
# Customer Specific Requirements

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**Ford Motor Company**
**Customer-Specific Requirements**
**For use with:AIAG PPAP Fourth Edition,Service PPAP First Edition**
**Effective 06-February-2025**
**IATF 16949 - Customer Specific Requirements**

**AGENDA:**

## 1. Scope

This Customer Specific Requirements Document (CSR) is an integral part of Corporate Supplier Manual (CSM) and aims - defines to transfer the specific and special requirements of the final customer (OEM) and Huf. This document contains the most restrictive requirements that have to be fulfilled by the Huf https://www.iatfglobaloversight.org/oem-requirements/customer-specific-requirements/ The supplier is obliged to sign this document.

Note: Ford forms are preferred to use, but no mandatory.

## 2. Targets

Targets for suppliers (PPM, Logistic Performance, 8D evaluation) are set for all components (material groups) in the Huf Supplier Portal, available on www.huf-group.com website and update annually.

## 3. Definitions

Supplier: a Direct Supplier to Huf
Sub supplier: Means all the supply chain (suppliers and all sub suppliers).

## 4. Phased PPAP

PPAP Submission is required for, but not limited to:

- All new tooled parts
- Design change to an existing part
  - And “running changes” for vehicles in production
- Any change in supplier operating pattern
- Any change in the manufacturing process after PPAP approval
- Any additional or modified production tooling or equipment
- Revised Ford required capacity exceeding verified supplier capacity

PPAP according to the latest revision of AIAG Production Part Approval Process manual.

- Phase 0: 'Run-at-Rate'
  - To confirm that all production input requirements are available and understood and can support a limited production run. To provide an early indicator that the design of the process/tool/facility has the potential to produce at rate the required number of acceptable parts as determined by the pre-launch control plan.
- Phase 1: 'Quality Verification'

- Utilizes parts produced during Phase 0. To confirm all customer design record and specification requirements are properly understood by the supplier. To provide an early indicator that the design of the process/tool/facility has the potential to produce product consistently meeting these requirements during an actual production run at the quoted production rate by operating a minimum of one selected production stream.

- Phase 2: 'Production Verification'
  - To confirm all customer engineering design record and specification requirements are properly understood by the supplier, and that ALL production streams have the potential to produce product consistently meeting these requirements during an actual production run at the quoted production rate
- Phase 2: 'Capacity Verification'
  - Verify the supplier's production system can support customer declared DPV (Daily Planning Volume) while meeting Phase 2 requirements.

| PHASED PPAP | REQUIRED DOCUMENTATION | | | |
|---|---|---|---|---|
| | **PHASE 0** | **PHASE 1** | **PHASE 2** | **PHASE 3** |
| | **Run-at-Rate**<br>CAR - Capacity Analysis Report<br>1 - Design Records<br>2 - Engineering Change<br>3 - Customer Engineering Approval<br>4 - Design FMEA<br>5 - Process Flow Diagrams<br>6 - Process FMEA<br>7 - Control Plans<br>8 - MSA Studies<br>16 - Checking Aids<br>17 - Customer Specific Requirements | **Quality Verification**<br>9 - Dimensional measurements<br>10 - Records of Material / Performance Tests<br>11 - Initial Process Studies<br>12 - Quality Laboratory Documentation<br>13 - Appearance Approval Report<br>14 - Sample Production Parts<br>15 - Master Samples<br>18 - PSW (Phase 1) | **Production Verification**<br>Run-at-Rate for all production streams (element 1-8, 16, 17)<br>Quality Verification for all production streams (element 9 - 15)<br>18 - PSW (Phase 2) | **Capacity Verification**<br>CAR - Capacity Analysis Report<br>18 - PSW(Phase 3) |

### 4.1 Requalification / Resampling (Small PPAP)

Requalification of materials, components must be performed once per 12 months. Small PPAP acc. to Ford Motor Company requirement - shall include a PSW and valid material certification report(s) not older than 12 months, a full dimensional report (full layout inspection and functional testing acc. to the drawing) on at least 5 parts. Where tooling has multiple cavities, tools or centers, the organization conducts the annual layout on at least one part from each cavity, tool or center, with a minimum overall sample of 5 parts. Note: 5 parts are not required from each cavity; tool or center, only

a minimum of 1 part is required from each cavity, tool or center. and a capability study for all print designated special characteristics.

## 4.2 Reporting of Part Material Composition

Reporting, Identification and Marking of Materials
• Ford materials reporting requirement and compliance details are specified in Ford's Restricted Substance Materials Standard (RSMS) WSS-M99P9999-A1. The current Ford RSMS package is released each year in the "FAQ" section of IMDS, via: https://www.mdsystem.com/ “OEM Specific Info”.

## 4.3 Process Failure Mode and Effects Analysis (Process FMEA)

Organizations shall meet the requirements of the Ford FMEA handbook through the FMA Supplier Site when developing DFMEAs, and PFMEAs (available through Ford Supplier Portal Library Services). Where Organizations are utilizing the AIAG & VDA FMEA Handbook, Ford will accept the use of the format

In addition to the part FMEA, the supplier shall have foundation FMEA’s for the processes used to make the part.

### Documentation of Controls for Critical Characteristics

Both build-to-print and design responsible organizations identify in the APQP/PPAP Evidence Workbook the special controls which prevent shipment of any nonconformance to Ford specified Critical Characteristics, regardless of the location of the special controls in the supply chain (tier 1 through tier N). This also applies to Ford-directed sub-tier suppliers without a Multi-Party Agreement.

## 4.4 Control Plan

Organization shall develop Control Plans in accordance with the AIAG Control Plan Manual, latest edition.
Note: Organizations must meet the above requirement by December 31, 2024.

The Control Plan shall include provisions for on-going monitoring of process capability, stability and control; refer to Ford customer specifics for IATF.

For critical characteristics (safety and regulatory) at a sub-tier level, sub-tier and Tier 1 control plans must identify controls in place to prevent shipment of non-conforming product.

### Critical Characteristics and SCCAF

Where Critical Characteristics are identified in the Special Characteristics Communication and Approval form (SCCAF), the physical characteristics (e.g. dimensional or material) leading to the compliance of the Critical Characteristic are identified on the SCCAF with the control method, regardless of the point of manufacture of the Critical Characteristics in the supply chain (tier 1 through tier N). The SCCAF is available through https://web.qpr.ford.com/sta/Phased_PPAP.html in the SCCAF drop down.
This also applies to Ford-directed sub-tier suppliers without a Multi-Party Agreement.

## 5. Certificates of conformity

Supplier shall send the CoC (also named as CQC, CoA) for materials, components as a part of the PPAP submission and each time on demand of the Huf company.

## 6. Knowledge of basic AIAG manuals and CQI´s

The supplier confirms that he is familiar with the requirements of the following AIAG documents and meets these requirements.

- Advanced Product Quality Planning and Control Plan
- Measurement Systems Analysis
- Potential Failure Mode & Effects Analysis / AIAG & VDA FMEA Handbook
- Production Part Approval Process
- Statistical Process Control *
- CQI-09 - Heat Treat System Assessment *
- CQI-11 - Special Process: Plating System Assessment *
- CQI-12 - Coating System Assessment *
- CQI-15 - Welding System Assessment *
- CQI-17 - Special Process: Soldering System Assessment *
- CQI-23 - Molding System Assessment *
- CQI-27 Special Process: Casting System Assessment *
- CQI-30 Special Process: Rubber Processing System Assessment *
- CQI-35 Wiring Harness Quality Guidelines *
- Preliminary Manufacturing Risk Assessment

* If applicable for supplied parts

All suppliers are responsible to assess the applicable CQI´s and documented on annual basis via ASTRAS portal.

## 7. Documentation and archiving

All Quality Records related to Product Safety and Functional shall be retained by the supplier over the life of the product (including spare parts) + 15 years so that they are readily available at Huf request.

## 8. Self assessment

Supplier must perform a self-audit (process and product) and send the result to Huf at least once every 12 months in the form of a complete audit report. In case of special processes supplier shall carry out a self audit according to relevant CQI.

### Supplier Manufacturing Health Chart Requirements

On request by Huf, the organization shall assess compliance to Critical to Quality process requirements in accordance with APQP as specified in the Supplier Manufacturing Health Charts located at https://web.qpr.ford.com/sta/Supplier_Manufacturing_Health_Charts.html

## 9. Measurement System Analysis Studies MSA

The organization shall successfully complete measurement system analysis of all gages prior to initiating the process capability study.

The required method for calculating Gauge R&R is by using the Analysis of variance (ANOVA) method, since the ANOVA method allows identification of the operator to part interaction, whereas the Average and Range or Range methods do not. Refer to the AIAG published MSA manual, and the ANOVA method is available through commercial statistical software packages such as MiniTab.

The organization shall report gauge R&R as both a percent of study variation and a percent of tolerance +/- 2 Total Gauge R&R standard deviations.

### Guidance for acceptable Gauge R&R analysis

For additional guidance, see the Measurement Systems Analysis and Statistical Process Control manuals from AIAG:

a) On the range charts, all values should be within the control limits

b) Gauge R and Rs greater than 10% of tolerance variation may not be acceptable and risks are to be evaluated.
Gauge error of more than 30% of tolerance variation is unacceptable

Note:
Resolution: a general rule of thumb is the measuring instrument resolution ought to be at least one-tenth of the range to be measured. Guidance on resolution can be found in the AIAG MSA standard.

**Acceptability criteria for Gauge R&R**

To help assess the gauge, the organization shall report the value of +/- 2 Total Gauge R&R Standard Deviations to understand the 95% prediction interval (uncertainty) of any one measurement. This value can be used in conjunction with engineering judgment to help assess the distance between the edge(s) of the process distribution and the specification limit(s). The organization shall report gauge R&R as both a percent of study variation and a percent of tolerance.

Gauge R&R as a percent of tolerance < 10% is acceptable (the parts used for the Gauge R&R study must be representative of a production run with all known sources of variation).

If Gauge R&R as a percent of tolerance > 30%, it is unacceptable, and the organization shall implement a containment action and a corrective action plan to improve measurement capability until the Gauge R&R requirements are met.

Variable gauge studies should utilize, at a minimum 10 parts, 3 operators and 3 trials.
Attribute gauge studies should utilize, at a minimum, 50 parts, 3 operators, 3 trials.
For critical characteristics 6pack MSA is required.

In general, the gauge R&R should use the full range of part to part variation from the process – representing all expected sources of manufacturing variation, while providing enough resolution around the upper and lower specification limits.

**Parts for Attribute Gauge R&R Study**

- 25% of the parts should be near the lower specification limit (on both sides of the specification).
- 25% of the parts should be near the upper specification limit (on both sides of the specification).
- 30% of the parts should represent the expected process variation.
- 10% of the parts should be outside the upper gauge specification limit and beyond the 25% of the parts near the specification as described above.

• 10% of the parts should be outside the lower gauge specification limit and beyond the 25% of the parts near the specification as described above.

The modified control method shall include techniques to incorporate mistake proofing methods, or 100% product inspection integrated into the manufacturing process to prevent the shipment of non-compliant product to Huf facilities. Visual or statistical control methods are not permitted in this situation. Any Note: examples of mistake proofing methods include the modification of manufacturing processes to detect and prevent the errors which lead to non-conforming product (e.g., poka-yoke), or a gauge to ensure product compliance to specification where the process does not meet the capability requirements. This is not the addition of a temporary manual inspection process at the end of the line. Supplier shall continue to determine sources of variation, improve the process with permanent corrective actions, and improve the process to meet the capability requirements.

**100% Inspection required / selected**

Wherever a 100% inspection is used, the organization shall use the gauge error (independent of whether the Gauge R&R met the acceptance criteria) to identify modified product acceptance criteria (typically tighter tolerances and often vent the shipment of non-conforming product to Huf Company.
For Variable Gauges Two sided tolerances: Tolerances used for 100% inspection gauges can be reduced by the extent of the gauge R&R as a percent of tolerance of the gauge(s) being used in the 100% inspection methodology. The typical practice is to remove half the gauge R&R as a percent of tolerance from the upper specification limit and the other half from the lower specification limit. Example: A variable gauge is used to check a product characteristic of 600 microns +/- 40 microns (this equates to 80 microns specification tolerance spread). Additionally, this variable gauge has a gauge R&R as a percentage of tolerance of 20%. The upper limit compensated for gauge capability would be 632 microns (600+40- 80 x 0.2/2) (Upper Specification (Specification tolerance spread x (% tolerance Gauge R&R)/2)) and the lower limit compensated for gauge capability would be 568 microns (600-40 + 80 x 0.2/2) (Lower Specification + (Specification tolerance spread x (% tolerance Gauge R&R)/2)). This example assumes the gauge error is equally distributed. Continue process variation reduction efforts until a Ppk greater than 1.67 is achieved. One-sided tolerances: For a "less than" tolerance specification (e.g. length less than 20 mm) subtract three gauge R&R standard deviations from the tolerance specification. For a greater than tolerance specification (e.g. plating thickness greater than 10 microns) add three gauge R&R standard deviations to the tolerance specification. "Greater than" example: A variable gauge is used to check the length of a product characteristic. The product specification is greater than 150 microns. The gauge R&R standard deviation is 2 microns. The specification compensated for gauge error would be greater than 156 microns (150 + 3x2) (Specification + 3 x gauge R&R standard deviation). "Less than" example: A variable gauge is used to check the length of product characteristic.

The product specification is less than 150 microns. The gauge R&R standard deviation is 2 microns. The specification compensated for gauge error would be less than 144 microns (150 - 3x2). If business reasons exist to deviate from the recommendations listed above, contact SQE to obtain concurrence. Continue process variation reduction efforts until an acceptable process capability is achieved.

## 10. Dimensional Results

At least 5 parts are to be measured and individual results from all Ford specified dimensions are to be recorded. For production streams involving multiple cavities, tools etc., the supplier ensures parts are measured from every cavity, tool etc.
The Annual Dimensional Layout requirement (see IATF 16949 customer specifics) shall be included in the Control Plan.

## 11. SPC

Critical Characteristics require controls which prevent the shipment of non-conforming product, regardless of the location in the supply chain (tier 1 through tier N) of the manufacture of the physical characteristic(s) associated with the Critical Characteristic and are recorded in the APQP/PPAP Evidence Workbook.
Statistical process control on product characteristics without continuous manufacturing process controls is not appropriate or sufficient for Critical Characteristics.

The Ppk index of the initial process study must be calculated using a data set that is statistically stable, in control and normally distributed or of the expected distribution. Stability, control and normality are determined using a data set of at least 25 subgroups and a subgroup size of at least 5 for a minimum of 125 measurements using rational sampling methods (see the AIAG SPC manual). Subgroups are to contain measurements from consecutive parts evenly spaced throughout the population being evaluated (minimum 300 parts).
Acceptable levels: Ppk > 1.67

The initial process study data set of 25 subgroups is to be developed to include the full range of expected variation of the manufacturing process (e.g., the actual manufacturing environment, including all tools, all cavities, all streams, all shifts, expected operating patterns and variation in environmental conditions.)

**Acceptance Criteria for Initial Study**

**Acceptance Criteria for Heat Treated Components (applicable to all tier level suppliers):**

Case depth, longitudinal induction pattern, surface hardness, core hardness, microstructure and any other product characteristic indicated on the part drawing and any other product characteristic indicated in the applicable product standard shall be tested. All heat treat product testing shall be conducted after final part processing that may impact heat treat product conformance to the heat treat specification (e.g. Final grinding that removes outer surface hardened layers).

Samples shall be collected from the extreme locations as indicated below:

- Batch furnaces (including pushers): 8 corners and center of the load (minimum 9 samples per CQI-9 volumetric method for TUS)
- Continuous furnaces: across the belt at the beginning, middle and end of the production run (samples collected shall represent qualified work zone height)
- Induction: per spindle at set up and 3 consecutive parts from the start, middle and end of the 8 hours run (10 parts minimum)

At the minimum, hardness or required product characteristics (e.g. tensile, bend) shall be tested on 30 parts collected in total as indicated above. Sampling using multiple batch or lot is recommended but not required for PPAP validation.
Destructive testing involving extensive sample preparation (such as case depth, microstructure, longitudinal induction pattern, tensile strength…) shall be performed on a minimum 9 parts that best represent process extremes, as indicated above. The study will be judged acceptable if all individual readings fall within a safety band that is defined at 90% specified tolerance with no readings at specification limits allowed. Hardness readings may not be rounded to an integer to avoid inadequate measurement discrimination. Rockwell hardness values shall be reported to first decimal place. The study shall be judged acceptable if no readings are reported at the specification limits.

Acceptance Criteria for Heat Treat process validation and PPAP sign-off, requires the following:

1. Sample collection and compliance to product specification per requirements described above.
2. Initial and ongoing compliance to heat treat process requirements defined in latest revision of AIAG CQI-9, including pyrometry requirements such as SAT, TUS, Instrumentation and Thermocouple requirements as well as requirements of all applicable CQI-9 Process Tables.
3. Production Control Plan shall include all requirements specified above in items 1 and 2. Supplier shall ensure that the Production Control Plan for heat treat processes are in conformance to the applicable Process Table(s) in CQI-9. Control Plan shall be used to control ongoing heat treat process and product conformance to the specification.

## 12. Appearance Approval Report (AAR)

All parts/products having appearance criteria shall be reviewed and approved by Ford Design Quality and approval recorded on the Appearance Approval Report (AAR) as specified in the Global Decorative Component Approval Process (GDCAP). The completed Appearance Approval Report (form CFG-1002) shall accompany all PSW submissions.

## 13. Part Submission Warrant (PSW)

**Sub-tier Supplier Advanced Product Quality Planning** as defined in the latest release of the AIAG published Advanced Product Quality (APQP) manual. Effective December 31st, 2024, the use of the APQP Manual 4th Edition is required.
The organization shall include evidence of organization approval of sub-tier part approval submissions in the PPAP submission package to Ford. Ford reserves the right to review the detailed sub-tier supplier part approval submission data for the sub-tier supplier components included in the Ford specified end item. Where Critical Characteristic controls are implemented at the sub-tier supplier, the PPAP submission package must show evidence that the sub-tier Critical Characteristic controls are effective in preventing the shipment of non-conforming product.

- Tier 1 Suppliers to Ford must require their sub-tier suppliers to use Advanced Product Quality Planning (APQP) to plan for production part approval
- Tier 1 Suppliers to Ford must use a production part approval process for their sub-tier suppliers. The Tier 1 Suppliers shall include the approved sub-tier supplier part approval submissions with each phase of PSW submission to Ford.
- For each New Tooled End Item (NTEI), where sub-tier suppliers are used to support the manufacture of the NTEI,the organization shall:

    - Manage the sub-tier supplier readiness using the principles defined in the latest release of the AIAG published Advanced Product Quality Planning (APQP) manual
    - Track sub-tier supplier component readiness using APQP, in support of each applicable deliverable and expectation in Ford’s APQP/PPAP Readiness Assessment (Schedule A)
    - Report sub-tier supplier component readiness to Ford in support of each deliverable in Ford’s APQP/PPAP Readiness Assessment (Schedule A) throughout the Vehicle or Powertrain program o Include the final Schedule A with the PSW submission to Ford for each NTEI, including sub-tier supplier readiness, and retain in the PPAP record

These requirements also apply to Ford-directed sub-tier suppliers without a Multi-Party Agreement.

## 14. Part history

The supplier is obliged to inform Huf about any changes in the process chain (place of production, product change or supplier change) using Part History form.

## 15. CAR Capability Analysis Report (OEE)

Suppliers have to demonstrate the production capability by sending the latest version of fulfilled CAR document to Huf for verification.

## 16. Warranty Parts Review, Containments and Problem Solving

Upon receipt of a warranty claim, Suppliers shall respond within the specified limits, utilizing only the array of available responses as set forth below:

- Category 1: Responsibility of Supplier (Sample provided by Huf Supplier)
- Category 2: Trouble Not Found NTF (Sample provided by Huf Supplier)
- Category 3: Responsibility of Dealer and/or Customer

**Reporting Tool 8D and Required Response Time Frame**

- Supplier will undertake to receive and respond to an 8-D Problem Action report which is the official communication tool for reporting and resolving problems.
- The required Response time frame is as follows:
  - an initial response to a critical problem (essentially the containment action/8D report: Steps 1 to 3 3D) is required within 48 hours of receipt from Huf
  - a 5-Why analysis for ascertaining root causes and verification is required to be completed as part of the 8D process
  - 8D final response is required within 10 working days of receipt from Huf

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Supplier Quality Development

Supplier signature and date
Quality Manger

| CREATED | CHECKED | APPROVED |
|---|---|---|
| Erika de Lucas | Fernanda Martinez | Jörn Geisel |
| Erika de Lucas Digitally signed by Erika de Lucas Date: 2025.06.03 08:53:19 -06'00' | Fernanda Martinez Firmado digitalmente por Fernanda Martinez Fecha: 2025.06.03 09:23:08 -06'00' | 10008097, Jörn Geisel Digital unterschrieben von 10008097, Jörn Geisel Datum: 2025.06.04 10:28:11 +02'00' |
| Signature | Signature | Signature |

| HISTORY | | | |
|---|---|---|---|
| REVISION | REASON | BY | DATE |
| 01 | Release document | Dariusz Kowalski | 16.02.2021 |
| 02 | Add new Ford requirements – preliminary Manufacturing Risk Assessment | Michal Zyzak | 27.01.2022 |
| 03 | Add Requirements: Customer-Specific Requirements, For use with AIAG PPAP Fourth Edition Service PPAP First Edition Effective 30-September-2024 and IATF CSR 06-Feb-2025 | Erika de Lucas | 27.05.2025 |
| | | | |
| Document review once per 12 months or in case of any changes/updates in Customer Specific Requirements | | | |