



Ms. Lisa Jackson, Administrator  
Environmental Protection Agency  
1200 Pennsylvania Ave., N.W.  
Washington, D.C. 20460

July 20, 2009

**Comments on Notice of Clean Air Act Waiver Petition to Increase the Allowable Ethanol Content of Gasoline to 15 Percent, 74 FR 18228, April 21, 2009, Docket No. EPA-HQ-OAR-2009-0211**

Dear Administrator Jackson:

Public Citizen and the Center for Auto Safety respectfully submit these comments in response to the petition filed by Growth Energy to raise the allowable ethanol content in gasoline to 15 percent. We urge that the Environmental Protection Agency (EPA) deny Growth Energy's petition. There are several concerns that have not been addressed in this petition and can not be resolved without further research.

- There has not been enough research to support the claim that legacy fleets will be undamaged by the increase in allowable ethanol content from 10 to 15 percent.
- Many manufacturers specifically state in the owner's manual that their vehicles are only warranted to run on blends of ethanol up to 10 percent, potentially leaving consumers with costly repairs not covered under their warranty agreements.
- The environmental benefits of ethanol are questionable, and EPA itself has not resolved its assessment of what those benefits are.
- Increasing the ethanol content of gasoline will have impacts on air quality and smog-forming emissions that have not been systematically analyzed for public health consequences.

EPA must consider this petition not in the limited context of allowing ethanol content of gasoline to increase from 10 to 15 percent, but in the broader context of whether such an expansion serves the environmental and energy independence goals of the United States, without harming public health and welfare.

**I. E15 Is Not Substantially Similar to E10 for the Purposes of the Clean Air Act.**

The Clean Air Act section 211(f)(4) requires that EPA issue a waiver before any fuel is introduced into commerce that is not "substantially similar" to pre-existing fuels. EPA must produce a finding that:

the application has established that such a fuel or fuel additive or a specified concentration thereof, and the emissions products of such fuel or fuel additive of a specified concentration thereof, will not cause or contribute to the failure of any emission control device or system (over the useful life of the motor vehicle, motor vehicle engine, nonroad engine or nonroad vehicle in which such device or system is used) to achieve compliance by the vehicle or engine with the emission standards.

EPA explains its notice for this petition that it has “required that applicants provide vehicle/engine testing for tailpipe emissions, evaporative emissions, materials compatibility, and drivability.”<sup>1</sup> The Growth Energy petition has not provided compelling vehicle and engine testing to suggest that these factors are substantially similar for vehicles running on E15 as compared with vehicle running on E10. The studies that have been completed suggest that there are substantial differences between E10 and E15 in terms of criteria pollutant emissions, evaporative emissions and drivability. There has also been evidence that in vehicles that cannot correct for enrichment that the catalyst temperatures are higher, which can degrade catalyst efficiency and lead to early catalyst failure.

Moreover, EPA has defined “substantially similar” such that it would preclude E15 due to its oxygen content of over 5 percent as follows:

Definition - Substantially Similar.

EPA will treat a fuel or fuel additive for general use in light-duty vehicles manufactured after model year 1974 as substantially similar to any fuel or fuel additive utilized in the certification of any model year 1975, or subsequent model year vehicle or engine, under section 206 of the Act, i.e., “substantially similar”, if the following criteria are met.

\* \* \*

(2) The fuel must contain no more than 2.0 percent oxygen by weight, except fuels containing aliphatic ethers and/or alcohols (excluding methanol) must contain no more than 2.7 percent oxygen by weight.<sup>2</sup>

## **II. The Claim that Legacy Fleets Will Not Be Damaged by E15 Cannot Be Substantiated.**

Growth Energy’s petition claims that studies it cites “compel the conclusion that the effect of E15 is no different than, and possibly superior to, the effect of the E10 blend we have used for over 30 years, and that vehicle engines are fully capable of meeting all requirements using E15 fuel.”<sup>3</sup> However, the studies that it cites do not conclusively support the claim that E15 is “no different than” E10, and do not support the claim that E15 is “possibly superior to” E10. With respect to operability and drivability concerns in legacy fleets, Growth Energy cites two relevant studies: the Department of Energy’s 2008 study *Effects of Intermediate Ethanol Blends on Legacy Vehicles and Small Non-Road Engines*, and Rochester Institute of Technology’s 2008 *Report to the U.S. Senate on E20 Ethanol Research*. Neither of these studies looked a large enough sample of vehicles to draw conclusions about the broad spectrum of

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<sup>1</sup> 74 Fed. Reg. 25014. (May 26, 2009).

<sup>2</sup> 56 Fed. Reg. 5352 (Feb. 11, 1991).

<sup>3</sup> Petition of Growth Energy, EPA Docket No. EPA-HQ-OAR-2009-0211-1, (Mar 6, 2009) at 7.

vehicles that comprise the legacy fleet – a point that the DOE study makes explicit: “the U.S. legacy fleet is too diverse to predict E15/E20 impacts from the limited available data.”<sup>4</sup>

One of the conditions for allowing E15 to enter the fuel stream is to show that there is no significant degradation of “drivability,” which roughly describes some characteristics of proper operation of the vehicle, including hot operation, cold start, enrichment, onboard diagnostics and materials compatibility. Growth Energy’s petition cites the Minnesota Department of Agriculture study, *Demonstration and Driveability Project to Determine the Feasibility of Using E20 as a Motor Fuel*. The study was conducted in part by the Renewable Fuels Association, and concludes that based on a study of 40 matched pairs of vehicles, “no significant differences between paired E0 and E20 vehicles were observed in driveability, reliability, or fuel economy.” However, the study notes that: “The lay driver response rate for completing the log sheets was disappointing throughout the thirteen-month vehicle driveability study, averaging 30 – 40%,” which undermines the quality of the data for typical drivers.

A 2002 study conducted by the National Renewable Energy Laboratory discusses the drivability concerns related to intermediate ethanol blends in more detail than the Minnesota Department of Agriculture study. The study discusses hot operation concerns including a risk of vapor lock, and water phase separation.<sup>5</sup> Vapor lock is an interruption in fuel delivery to the engine that results from vaporization of fuel while it is still in the line. Intermediate ethanol blends have a higher Reid Vapor Pressure (RVP) than E10 and E0, and therefore vaporize at a lower temperature. Studies have identified that RVP ceases to increase with increased ethanol content, and that the RVP returns to that of gasoline alone at ethanol concentrations of 25 percent.<sup>6</sup> However, the increase in RVP experienced in intermediate ethanol blends such as E15 also results in increased evaporative emissions, which are related to ground-level ozone.<sup>7</sup>

The 2002 NREL study explains that there are three types of fuel control technologies of varying complexity, and the model years that these technologies were added. The two groups relevant to this discussion are advanced closed-loop, three-way catalysts without adaptive learning algorithms and three-way catalysts with adaptive learning. These groups of technologies affect vehicles going back to 1986; however, this is relevant when considering the potential impacts to legacy fleets.<sup>8</sup> Oak Ridge National Laboratory estimates that 50 percent of vehicles that were sold 15 years ago are still on the road, which means that there is a significant population of vehicles on the road from before 1996, which the switch was made to fuel control technologies that include adaptive learning.<sup>9</sup>

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<sup>4</sup> Oak Ridge National Laboratory, *Technical Issues Associated with the Use of Intermediate Ethanol Blends (>E10) in the U.S. Legacy Fleet: Assessment of Prior Studies*. ORNL/TM-2007/37 (2007).

<sup>5</sup> National Renewable Energy Laboratory, *Issues Associated with the Use of Higher Ethanol Blends (E17-E24)*, (2002) at 17-18.

<sup>6</sup> Guerrieri, D.A., Caffrey, P. J., & Rao, V. *Investigation into the Vehicle Exhaust Emissions of High Percentage Ethanol Blends*. SAE Technical Paper Series, # 950777 (1995).

<sup>7</sup> See Coordinating Research Council, *Fuel Permeation from Automotive Systems: E0, E6, E10, E20 and E85* (2006). The study finds statistically significant increases in permeation, which is related to evaporative emissions along with leaks and fuel tank venting.

<sup>8</sup> National Renewable Energy Laboratory, *Issues Associated with the Use of Higher Ethanol Blends (E17-E24)*, (2002) at 4.

<sup>9</sup> See Oak Ridge National Laboratory, *Transportation Energy Data Book: Edition 20*, ORNL-6959 (2000).

Adaptive learning is important for adjusting the fuel-air mix to account for the oxygen content of a fuel. Fuel control systems that cannot adjust automatically to a change in the oxygen content will instead operate consistent with how the control system has been tuned. Since E10 has been in the fuel stream for more than 30 years, it is safe to assume that manufacturers tune fuel control systems to operate acceptably on E10, but such an assumption cannot be made for E15. The existing studies have not satisfactorily answered the question about what the potential drivability concerns are for vehicles that do not have adaptive learning equipped fuel control systems. Furthermore, existing studies raise the concern that increased ethanol blends may result in enleanment, or delivery of a fuel-air mix that does not contain enough fuel, resulting in decreased efficiency of emissions control systems and increased NO<sub>x</sub> emissions.<sup>10</sup>

Another element of drivability analysis is materials compatibility, which describes whether there are changes or damage to materials that come into contact with the fuel. The Growth Energy petition states that there are no materials compatibility issues associated with intermediate blends; however, an analysis by the Australian government conducted in 2004 exposes a number of materials compatibility issues associated with E20.<sup>11</sup>

The DOE study found that 7 out of 16 vehicles tested (43%), including two 2007 model-year vehicles, ran significantly leaner in wide-open throttle operation as ethanol content in the fuel increased.<sup>12</sup> Vehicles that ran leaner as compared with the E0 baseline also experienced higher catalyst temperatures, over 20°C higher for E15. These higher temperatures due to ethanol blends would lead to accelerated long-term catalyst degradation, potentially resulting in higher emissions of toxic air pollutants and the need for expensive, unplanned replacements. Such repairs may fall outside of the original manufacturer's warranty and subsequently shorten the useful life of a vehicle.

There are no data on the rate of catalyst degradation yet, and therefore quantitative estimates of the scope of this problem cannot be made. However, based on the DOE findings, it is possible that a significant number of vehicles on the road may fail to maintain stable exhaust and catalyst temperatures when operated on fuels with higher ethanol content, which may lead to catalyst burnout. Such a problem would imply a significant materials compatibility problem, as well as have negative air quality risks.<sup>13</sup>

A 2007 DOE/ORNL review of existing research on intermediate ethanol blends notes that EPA had previously denied multiple waiver requests to increase the oxygenate content of fuels. Five such cases are cited in the study from 1980 to 1987 on multiple grounds, including

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<sup>10</sup> National Renewable Energy Laboratory, *Issues Associated with the Use of Higher Ethanol Blends (E17-E24)*, (2002) at 7.

<sup>11</sup> Environment Australia. *Market Barriers to the Uptake of Biofuels Study: A Testing Based Assessment to Determine Impacts of a 20% Ethanol Gasoline Fuel Blend on the Australian Passenger Vehicle Fleet – 2000hrs Material Compatibility Testing*. (2003) at 26-28.

<sup>12</sup> National Renewable Energy Laboratory, *Effects of Intermediate Ethanol Blends on Legacy Vehicles and Small Non-Road Engines, Report 1 – Updated*, (2009).

<sup>13</sup> Olga Naidenko, Environmental Working Group, *Ethanol-Gasoline Blends May Cause Human Health Risks and Engine Issues*. (2009).

insufficient research and cited drivability concerns.<sup>14</sup> Since that time, the scope of legacy vehicles that have been tested has not provided a broad enough window to draw a conclusion about likely or probable damage to vehicles on the road. We urge that EPA suspend any action to increase ethanol content of gasoline until there is clear evidence that such an action would not damage vehicles already on the road.

The studies cited by Growth Energy have made no mention of any potential safety hazards posed by drivability disruptions related to higher blends of ethanol. Such an analysis must be completed to show that there will not be unacceptable risks posed to motorists by allowing higher ethanol blends. Some drivability concerns, including stalling and vapor lock can result in abrupt stopping of a vehicle, which can result in an increased crash risk. No attempt has been made to discuss whether and to what extent these types of malfunctions could cause an increase in death and injury. However, increased crash risk should be a consideration in describing the impact of allowing increased ethanol blends.

Marine engine manufacturers have discussed the issue of safety and unexpected disruption to engine function in a number of comments to the EPA docket. Although marine engines are distinct from passenger car and light truck engines, the problems cited by marine engine manufacturers underscore the need for an analysis of the safety concerns. Mercury Marine describes problems it has already observed with marine engines exposed to E10, including: damage to rubber parts, water contamination due to ethanol hygroscopicity, corrosion to fuel system components cause by dissolved water, increased exhaust temperatures due to enleanment and increased emissions of nitrogen oxides.<sup>15</sup> The experience and concern raised by marine engine manufacturers and users suggests that additional research is needed to determine how increased ethanol blends may result in damage to fuel system components and catalysts. We urge that EPA provide some indication that it has considered motor vehicle safety in its determination that increased ethanol blends can be safely used by the legacy fleet.

### **III. Manufacturers Have Not Warranted Vehicles to Use Ethanol Blends Greater than 10 Percent.**

The technical analyses do not provide conclusive information about operability and drivability concerns related to increasing ethanol blends above E10. These analyses provide considerable information that gives cause for concern about potential damage to vehicles if E15 is permitted to enter the fuel stream. However, many manufacturers specifically state in their owner's manuals that their vehicles are only warranted to run on ethanol blends up to 10 percent ethanol. This potentially exposes consumers to a situation where their vehicle has been damaged by a hasty decision by EPA to introduce a fuel onto the market that damages vehicle components, and consumers will find themselves unable to seek repair through their vehicle warranties.

Manufacturers have designed and built vehicles to operate satisfactorily using the fuels that are common on the market, including ethanol blends up to 10 percent. Emissions and fuel

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<sup>14</sup> Oak Ridge National Laboratory, *Technical Issues Associated with the Use of Intermediate Ethanol Blends (>E10) in the U.S. Legacy Fleet: Assessment of Prior Studies*. ORNL/TM-2007/37 (2007) at 23.

<sup>15</sup> See Comments of Mercury Marine to EPA Docket No. EPA-HQ-OAR-2009-0211 at 1026 (May 29, 2009).

control systems have been designed and tuned to operate on these fuels. It is not clear from the studies that have been done whether these control algorithms are robust enough to adjust to a 50 percent increase in the ethanol content of fuel. Because these algorithms are proprietary, they vary from manufacturer to manufacturer, and therefore the performance of a small number (how many?) of late model vehicles may not capture the variability across the industry.

These owner's manual explanations are often strongly worded to recommend against using any gasoline-ethanol blend above 10 percent ethanol. For example, a Toyota explanation states: "Do not use gasohol other than stated here. Other gasohol may cause fuel system damage or vehicle performance problems." Another from Mazda states: "Vehicle damage and drivability problems resulting from the use of the following may not be covered by the Mazda warranty. (1) Gasohol containing more than 10% ethanol (2) Gasoline or gasohol containing methanol (3) Leaded fuel or leaded gasohol."<sup>16</sup> Also, Toyota conducted a recall in January 2009, affecting some model year 2006-2008 Lexus vehicles equipped with aluminum fuel rails, which corroded when exposed to E10 fuel.<sup>17</sup>

Consumers may sustain damage and drivability problems as a result of the introduction of E15, a fuel that the manufacturer has anticipated may result in the need for costly repairs. Manufacturers have judged blends of ethanol greater than 10 percent to be unsuitable for use in their vehicles, and have specifically cautioned purchasers of their vehicles to refrain from using such fuels. The studies cited by Growth Energy have not provided sufficient evidence to support the claim that E15 is substantially similar to E10. Informed consumers will therefore avoid E15 when possible and uninformed consumers may find themselves faced with costly repairs.

As the Toyota recall demonstrates and as materials compatibility studies show, use of E15 will cause fuel system and emission control deterioration over time which will lead to emissions, both tailpipe and evaporative, over standards. If consumers are forced to absorb repair costs because the manufacturers do not honor warranties, the situation will be even worse because consumers will forgo repairs to their vehicles in these hard economic times until they become undriveable. The poor performance will lead to higher emissions.

Growth Energy has failed to produce any useful life durability tests and instead has argued that they are not required. In doing so, Growth Energy has misstated the prior waiver applications and the case law. EPA has long stated the test as "Which tests are appropriate to characterize the emission effects of a fuel depend on whether the fuel is predicted to have only an instantaneous effect or a long-term deteriorative effect effect on emissions or both. If the fuel is predicted to have only an instantaneous incremental shift in the emission levels relative to a base fuel and that shift remains constant throughout the useful life of the vehicle, then 'back-to-back' emission testing will suffice. If, however, a long-term deteriorative effect is predicted, then 50,000-mile [now 120,000 mile] durability testing would be required."<sup>18</sup>

The very case cited by Grown Energy to support its position that no durability testing is required shows durability is needed. In *MVMA v EPA*, the Court explained:

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<sup>16</sup> Excerpts from Toyota and Mazda, as well as others are attached as Appendix 1.

<sup>17</sup> See Attached details of recall campaign, attached in Appendix 1.

<sup>18</sup> Oxinol Waiver, 46 FR 56361 (Nov. 16, 1981).

Clear evidence before the EPA may allow it to conclusively rule out the possibility of long-term, deteriorative effects, thus making the EPA's Deteriorated Emissions Test sufficient and obviating the need for actually conducting costly and time-consuming 50,000-mile durability tests. FN12 Section 211(f)(4) only requires that the EPA determine that a fuel will not cause or contribute to a failure of an emission device to comply with applicable emission standards during a vehicle's useful life, it does not specify that the EPA must base this determination on actual 50,000-mile durability tests in all cases. Nonetheless, given section 211(f)(4)'s clear directive that the EPA must evaluate the effect of a fuel over the useful life of a vehicle, the EPA must have a clearly sound basis for determining in a given case that back-to-back testing provides an adequate and sufficient means of evaluation in lieu of actual 50,000-mile testing.<sup>19</sup>

There is no clear evidence that E15 to rule out the possibility that there is no possibility of long-term deteriorative effects. To the contrary, there is clear evidence of materials deterioration in the fuel system and even fuel system failures leading to recall. Auto companies will not warrant E15 use. Durability testing is a must and neither Growth Energy nor anyone else has done it.

#### **IV. There Must Be No Grant of a Partial Waiver for Some Portion of the Fleet.**

EPA states in its notice:

One potential outcome...after reviewing the entire body of scientific and technical information available to us, maybe be an indication that a fuel up to E15 could meet the criteria for a waiver for some vehicles and engines but not others.<sup>20</sup>

We strongly oppose the grant of such a partial waiver for E15 to be dispensed. While EPA mentions the issue of parallel dispensing of E15 with E10 and E0, as opposed to E15 replacing E10, there is a meaningful difference for a situation where EPA grants a waiver for only part of the fleet. We acknowledge that if EPA were to grant the waiver and E15 were to enter the fuel stream that there would be some amount of public education and consumer awareness of the change. However, in the event that EPA approved E15 as a fuel that can be used in only some vehicles on the road, then the public education campaign would become more complicated and more important.

By granting a partial waiver, EPA would send a message to consumers that E15 can be used safely and reliably in vehicles after a given model year, but not earlier than that. This implies to consumers and manufacturers that E15 can then *not* be used safely or reliably in vehicles older than that given model year. Based on the technical reports, however, we are skeptical that the delineation will be as clear as a simple model year cut off. This would result in either an unworkably complicated requirement for consumer education and labeling, as well as a large number of disputes between consumers and manufacturers in the event that vehicles are classified incorrectly.

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<sup>19</sup> 786 F2d 385, 392-93.

<sup>20</sup> 74 Fed. Reg. 18229 (Apr. 21, 2009).

EPA claims that it anticipates that fueling stations would make E15 available in addition to E0 and E10, and that it would merely add a consumer choice of E15.<sup>21</sup> However, it also states that in the past, even with consumer education there has been skepticism and uncertainty about newly introduced fuels, such as unleaded gasoline and reformulated gasoline. EPA said: “Although substantial test data proved otherwise, these concerns lingered in some cases for several years. As a direct result of these experiences, EPA wants to be assured that prior to granting a waiver, sufficient testing has been conducted to demonstrate the compatibility of a waiver fuel with engine, fuel and emission control system components.”<sup>22</sup> From the data that are available, EPA cannot conclude that “sufficient testing” demonstrates broad compatibility of E15 with the legacy fleet. It could be seriously damaging to the credibility of EPA to allow such a fuel to enter the market under the claim that it has been proven compatible with engine, fuel and emission control system components.

There are complex issues related to distribution and consumer information implicated in granting a partial waiver for a subset of vehicles. Neither Growth Energy’s petition nor EPA’s notice have sufficiently described these issues or recommended an approach to resolving them. If EPA were to pursue such an approach, a separate notice-and-comment period would be indicated to provide details of EPA’s proposed approach to preventing misfueling and confusion about which fuels any specific vehicle is approved to use. EPA cites no source to substantiate its claim that fueling stations would provide E15 in parallel with E10 and E0, and we are skeptical that this is what would happen. Underwriters Laboratories will not certify existing fuel pumps to dispense E15, which would require fueling station owners to purchase new pumps to dispense the fuel, or risk using their existing pumps without certification from Underwriters Laboratories. This places an expensive and potentially untenable burden on fueling station owners to provide an additional fuel.<sup>23</sup>

EPA cannot draw credible conclusions about the feasibility of granting a partial waiver from the information provided in this notice and supporting documents. There has also not been a sufficient investigation of the claim that Tier 2 compliance is a sufficient indication of E15 compatibility to grant a partial waiver at this time. We urge that EPA provide more detailed information about the potential challenges to fueling station owners in providing E15 in parallel with E10 and E0 to support the claim that such a situation is likely to occur.

#### **V. EPA Must Develop a Consistent National Policy about Ethanol that Serves Environmental and Public Health Goals.**

Ethanol has been touted as a clean fuel; however, as greater volumes of ethanol have entered the fuel stream, there has been increased attention focused at substantiating those claims. Every gallon of ethanol costs the American taxpayer \$0.45 in subsidies to the ethanol industry for dubious environmental benefits and negligible to no impact on oil consumption.<sup>24</sup> EPA has

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<sup>21</sup> *Id.* [74 Fed. Reg. 18229]

<sup>22</sup> *Id.*

<sup>23</sup> Chris Jensen. “Laboratory Will Not Certify Pumps for Gas With 15 Percent Ethanol” *New York Times*. (May 8, 2009).

<sup>24</sup> The Volumetric Ethanol Excise Tax Credit amended as part of the *Food, Conservation, and Energy Act of 2008* (Pub. L. 110-234, Sec. 15331, May 22, 2008).

an open rulemaking on its Renewable Fuels Standard, which implements the requirement extended by the Energy Independence and Security Act (EISA) in 2007 to include 36 billion gallons of renewable fuel in the fuel stream by 2022, including 16 billion gallons of cellulosic ethanol.<sup>25</sup> These regulations will require EPA to establish lifecycle greenhouse gas emissions profiles for ethanol from different production methods, which will provide valuable information about the environmental benefits of ethanol. EPA must decide on Growth Energy's petition with consideration given to the overall impact of ethanol.

Higher ethanol blends have also been linked to increased air pollution. Oxygenated fuels have been positively associated with reducing air toxics; however, research suggests that ethanol content in fuels has been linked to increased emissions of acetaldehyde and formaldehyde, which are both identified as carcinogens. Increased ethanol content of gasoline has also been linked to increases in ground level ozone, which contributes to smog and exacerbates asthma and other respiratory problems.<sup>26</sup> The DOE analysis of effects on legacy fleets also found that emissions of nitrogen oxides increased in some cases. Continued air quality improvements must not be undermined by introducing an increasing amount of ethanol into the fuel stream, which has unclear air quality benefits, and potentially degrades air quality.

The EPA must consider this petition in the broader context of national fuels policy, and not within the limited view of Growth Energy's argument that intermediate ethanol blends should be permitted to correct for the "blend wall." The blend wall argument, that soon there will be more ethanol on the market than can be actually blended into gasoline and used to meet obligations under the Renewable Fuels Standard, merely exposes a problem with volumetric mandate policies. The problem of the blend wall would exist with any volumetric mandate for which there is not a market. The policies that have been set regarding biofuels have been thoroughly unsuccessful in shifting demand, and on the other hand have been expensive and counterproductive to the taxpayer. For EPA to accept the blend wall argument would be yet another example of wasteful, counterproductive fuels policy.

Congress instructed EPA to take a broader view of the benefits and consequences of biofuels in EISA, when it required the agency to produce an analysis of:

- (1) Environmental issues, including air quality, effects on hypoxia, pesticides, sediment, nutrient and pathogen levels in waters, acreage and function of waters, and soil environmental quality.
- (2) Resource conservation issues, including soil conservation, water availability, and ecosystem health and biodiversity, including impacts on forests, grasslands, and wetlands.
- (3) The growth and use of cultivated invasive or noxious plants and their impacts on the environment and agriculture.<sup>27</sup>

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<sup>25</sup> 74 Fed. Reg. 24904. (May 26, 2009).

<sup>26</sup> See Testimony of A. Blakeman Early of the American Lung Association before the Senate Committee on Environment and Public Works. (April 1, 2009) & Mark Jacobsen *Effects of ethanol (E85) versus gasoline vehicle on cancer and mortality in the United States*. ENVIRONMENTAL SCIENCE AND TECHNOLOGY. Vol 41 No 11: 4150-7. (2007).

<sup>27</sup> *Energy Independence and Security Act*, Section 204. (Pub. L. 110-140, Dec. 19, 2007).

Congress ordered this analysis because there was increasing uncertainty about the potential negative impacts associated with ethanol and other biofuels. With the need for a national fuels policy that supports climate objectives, Congress also ordered that the lifecycle greenhouse gas emissions associated with renewable fuels be considered.

We have discussed the change in air pollution associated with increased volume of ethanol – carbon monoxide emissions generally are reduced, but emissions of nitrogen oxides, acetaldehyde and formaldehyde increase. EPA has not given sufficient attention to the potential public health consequences associated with these changes in air pollution characteristics. Nor has the agency described in detail the difference in criteria air pollutants between E10 and gasoline blended with MTBE.

## **VI. Conclusion**

It would be irresponsible for EPA to introduce a greater volume of ethanol in conventional gasoline when it is unclear what the impacts will be on the legacy fleet, consumers, public health and the environment. We strongly urge that EPA deny Growth Energy's petition for a waiver to increase allowable ethanol content of gasoline to 15 percent. There has not been sufficient demonstration that E15 is substantially similar to E10 to support grant of the petition. The potential for vehicle damage due to the diversity of the legacy fleet is unquantifiable based on the existing research.

**Appendix 1**  
**Selection of Auto Manufacturer Fueling Instructions**  
**And Lexus Fuel Delivery Pipe Recall Documents**

- P.1** Audi – Fuel Supply and Filling Your Tank
- P. 2** Mazda – 2009 Mazda 6 Fuel Requirements
- P. 3-5** Toyota – 2009 Toyota Corolla Fuel Information
- P. 6-8** General Motors – 2009 Pontiac G9
- P. 9** Lexus – Fuel Delivery Pipe Recall – 09V-020 – 214,570 Vehicles
  - 2006-08 Lexus IS
  - 2006-08 Lexus GS
  - 2007-08 Lexus LS

**Blend of gasoline and ethanol (grain alcohol or ethyl alcohol)**

- Anti-knock index must be 87 AKI or higher.
- Blend must not contain more than 10% ethanol.

**Blend of gasoline and MTBE**

- Anti-knock index must be 87 AKI or higher.
- Blend must contain not more than 15% MTBE.

**Seasonally adjusted gasoline**

Many gasoline grades are blended to perform especially well for winter or summer driving. During seasonal change-over, we suggest that you fill up at busy gas stations where the seasonal adjustment is more likely to be made in time.

**! Note**

- Methanol fuels which do not meet these requirements may cause corrosion and damage to plastic and rubber components in the fuel system.
- Do not use fuels that fail to meet the specified criteria in this chapter.
- If you are unable to determine whether or not a particular fuel blend meets the specifications, ask your service station or its fuel supplier.
- Do not use fuel for which the contents cannot be identified.
- Fuel system damage and performance problems resulting from the use of fuels different from those specified are not the responsibility of Audi and are not covered under the New Vehicle or the Emission Control System Warranties.
- If you experience a loss of fuel economy or driveability and performance problems due to the use of one of these fuel blends, we recommend that you switch to unblended fuel. ■

**Gasoline additives**

A major concern among many auto manufacturers is carbon deposit build-up caused by the type of gasoline you use.

Although gasoline grades differ from one manufacturer to another, they have certain things in common. All gasoline grades contain substances that can cause deposits to collect on vital engine parts, such as fuel injectors and intake valves. Although most gasoline brands include additives to keep engine and fuel systems clean, they are not equally effective.

Audi recommends using TOP TIER Detergent Gasoline. For more information on TOP TIER Detergent Gasoline, please go to the official website ([www.toptiergas.com](http://www.toptiergas.com)).

After an extended period of using inadequate fuels, built-up carbon deposits can rob your engine of peak performance.

**! Note**

Damage or malfunction due to poor fuel quality is not covered by the Audi New Vehicle Limited Warranty. ■

**Fuel tank****Fuel filler neck**

The fuel filler neck is located on the right rear side panel behind the fuel filler flap.

If the power locking system should fail, you can still open the flap manually - for detailed instructions see ⇒ *page 259*.

You can find the fuel tank capacity of your vehicle in **Technical Data** ⇒ *page 325*. ▶

## Fuel and Engine Exhaust Precautions

### Fuel Requirements

Vehicles with catalytic converters or oxygen sensors must use **ONLY UNLEADED FUEL**, which will reduce exhaust emissions and keep spark plug fouling to a minimum.

Your Mazda will perform best with fuel listed in the table.

Fuel	Octane Rating* (Anti-knock index)
Regular unleaded fuel	87 [(R+M)/2 method] or above (91 RON or above)

\* U.S. federal law requires that octane ratings be posted on gasoline station pumps.

Fuel with a rating lower than 87 octane (91 RON) could cause the emission control system to lose effectiveness. It could also cause engine knocking and serious engine damage.

#### CAUTION

➤ **USE ONLY UNLEADED FUEL.**

*Leaded fuel is harmful to the catalytic converter and oxygen sensors and will lead to deterioration of the emission control system and or failures.*

- *Your vehicle can only use oxygenated fuels containing no more than 10% ethanol by volume. Damage to your vehicle may occur when ethanol exceeds this recommendation, or if the gasoline contains any methanol. Stop using gasohol of any kind if your vehicle engine is performing poorly.*
- *Never add fuel system additives. Never add cleaning agents other than those specified by Mazda. Other cleaning agents and additives may damage the system. Consult an Authorized Mazda Dealer.*

Gasoline blended with oxygenates such as alcohol or ether compounds are generally referred to as oxygenated fuels. The common gasoline blend that can be used with your vehicle is ethanol blended at no more than 10%. Gasoline containing alcohol, such as ethanol or methanol, may be marketed under the name “Gasohol”.

Vehicle damage and drivability problems resulting from the use of the following may not be covered by the Mazda warranty.

- Gasohol containing more than 10% ethanol.
- Gasoline or gasohol containing methanol.
- Leaded fuel or leaded gasohol.

## 6-1. Specifications

# Fuel information

**You must only use unleaded gasoline in your vehicle.**

**Unleaded gasoline with an Octane Rating of 87 (Research Octane Number 91) or higher is required for optimum engine performance.**

At minimum, the gasoline you use should meet the specifications of ASTM D4814 in the U.S.A. and CGSB3.5-M93 in Canada.

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### n **Fuel tank opening for unleaded gasoline**

To help prevent incorrect fueling, your Toyota has a fuel tank opening that only accommodates the special nozzle on unleaded fuel pumps.

### n **If your engine knocks**

l Consult your Toyota dealer.

l You may occasionally notice light knocking for a short time while accelerating or driving uphill. This is normal and there is no need for concern.

### n **Gasoline quality**

In very few cases, driveability problems may be caused by the brand of gasoline you are using. If driveability problems persist, try changing the brand of gasoline. If this does not correct the problem, consult your Toyota dealer.

### n **Gasoline quality standards**

l Automotive manufacturers in the U.S., the Europe and Japan have developed a specification for fuel quality called World-Wide Fuel Charter (WWFC) that is expected to be applied worldwide.

l The WWFC consists of four categories that are based on required emission levels. In the U.S., category 4 has been adopted.

l The WWFC improves air quality by lowering emissions in vehicle fleets, and improves customer satisfaction through better performance.

### n **Toyota recommends the use of gasoline containing detergent additives**

- l Toyota recommends the use of gasoline that contains detergent additives to avoid build-up of engine deposits.
- l All gasoline sold in the U.S. contains detergent additives to clean and/or keep clean intake systems.

### n **Toyota recommends the use of cleaner burning gasoline**

Cleaner burning gasoline, including reformulated gasoline that contains oxygenates such as ethanol or MTBE (Methyl Tertiary Butyl Ether) is available in many areas.

Toyota recommends the use of cleaner burning gasoline and appropriately blended reformulated gasoline. These types of gasoline provide excellent vehicle performance, reduce vehicle emissions and improve air quality.

### n **Toyota does not recommend blended gasoline**

- l Toyota allows the use of oxygenate blended gasoline where the oxygenate content is up to 10% ethanol or 15% MTBE.
- l If you use gasohol in your Toyota, be sure that it has an octane rating no lower than 87.
- l Toyota does not recommend the use of gasoline containing methanol.

### n **Toyota does not recommend gasoline containing MMT**

Some gasoline contains octane enhancing additive called MMT (Methylcyclopentadienyl Manganese Tricarbonyl).

Toyota does not recommend the use of gasoline that contains MMT. If fuel containing MMT is used, your emission control system may be adversely affected.

The malfunction indicator lamp on the instrument cluster may come on. If this happens, contact your Toyota dealer for service.

 NOTICE

**n Notice on gasoline quality**

**I** Do not use leaded gasoline.

Leaded gasoline can cause damage to your vehicle's catalytic converters causing the emission control system to malfunction.

**I** Do not use gasohol other than that stated here.

Other gasohol may cause fuel system damage or vehicle performance problems.

**n Fuel-related poor driveability**

If after using a different type of fuel, poor driveability is encountered (poor hot starting, vaporization, engine knocking, etc.), discontinue the use of that type of fuel.

**n When refueling with gasohol**

Take care not to spill gasohol. It can damage your vehicle's paint.

If you put things inside the vehicle — like suitcases, tools, packages, or anything else — they will go as fast as the vehicle goes. If you have to stop or turn quickly, or if there is a crash, they will keep going.

### CAUTION

Things you put inside the vehicle can strike and injure people in a sudden stop or turn, or in a crash.

- Put things in the trunk of your vehicle. In a trunk, put them as far forward as you can. Try to spread the weight evenly.

(Continued)

### CAUTION (Continued)

- Never stack heavier things, like suitcases, inside the vehicle so that some of them are above the tops of the seats.
- Do not leave an unsecured child restraint in the vehicle.
- When you carry something inside the vehicle, secure it whenever you can.
- Do not leave a seat folded down unless you need to.

## Fuel

Use of the recommended fuel is an important part of the proper maintenance of this vehicle. To help keep the engine clean and maintain optimum vehicle performance, we recommend the use of gasoline advertised as TOP TIER Detergent Gasoline.

The 8th digit of the Vehicle Identification Number (VIN) shows the code letter or number that identifies the vehicle's engine. The VIN is at the top left of the instrument panel. See *Vehicle Identification Number (VIN)* on page 10-1.

## Gasoline Octane

If the vehicle has a V8 engine, use regular unleaded gasoline with a posted octane rating of 87 or higher. If the octane rating is less than 87, you might notice an audible knocking noise when you drive, commonly referred to as spark knock. If this occurs, use a gasoline rated at 87 octane or higher as soon as possible. If you are using gasoline rated at 87 octane or higher and you hear heavy knocking, the engine needs service.

If the vehicle has the 3.6L V6 engine (VIN Code 7), use regular unleaded gasoline with a posted octane rating of 87 or higher. For best performance or trailer towing, you could choose to use middle grade 89 octane unleaded gasoline. If the octane rating is less than 87, you might notice an audible knocking noise when you drive, commonly referred

to as spark knock. If this occurs, use a gasoline rated at 87 octane or higher as soon as possible. If you are using gasoline rated at 87 octane or higher and you hear heavy knocking, the engine needs service.

## Gasoline Specifications

At a minimum, gasoline should meet ASTM specification D 4814 in the United States or CAN/CGSB-3.5 or 3.511 in Canada. Some gasolines contain an octane-enhancing additive called methylcyclopentadienyl manganese tricarbonyl (MMT). We recommend against the use of gasolines containing MMT. See *Additives on page 8-36* for additional information.

## California Fuel

If the vehicle is certified to meet California Emissions Standards, it is designed to operate on fuels that meet California specifications. See the underhood emission control label. If this fuel is not available in states adopting California emissions standards, the vehicle will operate satisfactorily on fuels meeting federal specifications, but emission control system performance might be affected. The malfunction indicator lamp could turn on and the vehicle might fail a smog-check test. See *Malfunction Indicator Lamp on page 4-18*. If this occurs, return to your authorized dealer/retailer for diagnosis. If it is determined that the condition is caused by the type of fuel used, repairs might not be covered by the vehicle warranty.

### Additives

To provide cleaner air, all gasolines in the United States are now required to contain additives that help prevent engine and fuel system deposits from forming, allowing the emission control system to work properly. In most cases, you should not have to add anything to the fuel. However, some gasolines contain only the minimum amount of additive required to meet U.S. Environmental Protection Agency regulations. To help keep fuel injectors and intake valves clean, or if the vehicle experiences problems due to dirty injectors or valves, look for gasoline that is advertised as TOP TIER Detergent Gasoline. Also, your dealer/retailer has additives that will help correct and prevent most deposit-related problems.

Gasolines containing oxygenates, such as ethers and ethanol, and reformulated gasolines might be available in your area.

We recommend that you use these gasolines, if they comply with the specifications described earlier. However, E85 (85% ethanol) and other fuels containing more than 10% ethanol must not be used in vehicles that were not designed for those fuels.

***Notice:* This vehicle was not designed for fuel that contains methanol. Do not use fuel containing methanol. It can corrode metal parts in the fuel system and also damage plastic and rubber parts. That damage would not be covered under the vehicle warranty.**

Some gasolines that are not reformulated for low emissions can contain an octane-enhancing additive called methylcyclopentadienyl manganese tricarbonyl (MMT); ask the attendant where you buy gasoline whether the fuel contains MMT.

We recommend against the use of such gasolines. Fuels containing MMT can reduce the life of spark plugs and the performance of the emission control system could be affected. The malfunction indicator lamp might turn on. If this occurs, return to your dealer/retailer for service.

### Fuels in Foreign Countries

If you plan on driving in another country outside the United States or Canada, the proper fuel might be hard to find. Never use leaded gasoline or any other fuel not recommended in the previous text on fuel. Costly repairs caused by use of improper fuel would not be covered by the vehicle warranty.

To check the fuel availability, ask an auto club, or contact a major oil company that does business in the country where you will be driving.

Special Service Campaign 9LA  
Certain 2006 - 2007 GS, 2006 - 2008 IS and 2007 - 2008 LS vehicles  
Fuel Delivery Pipe Replacement (Safety Recall)

Dear Lexus Customer:

This notice is being sent to you in accordance with the requirements of the National Traffic and Motor Vehicle Safety Act. Lexus has decided that a defect, which relates to motor vehicle safety, exists in certain 2006 through 2007 GS 300/350, 2006 through 2008 model year IS 250/350, and 2007 through 2008 LS 460/LS 460L vehicles.

**What is the condition?**

Your vehicle is equipped with aluminum Fuel Delivery Pipes (Fuel Rails). Lexus has determined that ethanol fuels with a low moisture content will corrode the internal surface of the fuel rails. As this condition progresses, the engine Malfunction Indicator Light may illuminate. Over time, the corrosion will create a pinhole resulting in fuel leakage. In the worst case, fuel leakage in the presence of an ignition source could result in a fire.

**What will Lexus do?**

Your Lexus dealer will replace the involved Fuel Delivery Pipes with newly designed ones at **NO CHARGE**.

**What should you do?**

***This is an important Safety Recall***

Please make an appointment with your authorized Lexus dealer to replace the involved Fuel Delivery Pipes as soon as possible. The repair will take approximately three hours for GS and IS vehicles. LS vehicles will require approximately seven hours for the repair. However, depending upon the dealer's work schedule, it may be necessary to make your vehicle available for a longer period of time.

**We request that you present this notice to the dealer at the time of your service appointment.**

If you would like to update your vehicle ownership or contact information, you may do so by registering at [www.lexus.com/owners](http://www.lexus.com/owners). You will need your full 17-digit Vehicle Identification Number (VIN) to input the new information.

**What if you have other questions?**

*Your local Lexus dealer will be more than happy to answer any of your questions and set up an appointment to perform the repair.* If you require further assistance, you may contact the Lexus Customer Assistance Center at 1-800-255-3987 Monday through Friday, 5:00 am to 6:00 pm, Saturday 7:00 am through 4:00 pm Pacific Standard Time.

If you believe that the dealer or Lexus has failed or is unable to remedy the defect within a reasonable time, you may submit a complaint to the Administrator, National Highway Traffic Safety Administration, 1200 New Jersey Avenue S.E., Washington, D.C. 20590, or call the toll free Vehicle Safety Hot Line at 1-888-327-4236 (TTY: 1-800-424-9153), or go to <http://www.safercar.gov>.

If you are a vehicle lessor, Federal law requires that any vehicle lessor receiving this recall notice must forward a copy of this notice to the lessee within ten days.

We have sent this notice in the interest of your continued satisfaction with our products, and we sincerely regret any inconvenience this condition may have caused you.

Thank you for driving a Lexus.

Sincerely,

Lexus Division  
TOYOTA MOTOR SALES, U.S.A., INC.