



The Qualified Vehicle Modifier Program (QVM) Principals / Rating System

Coach-builders who build vehicles based on Ford cars help to contribute to Ford Motor Company's success, and Ford wants to contribute to the success of the coach-builders. The goals of the Qualified Vehicle Modifier (QVM) program are the production of higher quality vehicles and improved customer satisfaction. The program is open to the builders of limousines and professional cars, i.e.: hearse/6-door family car/24 hour cars or Excursions. This is a voluntary program open to any builder in these segments, and each builder will be rated on the same basis. The QVM program is intended to concentrate on the process of design, manufacturing and quality controls and is not intended to, nor will Ford, endorse any vehicle produced.

This brochure was developed to help coach-builders better understand the QVM program and rating system. The information provided is not meant to be complete, but is intended to provide an overview of the basic principles and guidelines of the program. Using the information contained in this brochure and in conjunction with the Limousine / Hearse or Excursion Builders Guide, builders may be able to conduct their own self evaluations and estimate their potential of becoming a part of the QVM program.

General Principals

The QVM rating system seeks to measure a coach-builder's ability to meet Ford guidelines and assesses a coach-builder's commitment to continuous improvement. If a builder has multiple facilities making products that are included in the QVM program, then all facilities must be inspected and acceptable before a builder can become qualified.

To support this program, a Limousine QVM Engineering Office has been established within Ford Motor Company. This office is responsible for administering the QVM program, coordinating resolution of engineering issues, and acting as the focal contact for engineering issues for the coach-builders.

Qualification for the QVM program is based on a review on a regular basis of approximately once/year. The main emphasis of the QVM program is the evaluation of process and build controls and includes reviews of the following:

- FMVSS/CMVSS
- Quality control
- Manufacturing process and controls
- Philosophy on quality and continuous improvement commitment
- Adherence to Ford guidelines
- Representative vehicles in process
- Customer support system(s)

The QVM program does **not** include:

- Analysis of each vehicles engineering, build or quality control specifications, process, and/or parts
- FMVSS or emissions testing or analysis of a builder's FMVSS or emissions testing
- Evaluation of add-on equipment
- Finished vehicle testing
- Inspection of every vehicle produced
- Inspection of vehicles not specified in the program
- Inspection of service records, unique facilities, etc.

The QVM Rating System

Background

The QVM rating system seeks to measure a builder's ability to meet Ford guidelines and assesses a builder's commitment to continuous improvement.

The QVM rating system is not designed to compare one coach-builder to another, but is used to analyze the full potential of each individual builder. The QVM Engineering Office concentrates on the improvement of the manufacturing process and controls of building a limousine vehicle, and intends to facilitate each coach-builder in maximizing their absolute highest potential.

In order to have a quantitative analysis toward the inspection process of each coach-builder, a simple rating system was designed that is based upon a 3 point maximum.

- 3 points** = Item has been demonstrated, is in place, or has been completed by the coach-builder
- 2 points** = Coach-builder has attempted to complete, or is in the process of completing the item, OR, item needs some revision after first attempt.
- 1 point** = Coach-builder has made little effort at completing an item, OR, is in the beginning stages of completing an item.
- 0 points** = Coach-builder has made no effort at completing an item.

QVM Rating System Criteria

The criteria for the QVM rating system is sorted in the following manner:

Mandatory - A Coach-builder must have in place, or can document that the item is in the process of being put in place to obtain QVM status. The mandatory categories determine whether a coach-builder is eligible to become a QVM. QVM status will be withheld until the item can be shown to the QVM Engineering Office as being implemented. (Please see page (3 & 4) for Mandatory criteria).

Recommended - These criteria are recommended by the QVM Engineering Office, but are not mandatory for initial QVM certification, however, these items *are covered extensively* during the facility inspection. If a coach-builder does not have in place, they must develop a plan to satisfy the item and submit to the QVM Engineering Office for review within 30-60 days. Recommended criteria suggested by the QVM Engineering Office must be in place by the next annual audit. (Please see page (5) for Recommended criteria)

Continuous Improvement - This subject is important to help improve the coach-builders overall process. The coach-builder should attempt continuous improvement items each model year. The QVM Program emphasizes continuous improvement, and items may be suggested by the QVM Engineering Office as a continuous improvement item from observations made during a facility visit / audit. These continuous improvement item suggestions from the QVM Engineering Office may not necessarily appear on the continuous improvement criteria list. (Please see page (6) for Continuous Improvement criteria)

Mandatory Rating Criteria

Process Controls

Each check is worth 3 points

- √ **FMVSS understanding and conformity**
 - Ability to demonstrate compliance and understanding of all applicable standards, especially standards directly affected by the limousine manufacturing process
- √ **Engineering Drawings / Critical Process Sketches**
 - Demonstrate parts and critical process drawings and concepts. Are these drawings easily accessible to anyone who may need them?
 - Are they updated on a regular basis in the process books ?
 - Who is responsible for updating these items ?
- √ **Weight and Electrical Load Analysis**
 - Identify an analysis for the weight of production vehicles, and their electrical load to ensure production is within GVWR and the electrical load capacity of the vehicle is not exceeded.
 - Demonstrate the purchase of private scales in order to measure vehicles with four corner weights.

Quality Controls

- √ **Written direction used in all stages of the manufacturing**
 - Demonstrate written direction process for quality and repeatability
 - Written direction supported by visual aids in critical areas ?
- √ **Engineering change control**
 - Demonstrate the use of change control. Can documentation be provided to show the process of an engineering change? Check/sign off for all pertinent areas including FMVSS affected changes?
- √ **Operator/Foreman knowledge of FMVSS & QVM requirements**
 - Sign-Off / Check sheet available?
 - Appointed FMVSS & QVM guideline inspector / specialist ?
 - How is this person trained ?
- √ **Road test performed and set road test route and procedure in place**
 - Demonstrate / show the document that reviews the route
 - Is the route formalized ?
 - Sign-Off / Check sheet available ?
- √ **Critical control items identified**
 - Weld integrity and critical torque monitored on a regular basis**
 - Weld integrity / critical torque check sheet / Sign-Off?
 - Crucial chassis modification inspections**
 - Sign-Off / Check sheets available?
 - In-process quality control checks of critical structural items**
 - Demonstrate the process. Check sheet available / Sign-Off?
 - Critical parts identified and tracked**
 - How are critical parts tracked from purchasing through production ?
 - How are wrong parts prevented from being used in production ?

Mandatory Rating Criteria - Con't

- √ **In-process testing performed for quality control**
 - ⇒ **Electrical**
 - Demonstrate the understanding of the aftermarket electrical system installation and OEM compatibility (fuses, gauges)
 - ⇒ **Water, air, fluid**
 - Demonstrate the test or area in which each is tested
- √ **Labeling**
 - Inspection area? Sample labels and sign-off sheet available?

Customer Support

- √ **Owners manual provided, including electrical, supplier, and Ford vehicle information**
 - Does the customer understand the information, or are they provided a contact within the organization to resolve issues regarding written material?

Vehicle Build / Modification (See Limousine/Hearse/Excursion Builders Guide for details)

Here, each heading is worth 3 points

Chassis:

- √ **Cutting fixture as described by QVM Program Guidelines**
 - Demonstrate the operation of the cutting fixture, including proper measurement documentation for each vehicle
- √ Fuel System - OEM extensions and fittings
- √ Exhaust / heat shields used where needed
- √ Frame extension - QVM approved technique
- √ Weld techniques at critical areas approved
- √ Air condition / heating - Tubing - Return air system
- √ Suspension / front springs used on vehicles where needed for weight
- √ Tires / wheels - OEM / GVW compliance
- √ Brakes-OEM lines and fittings
- √ Engine / Transmission / Driveline-Extension approved
- √ GVWR Compliance - Provide certified weight tickets on highest content vehicles

Body / Electrical:

- √ Floor / rocker / mounting
- √ Roof rails / bows - location
- √ Seating / restraint systems - seat belts
- √ Electrical management system - Are tapping locations approved and recommended by either Ford or the aftermarket supplier?

Seating / Seating Restrictions:

- √ Does seating coincide with QVM size guidelines ?
- √ Does seating coincide with GVW capacity ?
- √ Are restrictions robust / tamper proof per QVM recommendation ?

This section is worth a total of 42 points

Recommended Rating Criteria

Process Controls

Each check is worth 3 points

- √ **Problem anticipation / prevention**
 - Demonstrate how problems are anticipated and / or prevented

Quality Controls

- √ **Inspection / rejection procedures and control items identified**
 - When an operator recognizes a potential issue, are controls in place to follow a procedure to reject a vehicle in advancing in the manufacturing process?

Customer Support

- √ **Parts and service network and training**
 - How can customers / dealers / service centers obtain parts and service, and do they know where to go for information on these subjects?
- √ **Warranty analysis , customer follow-up , and extensive customer satisfaction plan**
 - Demonstrate a plan that identifies warranty issues, and tracks customer satisfaction, and how warranty issues are corrected.

Quality Planning / Training / Management Control

This heading is worth 3 points

- √ Does the company have a quality plan that identifies key goals ?
- √ Training program for operators and foreman with regard to quality , FMVSS and Ford requirements
- √ How does management respond to quality concerns? Customer complaints? Warranty? Resolution?
- √ Management's commitment to continuous improvement -examples
- √ Does management emphasize process controls? . Effective communication, employee involvement ?
- √ Does management monitor quality in manufacturing and regarding FMVSS compliance?
- √ Is there a chain of command in place for issuing concerns of non-compliance in either FMVSS or QVM standards?

This section is worth a total of 15 points

Continuous Improvement Rating Criteria

Process Controls

Each check is worth 3 points

- √ **Engineering innovative / progressive**
 - Are engineering ideas shared with all employees / encouraged ?
 - Is there a continuous effort to attempt to improve the engineering of the vehicle, and can these efforts be demonstrated?
- √ **Engineering specifications used to purchase parts consistent with Ford specifications**
 - Can parts be analyzed to determine their compatibility to Ford specs.

Quality Planning / Training / Management Control

- √ **Are there training methods for problem anticipation and resolution?**
 - Does management train or have training for employees on problem anticipation and resolution ?
- √ **Training plans - Networks**
 - Is there training available for dealers, distributors, and service networks with affiliated manufacturers on company direction and overall quality plans?

This section is worth a total of 12 points

Written Continuous Improvement Rating Criteria

During a facility visit, the QVM Engineering Office will make continuous improvement recommendations that may not be listed on the QVM Rating Sheet. These items will be clearly explained and pointed out to the coach-builder during the review of the audit.

If there are any questions, please contact the QVM Engineering Office: 313 / 322 – 7926