supplier shall consider these potential issues (including consideration of identified root causes) in the development of their FMEA's.

All design, development and assembly actions taken shall demonstrate reliability/robustness levels sufficient to mitigate occurrence and prevent recurrence of campaigns, stop ship/stop builds, and near misses in the future

- High Impact Supplier Challenge

The Design Responsible Supplier shall understand and document in FMEA, the failure modes related to their systems/ commodities that have led to vehicle campaigns, recalls and near misses in the auto industry.

It will involve supplying a person to stand in station and monitoring the fit of their parts for a suitable number of 'clean' cars. Each time a quality issue arises with a supplied defective part, the onsite supplier representative will be responsible for:

1. Any rework or containment action.
2. Feeding back any issues to their supply base immediately to ensure the next deliveries are ok.
3. Getting signoff daily, from the line supervisor, for their day's status.

Once the supplier has built a suitable number of clean cars*, TML will consider their process stable, allowing track support to be pulled. For further details contact your purchase/ STA contact."
*The suitable number will be no less than 500, but no more than 2000

CTQ

[Refer Annexure]

In case of Proprietary parts, supplier should submit the CTQs and get it approved by TML.
In case of Non-Proprietary parts, TML will give CTQ's to the supplier.
These CTQs to be maintained by the supplier during PPAP and regular production

Cpk≥1.67 for ●
Cpk≥1.33 for ◑

If the process does not meet the above Cpk capability target, the Supplier must supply a containment plan describing the 100% inspection method that prevents out of specification parts from being shipped to TML and a Corrective Action Plan for capability improvement

1. Control A,B,C,D parameters

The below mentioned category of critical parameters should be determined and addressed through, QMS documents DFMEA, PFMEA, MFEMA, PFD Control plan, Standard operating procedure. Also should be addressed in Quality Gates, Pokayoke, CTQ, and SPC as a defect occurrence prevention. Effectiveness of the actions shall be monitored with tools like Quality Gate buy-off, Process audit, Product audit.

A) Engg Specs
Determine critical dims and attributes for functional and fitment requirement

B) Voice of Process (at Supplier)
- FSO, Rejection and rework (at Supplier end)
- Disruptive factors like Man / Machine / Material / Vendor

C) Voice of Customer (TML)
- PPM (Primary & line)
- Downtime & FSO
- Craftsmanship Audit issues

D) Voice of Customer (Final)

- Warranty Complaints (PCR. CIR etc.)
- JDP-IQS / VDS scores

PPM Target at Supplier end

Pilot lot	SOP
<200 PPM	<32 PPM

- Supplier shall achieve Process audit score of greater than 80%

Reliability targets:

- Vehicle B10 Life is 300,000 Km

Warranty Targets

- **4 years / 160000 Km** which comes earlier
- Warranty issues
- PDI issues

Supplier warranty reduction Program

Apart from Quality requirements like Reliability requirements, reliability targets, warranty target & warranty period

Supplier shall submit the IPTV achievement plan which include following mandatory requirements for the referred IPTV in RFQ. This shall be submitted along with APQP plan
a. Capability study on similar parts
b. Plan for error proofing
c. Past IPTV data analysis
d. CTQ achievement plan

Warranty Clauses

- Generic Requirements:
Refer P.O.
- Part/commodity specific:

Supplier to send 8D report within 15 days of receipt of failed components from field. (Mandatory Clause) Clause)

Apart from Quality requirements like Reliability requirements, reliability targets, warranty target & warranty period, supplier shall submit the IPTV achievement plan which include following mandatory requirements for the referred IPTV in RFQ.

This shall submitted along with APQP plan
a. Capability study on similar parts
b. Plan for error proofing
c. Past IPTV data analysis
d. CTQ achievement plan

Failure mode avoidance: Annexure IV

A Failure Mode Avoidance plan identifies the scope of the engineering effort and aligns the start and completion dates of all the engineering disciplines with specific vehicle program milestone/gateway timing. The main aim of the Failure Mode Avoidance Plan is to find and eliminate failures due to mistakes and lack of robustness as early in the program as possible, and not wait until the failure has found during launch. To that end, the plan must include timing associated with the following engineering disciplines:

- *The cascade of vehicle level functional requirements down to "end-item" engineering metrics*
- *The completion of quality history (Warranty, Recalls, J.D. Powers, etc)*
- *Scoping of specific engineering content (Boundary Diagram)*
- *Interface Analysis*
- *P-Diagram development*
- *Design Verification Plan and Report*
- *Control Plan development/completion*

The FMEA is the "super-ordinate" engineering discipline, which will drive the Failure Mode Avoidance Plan. The DFMEA will; (1) identify and prioritize (via Criticality) all potential failure modes requiring countermeasure development (i.e. design action), (2) the list of countermeasures to be taken, and (3) the verification plan to confirm that the countermeasures taken sufficiently address the potential failure modes. All other design-engineering disciplines will support the development of a comprehensive DFMEA (i.e. Failure Mode Avoidance Plan). The PFMEA is the "super-ordinate" engineering discipline for the Manufacturing engineer.

FMASOW – FAILURE MODE AVOIDANCE STATEMENTS OF WORK

As an advance warning system, TML prioritizes certain design and process elements as critical. These have been identified in the following pages as
1. DESIGN QUALITY STATEMENTS
2. PROCESS QUALITY STATEMENTS

These statements need response from engineering teams and process teams respectively. The both statement are attached as an annexure IV. The failure mode mentioned in the annexure will be discussed during TRSO.
Please note under any circumstance these lists are not to be considered sufficient, as front loading of quality activity these have been identified upfront, **TML reserves the right to go beyond these statements to ensure correct product delivery**

- Following failure modes to be avoided **(FMASOW)**:
  - Electronic malfunctioning in gear shifter
  - Squeaking noise.
  - Mode selection scratchy/sticky/hard.

Detection mechanism:

The supplier shall have a robust detection strategy, which is derived using quality tools like
1. T-Matrix.
2. Step Detection method etc.

shall be deployed in the below mentioned gates for defect detection. Supplier also should demand similar detection strategies from Tier-2/3 suppliers.

- Incoming Quality
Supplier shall possess a valid & robust inspection plan for the supplier parts to detect the issues at incoming.

- Process Quality
Supplier shall identify the critical parameters in the process through a robust process control plan. All the critical process shall made mistake proof by implementing adequate poke-yoke in the process.
Supplier shall declare the percentage of Poke-yoke along with the process control plan and plan for further improvement.

- End of Line Inspection
End of line inspection shall carried out for all the critical parameters to detect the defects and hence avoid the outflow to the next process. Supplier should define a valid direct pass ratio target for the end of line with the approval from TML.

- Firewall station
Firewall inspection station shall be implemented if, the EOL inspection results are not meeting the direct pass ratio target and customer complaints since there are possibilities of defect out flow from the process.
The firewall inspection can be relaxed if the EOL target has met for consecutive 3 months. The firewall inspection standard shall be specific to the customer complaints and the defects escaping from the EOL

Engineering Change Management

Supplier shall identify design & development changes and maintain the record of the same. Design & development changes shall reviewed, verified and validated before implementation. The review of design & development changes includes the evaluation of the effect of the changes on particular part or product.

Supplier shall inform in writing any change in part / product / process/ material/ source and implement the same only after due validation, in regular Production after written approval by TML VD.

Supplier Engineering change management system shall include following major points:

1) Supplier shall do the feasibility study & risk analysis. This risk analysis shall be in terms of Quality risk, Productivity risk, Technical capability, Tool life risk, etc.
2) Inventory management for pre & post modified parts. i.e. disposal of pre modified parts.
3) Communication & approval from concerned agencies.
4) Release of revised documents & disposition of obsolete documents.
5) Updated DFMEA & PFMEA and other relevant documents.
6) Supplier shall keep the records & tracking of all Engineering Change Requests.

TML may verify the Suppliers engineering change management, related to TML parts, during the course of part development.

16 Step SQIP process

Supplier shall follow the 16 step SQIP manual, for the systematic improvement. It is Suppliers responsibility to ensure the availability of TML 16 Step SQIP Manual from relevant VD/SQIG representative.

Inspection Plan & Gauge Fixture Requirements

Supplier should have Maintenance plan for all Gauges & Fixtures (Part Specific). This plan shall include following points

1. Gauge/Fixture Type
2. Calibration details & plan
3. GRR for the Gauge/Fixture
4. Visual acceptance Criteria
5. Storage
6. Gauge /Fixture identification system

100% inspection of all parts for all CTQ dimensions required at supplier end for Beta, P0 and PP batch samples.

Craftsmanship Requirement

These 14 requirements shall be applied to the design and execution of all visible parts on vehicle as applicable.

- **Tool Parting Lines – visual expectation:** No visible tool parting lines permitted in intended customer view fields.

- **Tool Parting Lines – touch expectation:** No sharp edges or raised tool parting lines in any customer contact zones.

- **Functional Feel:** There shall be no unexpected movement, deflection or unacceptable efforts under intended customer usage scenarios.

- **Robust Sound Quality:** There shall be no unexpected or distracting sounds, such as squeaks, rattles, speaker induced vibrations or frictional noises during component operation.

- **Harmony - Interfacing Panel Fit:** Must have 'visually' consistent margins, flushness, radii and alignment of interfacing components from normal customer view fields. Interfacing or adjacent panels & trim components must appear to be equal among like systems (i.e. sheet metal fits & net fitting components), parallel (no "A" or "V" margins); consistently flush and no objectionable see through from normal customer view fields.

- **Exposed Fasteners:** No exposed fasteners on trim components unless specifically required by Styling theme. Components and systems must be free of visible metallic or plastic fasteners such as screws, bolts, rivets, fir-tree fasteners and clips.

- **Color, Grain & Gloss Appearance**: Color, grain and gloss must be compatible between "like" and adjacent components in accordance with Styling theme. Must also be compatible with all other systems to achieve visual harmony

- **Graphics, Fonts & Illumination Appearance:** Graphics, fonts and illumination shall be compatible between "like" and adjacent components in accordance with Styling theme. Component lettering, numbers and symbols must be the same or compatible in size font, orientation and color to achieve graphic and font harmony among all "like" systems. Illuminated displays & controls including switches, displays and clusters must be compatible in color, shades of color and intensity in both bright & dimming conditions to achieve harmony
- **Finish Quality: Surface Imperfections:** All surfaces must be free from customer perceived surface imperfections or blemishes. All surfaces must exhibit a harmonious surface appearance and be free of any surface imperfections from the design of the product

- **Displeasing Odors:** No offensive odor shall be detected from the vehicle's interior, such as from HVAC system, plastic components, adhesives, leather components or rubber-based components

- **Corrosion:** No component shall exhibit any visible rust (showroom condition - as customer takes delivery). This includes any visible red, white or green rust or surface corrosion, galvanic corrosion of dissimilar metals, corrosion bleed through or transferred corrosion within customer view fields

- **Intuitive Operation:** Controls, displays and functional trim must have intuitive operation conforming to operational stereotypes and providing appropriate feedback to the user. Items shall not be complex or require unnecessary steps to operate or be prone to inadvertent actuation

- **Reach & Clearance:** Controls and functional trim must be easily to reach and have sufficient finger and hand clearances for intended operation. Physical obstructions shall not impair access to controls, displays or functional trim items

- **Find ability - Placement, Visibility & Identification:** Controls and displays shall be easily located and identified by the customer. They shall be located based on function, importance, frequency of use, logical grouping and customer expectations. Components shall be visible to the driver under all lighting conditions, unobstructed and free from visual distractions (glare). Controls and displays shall be identifiable by vision or touch and graphics legible under normal driving conditions

Traceability Requirement

All parts should be traceable at any point of service. Manufacturing year, batch code, etc shall be at visible location.

Tool Maintenance

For all tool dominant parts (Plastic molding, Press parts, Castings, forgings etc), Supplier should have Tool Maintenance plan. This plan shall include following points.

1. Tool type
2. Expected Tool life
3. Storage
4. Tool identification System
5. Any other specific to Part, if any.

Supplier shall define the frequency & what maintenance activities to be carried out. Detailed plan to be submitted along with PPAP. Plan vs actual status will be reviewed by TML during different audits conducted at Supplier end.

APQP Status Report

The TML APQP status report summarizes the program status using the TML supplier APQP elements. It summarizes the information & provides an assessment at the component/subsystem level, the system/organization level(s), & finally the program level. The individual issues at each level are to be documented and tracked, as well as raised to management for assistance in solving/closing if they cannot be handled at the working level.

- Submit the Status Report to the TML at all major program reviews (e.g. TML Milestones).
- Submit supporting documentation upon TML request.

- Rating & assessment:

Green-Yellow-Red status communicates the progress toward the successful completion of an APQP element by the program need date. Program need date is the last possible date an element can be completed and not adversely affect quality or timing of the program. The “GYR Status” column of the report shows the assessment for each element.

“Definitions/Risk factors for Green, Yellow, and Red are listed in the table below.

Risk/Status Assessment		
Risk	**Colour**	**Definition**
High	Red	Target dates and/or deliverables are at risk. A recovery work plan is not available and/or implemented, or the work plan does not achieve program/project targets
Moderate	Yellow	Target dates and/or deliverables are at risk, but a resourced recovery work plan has been developed to achieve program/project targets, and has been approved by the appropriate management team
None	Green	Target dates and deliverables are on track and meeting objectives