

**DEPARTMENT OF AGRICULTURE**

**LABORATORY DIVISION**

**REGULATION NO. 564. AUTOMOTIVE MOTOR FUEL PURITY, ADDITIVES,  
AND GRADING**

(By authority conferred on the director of the department of agriculture by section 3 of 1984 PA 44, MCL 290.643)

**R 285.564.1 Definitions.**

Rule 1. (1) As used in these rules:

(a) "Act" means 1984 PA 44, MCL 290.641.

(b) "Antiknock index (AKI)" means  $(RON + MON)/2$ .

(c) "ASTM" means the scientific and technical organization founded for the development of standards and located at 100 Barr Harbor Drive, W. Conshohocken, PA 19428-2959.

(d) "Blender" means a person who as an individual or through his or her agent adds an oxygenate to gasoline.

(e) "Maximum phase separation temperature" means the temperature of a gasoline containing alcohol which retains water in solution or in a stable suspension.

(f) "Motor octane number (MON)" means a knock characteristic of automotive gasoline determined by use of standard procedures on a motor engine.

(g) "Research octane number (RON)" means a knock characteristic of automotive gasoline determined by use of standard procedures on a research engine.

(2) The terms defined in the act have the same meanings when used in these rules.

History: 1987 AACCS; 2003 AACCS; 2009 AACCS.

**R 285.564.2 Permissible oxygen content in gasoline; gasoline clarity.**

Rule 2. (1) The calculated oxygen content permitted in any gasoline sample shall not exceed 3.7% by weight. The percentage of oxygen by weight shall be calculated on the basis of the oxygenate added per 1% volume, without regard to the actual gravity of the finished gasoline, as listed in the following table:

Table 1

Oxygenate added	Percentage by Weight of oxygen per 1% volume oxygenate
Methanol	.53%
Ethanol	.37%
Tertiary butyl alcohol	.23%

The following are examples of calculated oxygen equivalents:

(a) Gasoline having 10% by volume ethanol. Oxygen by weight:  $10 \times .37 = 3.7\%$ .

(b) Gasoline having 4 1/2% by volume methanol and 4 1/2% by volume tertiary butyl alcohol. Oxygen by weight:  $4.5 \times .53 + 4.5 \times .23 = 3.4\%$ .

(c) The department shall provide oxygen equivalents for oxygenates not listed in table 1 upon request, which shall be based upon gasoline with a specific gravity of .7412 (6.17 pounds per gallon) at 60 degrees Fahrenheit.

(d) There shall not be intentional addition of methyl tertiary butyl ether (MTBE) to the gasoline.

(2) Gasoline shall be visually free of undissolved water, sediment, and suspended matter. It shall be clear and bright at the ambient temperature or 70 degrees Fahrenheit (21 degrees Celsius), whichever is higher.

(3) The finished fuel shall be free of an adulterant or contaminant that may render the fuel unacceptable for its commonly used applications.

(4) Ethanol blended with gasoline shall meet ASTM D 4806-07 (2007).

(5) Gasoline used for blending with ethanol shall meet ASTM D 4814-08b (2008) and the finished blend may have a 3-degree variation from the 105°F requirements, a 10-degree variation from 116°F requirements, and an 8-degree variation from the 124° requirements listed in R 285.564. 4 (h) provided both of the following:

(a) The gasoline used for blending with ethanol, after the time it met ASTM D4814-08b (2008), was not modified or altered in any way prior to or at the time of addition of ethanol.

(b) The finished blend contains between 9% and 10% ethanol by volume.

History: 1987 AACCS; 2003 AACCS; 2009 AACCS.

### **R 285.564.3 Gasoline grades.**

Rule 3. (1) There shall be the following uniform grades of gasoline:

- (a) "Subregular" with an AKI of 85 or above.
- (b) "Regular" with an AKI of 87 or above.
- (c) "Midgrade 88" with an AKI of 88 or above.
- (d) "Midgrade 89" with an AKI of 89 or above.
- (e) "Premium" with an AKI of 90 or above.
- (f) "Premium 91" with an AKI of 91 or above.
- (g) "Premium 92" with an AKI of 92 or above.
- (h) "Premium 93" with an AKI of 93 or above.
- (i) "Premium 94" with an AKI of 94 or above.

(2) Special grades of gasoline may be offered for sale if listed with and approved by the department. To apply for listing, the refiner or blender shall provide the department with the gasoline brand name, the grade specifications, and a copy of the complete test results for all applicable standards specified in these rules and other tests as required by the department.

History: 1987 AACCS; 2003 AACCS; 2009 AACCS.

### **R 285.564.4 Grades of gasoline; specifications.**

Rule 4. All uniform and special grades of gasoline shall meet the following specifications:

(a) The test method for oxygenates shall be ASTM standard D 5599-00(2005). If the total amount of any alcohol contained is 1% by volume or greater, the pump shall be posted with an alcohol notice. Gasoline that contains 10% or less ethanol is not subject to the notice requirement. Gasoline containing alcohol shall meet all other specifications contained in these rules. There shall not be intentional addition of methyl tertiary butyl ether (MTBE) to the gasoline.

(b) The test method for copper strip corrosion shall be ASTM standard D 130-04e1 (2004). Copper strip corrosion shall not exceed No. 1 on the test scale specified in test method ASTM standard D 130-04e1(2004).

(c) The test method for silver strip corrosion shall be ASTM standard D 4814-08b (2008) Annex. Silver strip corrosion shall not exceed No. 1 on the test scale specified in test method ASTM standard D 4814-08b (2008) Annex.

(d) The test method for distillation range shall be ASTM standard D 86-07a(2007). The following apply:

(i) The 10% evaporation temperature for each month shall not exceed the value indicated in table 2.

(ii) The 50% evaporation temperature for each month shall not be less than the minimum or exceed the maximum for the range indicated in table 2. Gasoline containing 9%-10% ethanol that does not meet this standard may be sold pursuant to the USEPA Fuel or Fuel Additive Waiver in section 211(F)(4) of Part a of Title II of the Clean Air Act, Chapter 360, 81 Stat. 502, 42 USC 7545, provided the product meets all of the conditions in the waiver and the base gasoline used for blending has a 50% evaporation temperature of not less than 170°F.

(iii) The 90% evaporation temperature shall not exceed the value for each month indicated in table 2. The end point temperature shall not exceed the value indicated in table 2.

(iv) The residue shall not exceed the amount indicated in table 2. The use of a trailing decimal point in a limit indicates that the digit preceding the decimal point is a significant digit.

(v) Table 2

Month	Distillation Temperatures, °F, at 10 % Evaporated	Distillation Temperatures, °F, at 50% Evaporated	Distillation Temperatures, °F, at End Point	Distillation Temperatures, °F, at 90% Evaporated	Residue Volume %
January	122.	150.-230.	365.	437.	2.%
February	122.	150.-230.	365.	437.	2.%
March	131.	150.-235.	365.	437.	2.%
April	158.	150.-250.	374.	437.	2.%
May	158.	150.-250.	374.	437.	2.%
June	158.	170.-250.	374.	437.	2.%
July	158.	170.-250.	374.	437.	2.%
August	158.	170.-250.	374.	437.	2.%
Sept. 1-15		158. 170.-250.	374.	437.	2.%
Sept. 16-30	158.	150.-250.	374.	437.	2.%
October	131.	150.-235.	365.	437.	2.%

November	131.	150.-235.	365.	437.	2.%
December	122.	150.-230.	365.	437.	2.%

(vi) The drivability index shall be derived using ASTM D 4814-08b (2008). The drivability index at the refinery or point of import shall not exceed in any month the value indicated in table 3. The use of a trailing decimal point in a limit indicates that the digit preceding the decimal point is a significant digit.

(vii) Table 3

Month	Drivability Index
January	1200.
February	1200.
March	1220.
April	1250.
May	1250.
June	1250.
July	1250.
August	1250.
September	1250.
October	1220.
November	1220.
December	1200.

(e) The test method for solvent washed gum shall be ASTM standard D 381-04 (2004). The solvent washed gum shall not exceed 5.0 mg per 100.0 ml.

(f) The maximum temperature for phase separation of gasoline containing alcohol shall not exceed in any month the value indicated in table 4:

Table 4

Lower Peninsula Maximum temperature for phase  
 Month Separation degrees Fahrenheit (CELSIUS)

January	0 (-18)
February	1 (-17)
March	10 (-12)
April	27 (-3)
May	34 (1)
June	45 (7)
July	

August	50 (10)
September	48 (9)
October	41 (5)
November	32 (0)
December	21 (-6)
	7 (-14)
Upper Peninsula Month	Maximum temperature for phase Separation degrees Fahrenheit (CELSIUS)
January	-6 (-21)
February	-4 (-20)
March	5 (-15)
April	21 (-6)
May	30 (-1)
June	43 (6)
July	48 (9)
August	48 (9)
September	39 (4)
October	30 (-1)
November	16 (-9)
December	0 (-18)

(g) The test method for vapor pressure for gasoline and gasoline oxygenate blends shall be ASTM D 6378-07 (2007) or D 5191-07 (2007) The vapor pressure of gasoline shall not exceed any of the values in table 5 except as provided in section 3 of the act and regulation 561. Gasoline containing up to 10% ethanol may obtain the 1 psi waiver indicated for gasoline containing between 9-10 volume % ethanol during the months of January, February, March, April, May, September 16 to 30, October, November and

December if the last 3 deliveries of gasoline received by the retailer contained at least 5% ethanol or were straight gasoline.

Table 5

Month	Vapor Pressure (gasoline containing less than 9 volume % Ethanol)	
	Vapor Pressure (gasoline containing 9-10 volume % ethanol)	
January	15.0 psi	16.0 psi
February	15.0 psi	16.0 psi
March	15.0 psi	16.0 psi
April	13.5 psi	14.5 psi
May	13.5 psi	14.5 psi
June	9.0 psi	10.0 psi
July	9.0 psi	10.0 psi
August	9.0 psi	10.0 psi
September 1-15	9.0 psi	10.0 psi
September 16-30	13.5 psi	14.5 psi
October	13.5 psi	14.5 psi
November	15.0 psi	16.0 psi
December	15.0 psi	16.0 psi

(h) The test method for the vapor-liquid ratio for gasoline shall be ASTM standard D 5188-04a (2004). For gasoline, the test temperature at which the vapor-liquid ratio is a maximum of 20 to 1 shall be the value indicated in table 6. Gasoline containing 9%-10% ethanol that does not meet this standard may be sold pursuant to the USEPA Fuel or Fuel Additive waiver, Title II of the Clean Air Act, ch.360, 81 Stat.502 §211(F)(4), 42 U.S.C. §7545, provided the product meets all of the conditions in the waiver and the base gasoline used for blending does not have a test temperature less than that indicated in table 6 at which the vapor-liquid ratio is a maximum of 20 to 1.

Table 6

Month	V/L (°F)
January	105
February	105
March	105
April	116
May	116
June	124
July	124
August	124
September 1-15	124
September 15-30	116
October	116
November	105

History: 1987 AACS; 2003 AACS; 2009 AACS.

### **R 285.564.5 Rescinded.**

History: 1987 AACS; 2003 AACS; 2009 AACS.

### **R 285.564.6 Grades of unleaded gasoline; additional specifications.**

Rule 6. In addition to the specifications listed in R 285.564.4, all uniform grades of gasoline shall meet both of the following specifications:

(a) The test method for lead content shall be ASTM standard D 5185-05 (2005). There shall be no intentional addition of lead compounds to any uniform grade of gasoline. Any single sample shall contain not more than 0.05 gram (50 milligrams) of lead per gallon.

(b) The test method for sulfur content shall be ASTM standard D 5453-06 (2006). Sulfur shall not exceed 95 ppm by weight.

History: 1987 AACS; 2003 AACS; 2009 AACS.

### **R 285.564.7 Antiknock index standard.**

Rule 7. (1) All uniform grades of automotive gasoline shall meet the following specified standards for antiknock index (octane):

(a) Subregular: not less than 85.0 AKI.

(b) Regular: not less than 87.0 AKI and not less than 82.0 MON.

(c) Midgrade 88: not less than 88.0 AKI and not less than 82.0 MON.

(d) Midgrade 89: not less than 89.0 AKI and not less than 83.0 MON.

(e) Premium: not less than 90.0 AKI.

(f) Premium 91: not less than 91.0 AKI.

(g) Premium 92: not less than 92.0 AKI.

(h) Premium 93: not less than 93.0 AKI.

(i) Premium 94: not less than 94.0 AKI.

(2) The test method for antiknock index shall be ASTM standard D 2700-08 (2008) for a motor engine and ASTM standard D 2699-08 (2008) for a research engine.

(3) The formula for determination of the antiknock index shall be  $AKI = (RON + MON) / 2$ .

History: 1987 AACS; 2003 AACS; 2009 AACS.

### **R 285.564.8 Rescinded.**

History: 1987 AACS; 2003 AACS; 2009 AACS.

**R 285.564.9 Rescinded.**

History: 1987 AACCS; 2003 AACCS.

**R 285.564.10 Rescinded.**

History: 1987 AACCS; 2003 AACCS; 2009 AACCS.

**R 285.564.11 ASTM motor fuel standards; adoption by reference.**

Rule 11. (1) The department adopts the following standards of the ASTM for gasoline or an ASTM method approved by the department:

- (a) D 86-07a (2007).
- (b) D 130-04e1 (2004).
- (c) D 6378-07 (2007) or D5191-07 (2007).
- (d) D 381-04 (2004).
- (e) D 5188-04a (2004).
- (f) D 5453-06 (2006).
- (g) D 2699-07 (2007).
- (h) D 2700-07a (2007).
- (i) D 5599-00(2005).

(2) The department adopts the following standards of the ASTM for diesel fuel, biodiesel, and biodiesel blends or an ASTM standard approved by the department.

- (a) D 6751-08 (2008).
- (b) D 975-08a (2008).
- (c) D 7467-08 (2008).

(3) Copies of these standards may be obtained, at actual printing and mailing cost, by writing to the Department of Agriculture, Laboratory Division, 940 Venture Lane, Williamston, Michigan 48895, or, for a fee as specified in this subrule, from the ASTM, 100 Barr Harbor Drive, W. Conshohocken, PA 19428-2959. The ASTM standards are composed of volumes priced as follows:

Volume 05.01: D 56 to D 3220 .....	\$311.00
Volume 05.02: D 3221 to D 5293 .....	\$278.00
Volume 05.03: D 5303 to D 6729 .....	\$299.00
Volume 05.04: D 6730 - latest	\$396.00
Volume 05.05: Combustion Characteristics .....	\$156.00

History: 1987 AACCS; 2003 AACCS; 2009 AACCS.

**R 285.564.12 Use variations or exemptions for motor fuel designed for unique equipment or service.**



Rule 12. Specific use variations or exemptions may be made for motor fuel designed for unique equipment or service if it can be demonstrated to the department that the distribution and sale of such motor fuel shall be restricted to such use.

History: 1987 AACS; 2003 AACS; 2009 AACS.

**R 285.564.13 Product registration of motor fuels not meeting R 285.564.4.**

Rule 13. (1) All motor fuels that do not meet ASTM specifications or standards in R 285.564.4 shall be registered with the director on forms prescribed by the director 30 days before the registrant wishes to engage in sales. The registration form shall include all of the following information:

- (a) Business name and address(es).
  - (b) Mailing address if different than business address.
  - (c) Type of ownership of the distributor or retail dealer, such as an individual, partnership, association, trust, corporation, or any other legal entity or combination thereof.
  - (d) An authorized signature, title, and date for each registration.
  - (e) Product brand name and product description.
  - (f) A product specification sheet shall be attached.
  - (g) If the motor fuel is marketed under a waiver granted by the United States environmental protection agency the registration must include the regulatory citation number or other acceptable proof of a valid waiver.
  - (h) If requested by the department, a complete list of business names and addresses where the product is being delivered to or offered for sale from.
- (2) Registration is subject to annual renewal. All previous listings and registrations with the department are rescinded 30 days after adoption of this regulation.
- (3) Re-registration is required 30 days before any changes in subrule (1) of this rule.
- (4) The Director may decline to register any product that actually or by implication would deceive or tend to deceive a purchaser as to the identity or the quality of the motor fuel.
- (5) The registration is not transferable.

History: 1987 AACS; 2003 AACS; 2009 AACS.

**R 285.564.14 Retailer requirements.**

Rule 14. A Retailer offering an ethanol blended product at retail shall do all of the following:

- (a) Remove all water and precipitated materials from the storage tank before the initial gasoline-alcohol blend is delivered into the tank.
- (b) Install a suitable filter, 10 microns or less, in the meter inlet or discharge line and immediately adjacent to the meter.
- (c) Record the water level of blended product storage tanks daily and make these records available to the department upon request.

(d) On a regular basis and upon receipt of a quality complaint examine the blended product to ensure that the product dispensed remains clear and bright and free of visible water or haze.

History: 2009 AACs.