Corporate Average Fuel Economy (CAFE)

Enforcement Programs for Footprint Calculations and Credit Tracking and Allocation

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Office Of Vehicle Safety Compliance (OVSC)

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Presentation Overview

- CAFE Enforcement Programs
  - Footprint Calculation and Verification
  - Credit Tracking and Allocation
  - Penalty Assessment
  - CAFE Reporting
- NHTSA Points-of-Contact
- Questions
# OVSC CAFE PROGRAMS

<table>
<thead>
<tr>
<th>Program</th>
<th>Purpose</th>
<th>Applies to</th>
<th>Initiated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Footprint Calculation and Verification</td>
<td>Verifies manufacturer’s reported vehicle attribute information track width and wheelbase per 49 CFR 523, 531, 533 and 537 used to calculate new target fleet fuel economy standards</td>
<td>At mfr’s optional for MY 2008 to 2010 Light trucks (LTs)</td>
<td>April 6, 2006 (71FR17566)</td>
</tr>
<tr>
<td>Penalty Assessment</td>
<td>How manufacturers resolve or pay for CAFE credit shortfalls</td>
<td>All LTs and PCs</td>
<td>See above</td>
</tr>
</tbody>
</table>
| CAFE Reporting                               | - Summary of Fuel Economy Performance Report  
- Fines Collected Status Table  
- Flex Fuel Table  
- Credit Status Table (Future) | All LTs and PCs                                 | Various                                        |

**Penalty Assessment:** How manufacturers resolve or pay for CAFE credit shortfalls. For MY 2008 to 2010 Light trucks (LTs), see 49 CFR 536. For MY 2011 and beyond (new provisions), see 49 U.S.C. § 32902 (b)(3).
Footprint Calculation and Verification Program

- Measures production wheelbases and track widths to calculate footprint and verify reported values used to calculate new CAFE fleet target fuel economy standards
- OVSC test procedure issued March 30, 2009
  - Uses precise attribute measurement methodology
  - Measures the variation between measured and reported attribute values
  - Addresses how significant discrepancies will be resolved with manufacturers

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Footprint

*Defined at 49 CFR § 523.2 and in NHTSA’s test procedure*

**Track width** (in) = Lateral distance between the centerlines of the base tires at ground, including the camber angle (rounded to nearest 1/10 in.)

**Wheelbase** (in) = Longitudinal distance between front and rear wheel centerlines (rounded to nearest 1/10 in.)

**Footprint** (ft²) = [track width (in) * wheelbase (in)]/144 (in²/ft²) (rounded to nearest 1/10 ft²)

**Base Tire** = Tire specified as standard equipment by a manufacturer on each vehicle configuration of a model type.
**Geometric Overview of The Track Width Measurement Procedure**

**ORTHOGRAPHIC VIEW**

Rearward most plane passing through the rear of the tires

Centers at the rear of the tires \( Y = \frac{(X_2 + X_4)}{2} \)

**CENTER OF CONTACT PATCH**

Forward most plane passing through the fronts of the tires

Centers at the front of the tires \( X = \frac{(X_1 + X_3)}{2} \)

**VEHICLE TRACK WIDTH (Z)**

\[ Z = \frac{(Z_1 + Z_2)}{2} \]

Where:

The average of the lateral distances from the centers at the front \( X \) and the rear \( Y \) of the tires is equal to the lateral distance between the centers of the tire-to-ground contact patches at the front and rear of the tires

(1) Assumes the centers of the contact patches are in-line with the longitudinal centerlines of the tire and equidistant from the forward and rearward most planes of the tires

(2) Accounts for differences in toe and camber angles

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Geometric Overview of the Wheelbase Measurement Procedure

Horizontal distance, parallel to the ground, from the forward most location of the front wheel rim to the rearward most location of the rear wheel rim

Y1

Horizontal distance, parallel to the ground, from the rearward most location of the front wheel rim to the forward most location of the rear wheel rim

Y2

LEFT WHEELBASE (LW) = (Y1+Y2)/2
RIGHT WHEELBASE (RW) = (Y3+Y4)/2

VEHICLE WHEELBASE (W)
W = (LW+RW)/2

Where:
The average of the longitudinal distances from the rim edges from outermost and innermost edges is equal to the average of the longitudinal distances between the centers of the rims on both sides of the vehicle

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OVSC CAFE FOOTPRINT ACTIVITIES

MY 2009 OVSC Accomplishments

- New test procedure issued March 30, 2009
- 16 LT indicant tests conducted March-June 2009
- NHTSA held CAFE public meeting and demonstration June 24, 2009

MY 2010 Goals

- 30 LT compliance tests
- 5 PC indicant tests
- Conduct additional research on variation and testing methodologies
- Develop guidance on how to resolve differences between design and measured values
# 2009 Indicant Test Results

<table>
<thead>
<tr>
<th>VEHICLE NUMBER</th>
<th>MODEL YEAR</th>
<th>VEHICLE TYPE</th>
<th>VARIATION (DESIGN MINUS MEASURED DIMENSIONS)</th>
<th>VARIATION IN CALCULATED VALUES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>VEHICLE WHEELBASE (IN)</td>
<td>FRONT TRACK (IN)</td>
</tr>
<tr>
<td>1</td>
<td>2009</td>
<td>MPV</td>
<td>-0.06</td>
<td>-0.14</td>
</tr>
<tr>
<td>2</td>
<td>2009</td>
<td>MPV</td>
<td>0.07</td>
<td>0.01</td>
</tr>
<tr>
<td>3</td>
<td>2009</td>
<td>MPV</td>
<td>-0.04</td>
<td>-0.02</td>
</tr>
<tr>
<td>4</td>
<td>2009</td>
<td>MPV</td>
<td>0.03</td>
<td>-0.02</td>
</tr>
<tr>
<td>5</td>
<td>2009</td>
<td>MPV</td>
<td>-0.08</td>
<td>-0.13</td>
</tr>
<tr>
<td>6</td>
<td>2009</td>
<td>MPV</td>
<td>-0.15</td>
<td>-0.15</td>
</tr>
<tr>
<td>7</td>
<td>2009</td>
<td>MPV</td>
<td>0.24</td>
<td>Single Track Width Value</td>
</tr>
<tr>
<td>8</td>
<td>2009</td>
<td>MPV</td>
<td>0.30</td>
<td>0.33</td>
</tr>
<tr>
<td>9</td>
<td>2009</td>
<td>MPV</td>
<td>0.12</td>
<td>0.04</td>
</tr>
<tr>
<td>10</td>
<td>2009</td>
<td>MPV</td>
<td>0.08</td>
<td>-0.02</td>
</tr>
<tr>
<td>11</td>
<td>2009</td>
<td>MPV</td>
<td>0.27</td>
<td>Single Track Width Value</td>
</tr>
<tr>
<td>12</td>
<td>2009</td>
<td>PASS CAR</td>
<td>-0.24</td>
<td>-0.08</td>
</tr>
<tr>
<td>13</td>
<td>2009</td>
<td>TRUCK</td>
<td>-0.18</td>
<td>-0.07</td>
</tr>
<tr>
<td>14</td>
<td>2009</td>
<td>TRUCK</td>
<td>0.05</td>
<td>-0.19</td>
</tr>
<tr>
<td>15</td>
<td>2009</td>
<td>TRUCK</td>
<td>0.14</td>
<td>-0.08</td>
</tr>
<tr>
<td>16</td>
<td>2009</td>
<td>MPV</td>
<td>0.20</td>
<td>NA</td>
</tr>
</tbody>
</table>

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IMPORTANCE OF MEASUREMENT VARIATIONS

Worst Case Scenario

- Assume smaller footprints if wheelbase and track widths are both less than design dimensions
- Also, assume a manufacturer’s actual EPA tested FE = 23.1 mpg for total fleet population = 9,500 vehicles
- The effect of variations for all models and all dimensions by -0.25 and -0.50 inches are as follows:

<table>
<thead>
<tr>
<th>Potential Shortfalls</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FE (mpg)</td>
</tr>
<tr>
<td>Target</td>
<td>23.1</td>
</tr>
<tr>
<td>Target FE -.25</td>
<td>23.2</td>
</tr>
<tr>
<td>Target FE -.50</td>
<td>23.3</td>
</tr>
</tbody>
</table>

The current penalty for failing to meet CAFE standards is $5.50 per tenth of a mile per gallon under the target value times the total volume of vehicles in the manufacturer’s fleet for a given model year.
# Credit Allocation Program

## Pre-MY 2011 vs. MY 2011 and beyond

<table>
<thead>
<tr>
<th>Credit Allocation Program</th>
<th>Applies to</th>
<th>Credits</th>
<th>Credit Carry Forward</th>
<th>Credit Carry Backward</th>
<th>Trade **</th>
<th>Transfer ***</th>
<th>Penalties (credit short fall)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-MY 2011</td>
<td>MY 1978 to 2010 PC and LTs*</td>
<td>Each 1/10 mpg above or below STD x number of vehicles</td>
<td>MY 1978 to MY2007 +3 MYs (Positive credits within same category)</td>
<td>-3 MYs (Positive credits within same category)</td>
<td>No</td>
<td>No</td>
<td>If sufficient credit are not available to offset shortfalls mfg is liable for civil penalty $5.50 each negative credit</td>
</tr>
<tr>
<td>MY 2011 and beyond</td>
<td>MY 2011+ PC and LTs</td>
<td>Credits earned MY 2011+ (Between different credit holders within same compliance category)</td>
<td>Credits earned MY 2011+ (Across compliance categories held by same manufacturer)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* LTs have option of old or new in MY 2008-2010

** A trade occurs when NHTSA receives instructions from a credit holder to place credits held by that credit holder into the account of another credit holder

*** A transfer occurs when NHTSA receives instructions from a credit holder to move credits from one of its compliance categories to another of its (or another manufacturers) compliance categories
New Process for Resolving CAFE Non-Compliance

- EPA measures fuel economy, calculates average fuel economy, and reports measurements and calculations to NHTSA
- Credits calculated
- Manufacturer notified when standard not met
- Manufacturer must confirm shortfall
- Manufacturers must submit plan to resolve shortfall with earned, transferred and/or traded credits
- Plan must be approved by NHTSA
- Otherwise, manufacturers must pay civil penalty
Additional Steps in CAFE Compliance

- NHTSA must be notified of any corporate relationship changes
- Periodically NHTSA will:
  - Send credit status letters to each credit holder
  - Publish credit holders names and holdings

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Limitations on Use of Credits

- Minimum standard for domestic PC compliance category (49 U.S.C. § 32902 (b)(4))
- Domestic PC minimum standard cannot be met with traded and transferred credits
- Traded and transferred credits must be adjusted (49 CFR Part 536)
- Credit transfer limitations (49 U.S.C. § 32903 (g)(3))
  - MY 2011 - 2013, 1.0 mpg; MY 2014 - 2017, 1.5 mpg; MY 2018 and there after, 2.0 mpg
- Maximum increase limited from dual fueled automobiles (49 U.S.C. § 32906(a))
  - Phased out over time from 1.2 mpg through MY 2014 to 0.0 mpg after MY 2019
### Example of Credit Allocation Process

**Option 1**
- Carry forward +3570471 credits
- From previous MYs in same compliance category

**Option 2**
- Carry backwards +3570471 credits
- From subsequent MYs in same compliance category

**Option 3**
- MY 2011+
- Transfer +3570471 credits
- Across compliance categories held by same manufacturer

**Option 4**
- MY 2011+
- Trade +3570471 credits
- Between different credit holders within same compliance category

<table>
<thead>
<tr>
<th>Model Year</th>
<th>Actual CAFE (mpg)</th>
<th>CAFE Standard (mpg)</th>
<th>Production Volume</th>
<th>MY Credit Balance Excess or (Shortfall)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>32.2</td>
<td>32.5</td>
<td>1190157</td>
<td>-3570471</td>
</tr>
</tbody>
</table>

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CAFE Reporting

- Summary of Fuel Economy Performance Report
- Fines Collected Status Table
- Flexible Fuel Table
- Credit holders credit status table (available in near future)
- [http://www.nhtsa.gov/portal/fueleconomy.jsp](http://www.nhtsa.gov/portal/fueleconomy.jsp)
NHTSA OVSC Points of Contact

- Credit Allocation Program - Mr. John Finneran, (202)366-0645
- Footprint Testing - Mr. Maurice Hicks, (202)366-1708
- CAFE Reporting – Mr. Terry Anderson, (202)366-6030
Any Questions?