

# 2200

## FORD SPECIFIC REQUIREMENTS

Revision A

August 14, 1998

Supersedes: N/A

Approval: Rob King, COO

Compliance: QS 9000, Section II

**This document defines policy related to Ford specific requirements.**

### 1.0 Policies

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When Ford becomes a customer, ICM will establish and maintain documented procedures for performing, verifying and reporting that meet specified requirements.

#### Control Item (∇) Parts

Control Item Parts are selected products identified by Ford Product Engineering on drawings and specifications with an inverted delta (∇) preceding the part and/or material number. Control Item products have Critical Characteristics (refer to Ford Glossary) that may affect safe vehicle operation and/or compliance with government regulations. Unique symbols identifying safety and regulatory characteristics on components designed by other companies (e.g. Mazda) are equivalent to the inverted delta (∇) symbol. Examples are the Mazda "A" and "AR" symbols which are to be treated as ∇. Special requirements for Control Item Parts are:

#### Control Plans and FMEAs

Signatory approval by the Ford design and quality engineers is obtained. The same approvals are obtained for revisions to these documents. When Imperial is responsible for the design (black/gray boxes, full service suppliers, integrators), the ICM will also prepare a design FMEA.

#### Shipping Container Label

The inverted delta symbol will precede the Ford part number in accordance with the Packaging Guidelines for Production Parts, Form 1750 (North America) or 1 750EU (Europe).

## **Annual Layout**

All product characteristics are measured at a minimum annually to demonstrate conformance to specified requirements. Characteristics which are enumerated on a Control Plan and are measured more frequently than once per year will not require annual layout.

## **Setup Verification**

Setup Verification is completed for all Critical and Significant Characteristics in applications where the setup of the process impacts process performance.

## **Control Item (∇) Fasteners**

The following controls are included in the Control Plan for fasteners that are Control Items:

### **Material Analysis - Heat-Treated Parts**

Prior to release of metal from an identified mill heat, a sample from at least one coil or bundle of wire, rod, strip, or sheet steel is analyzed and tested to determine its conformance to specifications for chemical composition and quenched hardness. A sample from each additional coil or bundle in the heat is tested for either chemical composition or quenched hardness. The results are documented and referenced to the steel supplier's mill heat number.

### **Material Analysis - Non Heat-Treated Parts**

The identification of each coil or bundle of wire, rod, strip, or sheet steel is visually checked to determine that the mill heat number agrees with the steel supplier's mill analysis document and applicable specifications. Each coil or bundle is tested for hardness and other applicable physical properties.

### **Lot Traceability**

Lot Traceability is maintained.

## **Heat Treating**

If ICM provides heat-treating services it demonstrates compliance to Ford Manufacturing Standard W-HTX. Heat treating processes are assessed against the Ford Heat Treat System Survey Guidelines.

To reduce the risk of embrittlement, heat-treated steel components conform to the requirements of Ford Engineering Material Specification WSS-M99A3-A.

## **Process Changes and Design Changes for Supplier-Responsible Designs**

For all Control Item (∇) parts and whenever a note appears on the design record, "No change without prior approval", the Imperial obtains Ford Product Engineering approval using Form 1638, Supplier Request for Engineering Approval. (The form is available from Purchasing and in the PPAP manual.)

## **Supplier Notification of Control Item (∇) Requirements**

When data from control charts and ES tests indicate a high degree of capability, Imperial may request a revision to the testing and inspection requirements for Control Item parts. Such revisions are effected by obtaining Ford Product Engineering and Quality approval of a revised Control Plan. Approval is obtained prior to implementing the change. The same approach is used to replace finished product inspection/testing with upstream controls.

## **Engineering Specification (ES) Test Performance Requirements**

The goal of ES testing is to confirm that the design intent has been met. ES test failure is cause for the supplier to stop production shipments immediately, pending analysis of the process and corrective action. Imperial immediately notifies the using Ford facility of test failure, suspension of shipments, and identification of any suspect lots shipped. After the root cause(s) of ES test failure are determined, corrected, and verified, the supplier may resume shipments. Suspect product is not shipped without sorting or reworking to eliminate the cause of failure.

When the root cause of test failure cannot be determined, the ICM will immediately notify Ford Product Engineering, the responsible customer quality activity, and the using Ford facility that the product has failed an ES test but meets all other requirements. Producers stop production pending further instructions.

## **Prototype Part Quality Initiatives**

When ICM is also sourced with the production of prototypes, effective use should be made of data from prototype fabrication to plan the production process. Specific requirements and supporting data, Percent Inspection points which Satisfy Tolerance (P1ST) and Percent Indices which are Process Capable (PIPC) may be required to support prototype vehicle evaluations.

## **QOS Assessment Guideline**

Imperial implements the Ford QOS methodology - a systematic, disciplined approach that uses standardized tools and practices to manage the business and achieve ever-increasing levels of customer satisfaction. See the Ford QOS Assessment Form (dated July 12, 1996).

## **Advanced Product Quality Planning Status Reporting Guidelines, Ford Automotive Operations**

Is used by all suppliers to Ford Motor Company. This guideline defines expectations, roles and responsibilities, and metrics for APQP elements. The Status Report facilitates communication

between suppliers and customers, particularly when information, direction or support is required. Copies of this document can be ordered from National Reproductions Corporation - 01-248-398-7900.

## Run at Rate

Is an integral part of the sample submission (PSW) for all suppliers to Ford and which provides the basis to extract capability data and inspection layout data. All production tooling is in place and running at full production feeds and speeds, utilizing all regular production direct and indirect personnel and support systems.

## Supplier Laboratory Requirements and Calibration Services

Supplier Laboratory Requirements (4.10.6) and Calibration Services (4.1 I.2.b.I) are not applicable to Ford Suppliers.

## Table A - Qualification of All Product Characteristics

Imperial selects the appropriate methods to control all dimensions and other characteristics of their products. For characteristics not controlled with SPC and not enumerated on a Control Plan, one or more of the following methods should be selected:

- Product Qualification for attributes characteristics using the tables below.
- Product audits performed on a regular basis.
- Periodic layout and laboratory tests

### SAMPLE SIZE RECOMMENDATIONS FOR PRODUCT QUALIFICATION

Condition	I	II
Minimum sample per lot*	200	50
Provision to switch to the other condition:	Allowed to switch to Condition II, if; within the previous 20 consecutive lots, no sample has any nonconforming units.	Required to switch to Condition I if any sample group has any nonconforming units.

\*Sample size will not change with lot size; if the lot size is equal to or smaller than the sample size, inspect 100%. A lot is not to exceed eight hours' or one day's production, whichever is smaller.

The initial application of product qualification is to use Condition I. When nonconforming units are found, the following actions are required:

## PRODUCT QUALIFICATION

SAMPLE RESULTS	ACTIONS ON PROCESS	ACTIONS ON LOT
No nonconforming units	Continue to operate	Accept
One or more nonconforming	Find root causes(s) and correct	Sort 100% since last OK lot

### Table B - Ongoing Process and Product Monitoring

The table below is used to make disposition on product produced by a process for which SPC is in use. After process stability has been demonstrated and capability has been calculated, the most recent point on the control chart and the historical process capability index (Cpk) is used to determine appropriate actions.

## ONGOING PROCESS AND PRODUCT MONITORING

### Control Chart Interpretation and Reaction

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The <u>MOST RECENT POINT</u>	ACTIONS ON THE PROCESS OUTPUT Based on the Historical Process Capability (Cpk)*		
indicates that the process:	Less than 1.33*	1.33 - 1.67	Greater than 1.67
Is in control	100% inspect	Accept product Continue to reduce product variation	
Has gone out of control in an		IDENTIFY AND CORRECT SPECIAL CAUSE	
adverse direction. All individuals in the sample are within specification.	100% inspect	Inspect 100% since the last in- control point	Accept product - Continue to reduce process variation
Has gone out of control and one or		IDENTIFY AND CORRECT SPECIAL CAUSE	
more individuals in the sample are outside specification	100% inspect	100% inspect product produced since the last in-control sample.	

\*For parts with tooling committed prior to January 1, 1990, these categories are: Cpk less than 1.0, Cpk 1.00- 1.33, and Cpk greater than 1.33.

\*\*Unless superseded by a Control Plan.

This table applies only when stability and capability have been demonstrated and special causes are rigorously identified and eliminated. Otherwise, ICM will implement 100% inspection. The table applies only to those product characteristics that are normally distributed.