



# **Magellan Pipeline Product Specifications**

**Version 113  
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## MAGELLAN PIPELINE PRODUCT ACCEPTANCE TERMS

The most current version of the methods referenced in these specifications will prevail at all times. Alternate test methods listed in ASTM or MPL product specification standards may be used. In instances of dispute, tests will be conducted using the referee methods identified in the applicable standard.

Sampling	<p>LPG products must be sampled in accordance with D1265. All other products must be sampled according to D4057, D4177, and/or D5842.</p> <p>Compliance with Magellan Pipeline Specifications will be determined by the shipper's analysis of a composite sample produced in accordance with D5854. Top, middle, and bottom samples may not deviate more than 1.0° API from the gravity of the composite, nor contain product below the flash point minimum for oils, or above the seasonal RVP maximum for gasolines.</p>
Reporting	<p>It is the responsibility of the shipper to enter a certificate of analysis representative of each shipment into Magellan's Prospector database for approval.</p> <p>Tests performed by the carrier are for carrier's information and do not relieve the shipper of the responsibility to comply with the specifications.</p> <p>The carrier reserves the right to sample the product and/or tank water below any product offered for shipment.</p>
Test Precision	<p>Delivery test results may be obtained by Magellan upon receipt and evaluated following D3244 and E29 to determine conformance with Magellan specifications.</p>
Corrosivity	<p>Shipments of proprietary grades must not be corrosive, with a minimum NACE test result of B+.</p>
Workmanship	<p>Products must be clear and bright, free of water, impurities, or any adulterant. Individual batches cannot differ markedly in appearance and/or odor from the stored fungible inventory.</p> <p>Any undissolved water received with incoming product may be deducted from the shipment volume ticketed. Magellan may request the Shipper to remove the water received, and/or invoice the Shipper for water disposal and other costs incurred.</p>

# MAGELLAN PIPELINE ADDITIVE SPECIFICATIONS

Magellan will permit the types and concentrations of additives detailed below; all other types and concentrations or additives are prohibited.

Additive products containing Dodeceny Succinic Anhydride or Dodeceny Succinic Acid (DDSA) will not be reviewed for approval and are strictly prohibited.

## Gasoline Additive Specifications

The following additive specifications apply to all grades except aviation products, LPG's, and Natural Gasoline, for the grades noted in each section.

(H, I, J8, L, Q, and W Grade)

Gum Inhibitors and Metal Deactivators

Gasoline shipments may, but are not required to, contain any of the following gum inhibitors and/or metal deactivators:

N, N'di-secondary butyl ortho-phenylenediamine  
 N, N'di-secondary butyl para-phenylenediamine  
 N, N'disalicylidene-1,2 propanediamine  
 N, N'di(1-ethyl-3-methylpentyl)-para-phnylenediamine  
 N, N'di-isopropyl-para-phenylenediamine  
 N, n'bis-(1, 4-demethylpentyl)-p-phenylenediamine n-Butyl -  
 para-aminophenol  
 2-6-di-tert-butylphenol  
 2,4,6-tri-tert-butylphenol  
 Ortho-tert-butylphenol

UOP 12P	UOP 12S	UOP 17P
UOP 3455	UOP 5S	Innospec AO-31
Innospec AO-36	Innospec AO-37	Ethyl 733
Ethanox 4776	Ethanox 4720	Ethanox 4740
Tolad 3905	Tolad 3910	Specaid 8Q202
Nalco 88BU-118	Unichem 7529	Pitt-Consol M-56
Tolad 4695		Specaid 8Q206

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Corrosion Inhibitors

**Gasoline, Fuel Oil, and Diesel Fuel Additives**

Products requiring compliance with NACE standard TM0172 may contain any of the following corrosion inhibitors:

Nalco 5403	Nalco EC5626A	Baypros 853
Nalco Visco 3554	Nalco 5405	UOP Unicor PL
Apollo PRI-19	Lubrizol 541	Unichem 7504
UOP Unicor	Innospec DCI-4A	Tolad 249
Innospec DCI-6A	UOP Unicor J	Unichem 7501
HiTech 580	Hitec E-534	Tolad 9715
Nalco EC5407A	Tolad 4410	Tolad 9719
	Spec-Aid 8Q5127	Spec-Aid 8Q110ULS

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Stability

**Fuel Oil and Diesel Fuel Additives**

Fuel oil and/or diesel fuel shipments may contain one or more of the following stability additives as required to achieve compliance with the stability characteristics outlined in the applicable grade specification.

Innospec FOA-3	Chemtec 7220	Specaid 8Q72
UOP Polyflo-121	Spec-Aid 8Q403ULS	Nalco 5303
UOP Polyflo-122	Tolad 9076	Nalco 5301
UOP Polyflo-128	Unichem 7530	UOP Polyflo-195
Tolad 9022	Spec-Aid 8Q401	

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### **Cold Flow Additives**

Fuel oil and/or diesel fuel shipments requiring additives to achieve compliance with low temperature properties may, but are not required to contain one or more of the following additives:

Hitec 4541	Innospec PDD-7450	Tolad 3005
Innospec 2152	Spec-Aid 8Q5201	Tolad 3030
Betz Q5201	Paradyne 25	Betz 8Q12
Hitec 4518	Unichem 8094	Hitec 4566
Exxon ECA 7305	Nalco 5375	Spec-Aid 8Q14ULS
UOP Polyflo 6000	Spec-Aid 8Q72ULS	BakerHughes T3034

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### **Dyes**

X5 Grade High Sulfur Fuel Oil is the only product in Magellan Pipeline that requires dye at the origin. Applicable dyes and required treat rates are listed in the X5 grade product specifications.

XR Grade Low Sulfur Fuel Oil is dyed at the Magellan rack.

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## Seasonal Gasoline Volatility Classes

### Shipments From Origin

Reid Vapor Pressure, D5191 <sup>1/</sup>

March 1 - September 15      DVPE using EPA formula <sup>2/</sup>

September 16 – February 28    DVPE using D5191 formula

Distillation, ASTM D 86 <sup>3/</sup>	Class AA	Class A	Class B	Class C	Class D	Class E
10% Evaporated °F, max	158	158	149	140	131	122
50% Evaporated °F, min <sup>4/</sup>	170	170	170	170	170	170
50% Evaporated °F, max	250	250	245	240	235	230
90% Evaporated °F, max	374	374	374	365	365	365
Final Boiling Point °F, max <sup>5/</sup>	430	430	430	430	430	430
Residue, vol % max	2	2	2	2	2	2
Driveability Index, D4814, max <sup>3/</sup>	1250	1250	1240	1230	1220	1200
Vapor to Liquid Ratio=20:1, °F <sup>3,6/</sup>	<u>Class 1</u>	<u>Class 2</u>	<u>Class 3</u>	<u>Class 4</u>	<u>Class 5</u>	
D5188, min	140	133	124	116	105	

- 1/ All gasoline deliveries will not exceed applicable Federal and State requirements.
- 2/ The calculation required for the EPA compliance period is published in 40 CFR 80.46
- 3/ Specifications must be met before blending with denatured fuel ethanol.
- 4/ Conventional Gasoline shall meet a minimum 50 % evaporated distillation temperature of 150 °F after blending of 9 % to 10 % by volume ethanol.
- 5/ The final boiling point of all gasoline deliveries at terminals will be at or below 437 °F as determined by ASTM D86
- 6/ D5188 is the referee test method. The alternative equations in D4814 may also be used.

**Schedule of Origin Volatility Requirements**

**A GRADE**

		<b>Jan. 1-15</b>	<b>Jan. 16-31</b>	<b>Feb. 1-15</b>	<b>Feb. 16-29</b>	<b>Mar. 1-15</b>	<b>Mar. 16-31</b>	<b>Apr. 1-30</b>	<b>May 1-31</b>	<b>June 1-30</b>	<b>July 1-31</b>	<b>Aug. 1-31</b>	<b>Sept. 1-15</b>	<b>Sept. 16-30</b>	<b>Oct. 1-31</b>	<b>Nov. 1-30</b>	<b>Dec. 1-31</b>
<b>Colorado</b>	DVPE)	15.00	15.00	13.50	13.50	11.50	11.50	9.00	9.00	9.00	9.00	9.00	9.00	10.00	11.50	13.50	15.00
	(Class)	E-5	E-5	D-5	D-5	C-3	C-3	A-3	A-3	A-2	A-2	A-2	A-2	B-2	C-3	D-4	E-5
<b>Kansas</b>	(DVPE)	13.50	13.50	10.00	10.00	8.50	8.50	8.50	9.00	9.00	9.00	9.00	9.00	10.00	11.50	13.50	15.00
	(Class)	D-5	D-5	B-5	B-5	A-4	A-4	A-3	A-3	A-2	A-2	A-2	A-2	B-2	C-3	D-4	E-5
<b>Illinois</b>	(DVPE)	13.50	13.50	13.50	13.50	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	11.50	13.50	15.00	15.00
	(Class)	D-5	D-5	D-5	D-5	A-4	A-4	A-4	A-4	A-3	A-3	A-3	A-3	C-3	D-4	E-5	E-5
<b>Minnesota</b>	(DVPE)	13.50	13.50	10.00	10.00	8.50	8.50	8.50	9.00	9.00	9.00	9.00	9.00	11.50	13.50	15.00	15.00
	(Class)	D-5	D-5	B-5	B-5	A-5	A-5	A-4	A-4	A-3	A-3	A-3	A-3	C-3	D-4	E-5	E-5
<b>N. Dakota</b>	(DVPE)	13.50	13.50	10.00	10.00	8.50	8.50	8.50	9.00	9.00	9.00	9.00	9.00	11.50	13.50	15.00	15.00
	(Class)	D-5	D-5	B-5	B-5	A-5	A-5	A-4	A-4	A-3	A-2	A-2	A-3	C-3	D-4	E-5	E-5
<b>Oklahoma</b>	(DVPE)	13.50	13.50	10.00	10.00	8.50	8.50	8.50	9.00	9.00	9.00	9.00	9.00	10.00	11.50	13.50	15.00
	(Class)	D-4	D-4	B-4	B-4	A-4	A-4	A-3	A-3	A-2	A-2	A-2	A-2	B-2	C-3	D-4	E-5

Revision Date: July 1, 2017

NOTE: Gulf Coast origin changeover dates will precede this schedule by approximately 10 days, depending upon the applicable Explorer Pipeline cycle. Shipments via Explorer Pipeline must meet the specification applicable to the anticipated West Tulsa delivery date. Gulf Coast shippers will be advised of these dates through seasonal letters.



**Schedule of Origin Volatility Requirements**

**A GRADE (continued)**

		<b>Jan. 1-15</b>	<b>Jan. 16-31</b>	<b>Feb. 1-15</b>	<b>Feb. 16-29</b>	<b>Mar. 1-15</b>	<b>Mar. 16-31</b>	<b>Apr. 1-30</b>	<b>May 1-31</b>	<b>June 1-30</b>	<b>July 1-31</b>	<b>Aug. 1-31</b>	<b>Sept. 1-15</b>	<b>Sept. 16-30</b>	<b>Oct. 1-31</b>	<b>Nov. 1-30</b>	<b>Dec. 1-31</b>
<b>Texas</b>	(DVPE)	13.50	13.50	10.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	10.00	11.50	13.50	13.50
	(Class)	D-4	C-4	B-4	A-4	A-4	A-4	A-3	A-3	A-2	A-2	A-2	A-2	A-2	C-3	D-4	D-4
<b>El Paso</b>	(DVPE)	13.50	13.50	10.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	10.00	11.50	13.50	13.50
	(Class)	D-4	C-4	B-4	A-4	A-4	A-4	A-3	A-3	A-2	A-2	A-2	A-2	A-2	C-3	D-4	D-4
<b>Wisconsin</b>	(DVPE)	13.50	13.50	10.00	10.00	8.50	8.50	8.50	9.00	9.00	9.00	9.00	9.00	11.50	13.50	15.00	15.00
	(Class)	D-5	D-5	B-5	B-5	A-5	A-5	A-4	A-4	A-3	A-3	A-3	A-3	C-3	D-4	E-5	E-5
<b>Wyoming</b>	(DVPE)	15.00	15.00	13.50	13.50	11.50	11.50	9.00	9.00	9.00	9.00	9.00	9.00	10.00	11.50	13.50	15.00
	(Class)	E-5	E-5	D-5	D-5	C-3	C-3	A-3	A-3	A-2	A-2	A-2	A-2	B-2	C-3	D-4	E-5

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**Schedule of Origin Volatility Requirements**

**A1 GRADE**

	<b>Jan. 1-15</b>	<b>Jan. 16-31</b>	<b>Feb. 1-15</b>	<b>Feb. 16-29</b>	<b>Mar. 1-31</b>	<b>Apr. 1-30</b>	<b>May 1-31</b>	<b>June 1-30</b>	<b>July 1-31</b>	<b>Aug. 1-31</b>	<b>Sept. 1-15</b>	<b>Sept. 16-30</b>	<b>Oct. 1-31</b>	<b>Nov. 1-30</b>	<b>Dec. 1-31</b>
(DVPE) (Class)	N/A	N/A	N/A	N/A	N/A	6.8 A-3	6.8 A-3	6.8 A-2	6.8 A-2	6.8 A-2	6.8 A-2	N/A	N/A	N/A	N/A

Revision Date: December 22, 2014

NOTE: Gulf Coast origin changeover dates will precede this schedule by approximately 10 days, depending upon the applicable Explorer Pipeline cycle. Shipments via Explorer Pipeline must meet the specification applicable to the anticipated West Tulsa delivery date. Gulf Coast shippers will be advised of these dates through seasonal letters.



**Schedule of Origin Volatility Requirements**

**A1X GRADE**

		<b>Jan.</b>	<b>Jan.</b>	<b>Feb.</b>	<b>Feb.</b>	<b>Mar.</b>	<b>Mar.</b>	<b>Apr.</b>	<b>May</b>	<b>June</b>	<b>July</b>	<b>Aug.</b>	<b>Sept.</b>	<b>Sept.</b>	<b>Oct.</b>	<b>Nov.</b>	<b>Dec.</b>
<b>Texas</b>		<b>1-15</b>	<b>16-31</b>	<b>1-15</b>	<b>16-29</b>	<b>1-15</b>	<b>16-31</b>	<b>1-30</b>	<b>1-31</b>	<b>1-30</b>	<b>1-31</b>	<b>1-31</b>	<b>1-15</b>	<b>16-30</b>	<b>1-31</b>	<b>1-30</b>	<b>1-31</b>
	(DVPE)	11.50	11.50	10.00	10.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	10.00	10.00	11.50	11.50
	(Class)	C-3	C-3	B-2	B-2	A-1	A-1	A-1	A-1	A-1	A-1	A-1	B-2	B-2	B-2	C-3	C-3
<b>El Paso</b>	(DVPE)	11.50	11.50	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	11.50	11.50
	(Class)	C-3	C-3	B-2	B-2	B-2	B-2	B-2	B-2	B-2	B-2	B-2	B-2	B-2	B-2	C-3	C-3

**Schedule of Origin Volatility Requirements**

<b><u>A5 GRADE</u></b>		<b>Jan. 1-15</b>	<b>Jan. 16-31</b>	<b>Feb. 1-15</b>	<b>Feb. 16-29</b>	<b>Mar. 1-15</b>	<b>Mar. 16-31</b>	<b>Apr. 1-30</b>	<b>May 1-31</b>	<b>June 1-30</b>	<b>July 1-31</b>	<b>Aug. 1-31</b>	<b>Sept. 1-15</b>	<b>Sept. 16-30</b>	<b>Oct. 1-31</b>	<b>Nov. 1-30</b>	<b>Dec. 1-31</b>
<b>Colorado</b>	(DVPE)	15.00	15.00	13.50	13.50	11.50	11.50	9.00	9.00	9.00	9.00	9.00	9.00	10.00	11.50	13.50	15.00
	(Class)	E-5	E-5	D-5	D-5	C-3	C-3	A-3	A-3	A-2	A-2	A-2	A-2	B-2	C-3	D-4	E-5
<b>Kansas</b>	(DVPE)	15.00	15.00	13.50	13.50	11.50	11.50	9.00	9.00	9.00	9.00	9.00	9.00	10.00	11.50	13.50	15.00
	(Class)	E-5	E-5	D-5	D-5	C-3	C-3	A-3	A-3	A-2	A-2	A-2	A-2	B-2	C-3	D-4	E-5
<b>Oklahoma</b>	(DVPE)	15.00	15.00	13.50	13.50	11.50	11.50	9.00	9.00	9.00	9.00	9.00	9.00	10.00	11.50	13.50	15.00
	(Class)	E-5	E-5	D-5	D-5	C-3	C-3	A-3	A-3	A-2	A-2	A-2	A-2	B-2	C-3	D-4	E-5
<b>Texas</b>	(DVPE)	13.50	13.50	10.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	10.00	11.50	13.50	13.50
	(Class)	D-4	C-4	B-4	A-4	A-4	A-4	A-3	A-3	A-2	A-2	A-2	A-2	A-2	C-3	D-4	D-4
<b>El Paso</b>	(DVPE)	13.50	13.50	10.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	10.00	11.50	13.50	13.50
	(Class)	D-4	C-4	B-4	A-4	A-4	A-4	A-3	A-3	A-2	A-2	A-2	A-2	A-2	C-3	D-4	D-4
<b>Wyoming</b>	(DVPE)	15.00	15.00	13.50	13.50	11.50	11.50	9.00	9.00	9.00	9.00	9.00	9.00	10.00	11.50	13.50	15.00
	(Class)	E-5	E-5	D-5	D-5	C-3	C-3	A-3	A-3	A-2	A-2	A-2	A-2	B-2	C-3	D-4	E-5

Revision Date: July 1, 2017

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**Schedule of Origin Volatility Requirements**

**AMS GRADE**

		<b>Jan. 1-15</b>	<b>Jan. 16-31</b>	<b>Feb. 1-15</b>	<b>Feb. 16-29</b>	<b>Mar. 1-15</b>	<b>Mar. 16-31</b>	<b>Apr. 1-30</b>	<b>May 1-31</b>	<b>June 1-30</b>	<b>July 1-31</b>	<b>Aug. 1-31</b>	<b>Sept. 1-15</b>	<b>Sept. 16-30</b>	<b>Oct. 1-31</b>	<b>Nov. 1-30</b>	<b>Dec. 1-31</b>
<b>Colorado</b>	(DVPE)	N/A	N/A	N/A	N/A	N/A	N/A	7.80	7.80	7.80	7.80	7.80	7.80	N/A	N/A	N/A	N/A
	(Class)							A-3	A-3	A-2	A-2	A-2	A-2				
<b>Kansas</b>	(DVPE)	N/A	N/A	N/A	N/A	N/A	7.80	7.80	7.80	7.80	7.80	7.80	7.80	N/A	N/A	N/A	N/A
	(Class)						A-3	A-3	A-3	A-2	A-2	A-2	A-2				
<b>Oklahoma</b>	(DVPE)	N/A	N/A	N/A	N/A	N/A	7.80	7.80	7.80	7.80	7.80	7.80	7.80	N/A	N/A	N/A	N/A
	(Class)						A-3	A-3	A-3	A-2	A-2	A-2	A-2				
<b>Texas</b>	(DVPE)	N/A	N/A	N/A	N/A	N/A	5.70	5.70	5.70	5.70	5.70	5.70	5.70	N/A	N/A	N/A	N/A
	(Class)						AA-1	AA-1	AA-1	AA-1	AA-1	AA-1	AA-1				
<b>El Paso</b>	(DVPE)	N/A	N/A	N/A	N/A	N/A	5.70	5.70	5.70	5.70	5.70	5.70	5.70	N/A	N/A	N/A	N/A
	(Class)						AA-1	AA-1	AA-1	AA-1	AA-1	AA-1	AA-1				
<b>Wyoming</b>	(DVPE)	N/A	N/A	N/A	N/A	N/A	N/A	7.80	7.80	7.80	7.80	7.80	7.80	N/A	N/A	N/A	N/A
	(Class)							A-3	A-3	A-2	A-2	A-2	A-2				

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**Schedule of Origin Volatility Requirements**

**AR Grade**

	Jan. 1-31	Feb. 1-20	Feb. 21-28	Mar. 1-20	Mar. 21-31	Apr. 1-30	May. 1-31	June. 1-30	July. 1-31	Aug. 1-31	Sept. 1-15	Sept. 16-30	Oct. 1-31	Nov. 1-30	Dec. 1-31
<b>Texas</b> (DVPE)	13.5	13.5	11.5	9.0	Report	Report	Report	Report	Report	Report	Report	10.0	11.5	13.5	13.5
(CLASS)	D-4	D-4	D-4	A-3	A-3	A-3	A-3	A-3	A-2	A-2	A-2	B-2	C-3	D-4	D-4

**NR Grade**

	Jan. 1-31	Feb. 1-20	Feb. 21-29	Mar. 1-20	Mar. 21-31	Apr. 1-30	May. 1-31	June. 1-30	July. 1-31	Aug. 1-31	Sept. 1-15	Sept. 16-30	Oct. 1-31	Nov. 1-30	Dec. 1-31
<b>Texas</b> (DVPE)	13.5	13.5	13.5	13.5	Report	Report	Report	Report	Report	Report	Report	10.0	11.5	13.5	13.5
(CLASS)	D-4	D-4	D-4	D-4	A-3	A-3	A-3	A-3	A-2	A-2	A-2	B-2	C-3	D-4	D-4

	Jan. 1-20	Jan. 21-31	Feb. 1-10	Feb. 11-29	Feb. 20-28	Mar. 1-10	Mar. 11-30	Apr. 1-30	May. 1-31	June. 1-30	July. 1-31	Aug. 1-31	Sept. 1-15	Sept. 16-30	Oct. 1-31	Nov. 1-20	Nov. 21-31	Dec. 1-31
<b>Oklahoma</b> (DVPE)	15.0	13.5	13.5	11.5	9.0	9.0	Report	Report	Report	Report	Report	Report	Report	11.5	13.5	13.5	15.0	15.0
(Class)	E-5	D-4	D-4	C-3	A-3	A-3	A-3	A-3	A-3	A-2	A-2	A-2	A-2	C-3	D-4	D-4	E-5	E-5

Revision Date: August 12, 2014

NOTE: Gulf Coast origin changeover dates will precede this schedule by approximately 10 days, depending upon the applicable Explorer Pipeline cycle. Shipments via Explorer Pipeline must meet the specification applicable to the anticipated West Tulsa delivery date. Gulf Coast shippers will be advised of these dates through seasonal letters.

**Schedule of Origin Volatility Requirements**

**AZ(6,9) GRADE**

		<b>Jan. 1-15</b>	<b>Jan. 16-31</b>	<b>Feb. 1-20</b>	<b>Feb. 21-29</b>	<b>Mar. 1-20</b>	<b>Mar. 21-31</b>	<b>Apr. 1-30</b>	<b>May 1-31</b>	<b>June 1-30</b>	<b>July 1-31</b>	<b>Aug. 1-31</b>	<b>Sept. 1-15</b>	<b>Sept. 16-30</b>	<b>Oct. 1-31</b>	<b>Nov. 1-30</b>	<b>Dec. 1-31</b>
<b>Texas</b>	(DVPE)	8.00	8.00	8.00	8.00	5.70	5.70	5.70	5.70	5.70	5.70	5.70	5.70	5.70	8.00	8.00	8.00
	Grade	AZ6	AZ6	AZ6	AZ6	AZ9	AZ9	AZ9	AZ9	AZ9	AZ9	AZ9	AZ9	AZ9	AZ6	AZ6	AZ6
<b>El Paso</b>	(DVPE)	8.00	8.00	8.00	8.00	8.00	5.70	5.70	5.70	5.70	5.70	5.70	5.70	5.70	8.00	8.00	8.00
	Grade	AZ6	AZ6	AZ6	AZ6	AZ6	AZ9	AZ9	AZ9	AZ9	AZ9	AZ9	AZ9	AZ9	AZ6	AZ6	AZ6

**NZ(6,9) GRADE**

		<b>Jan. 1-15</b>	<b>Jan. 16-31</b>	<b>Feb. 1-20</b>	<b>Feb. 21-29</b>	<b>Mar. 1-20</b>	<b>Mar. 21-31</b>	<b>Apr. 1-30</b>	<b>May 1-31</b>	<b>June 1-30</b>	<b>July 1-31</b>	<b>Aug. 1-31</b>	<b>Sept. 1-15</b>	<b>Sept. 16-30</b>	<b>Oct. 1-31</b>	<b>Nov. 1-30</b>	<b>Dec. 1-31</b>
<b>Texas</b>	(DVPE)	8.00	8.00	8.00	8.00	5.70	5.70	5.70	5.70	5.70	5.70	5.70	5.70	5.70	8.00	8.00	8.00
	Grade	NZ6	NZ6	NZ6	NZ6	NZ9	NZ9	NZ9	NZ9	NZ9	NZ9	NZ9	NZ9	NZ9	NZ6	NZ6	NZ6
<b>El Paso</b>	(DVPE)	8.00	8.00	8.00	8.00	8.00	5.70	5.70	5.70	5.70	5.70	5.70	5.70	5.70	8.00	8.00	8.00
	Grade	NZ6	NZ6	NZ6	NZ6	NZ6	NZ9	NZ9	NZ9	NZ9	NZ9	NZ9	NZ9	NZ9	NZ6	NZ6	NZ6

Revision Date: July 1, 2017

NOTE: Gulf Coast origin changeover dates will precede this schedule by approximately 10 days, depending upon the applicable Explorer Pipeline cycle. Shipments via Explorer Pipeline must meet the specification applicable to the anticipated West Tulsa delivery date. Gulf Coast shippers will be advised of these dates through seasonal letters.

**Schedule of Origin Volatility Requirements**

**NEP GRADE**

		<b>Jan.</b>	<b>Jan.</b>	<b>Feb.</b>	<b>Feb.</b>	<b>Mar.</b>	<b>Mar.</b>	<b>Apr.</b>	<b>May</b>	<b>June</b>	<b>July</b>	<b>Aug.</b>	<b>Sept.</b>	<b>Sept.</b>	<b>Oct.</b>	<b>Nov.</b>	<b>Dec.</b>
		<b>1-15</b>	<b>16-31</b>	<b>1-15</b>	<b>16-29</b>	<b>1-15</b>	<b>16-31</b>	<b>1-30</b>	<b>1-31</b>	<b>1-30</b>	<b>1-31</b>	<b>1-31</b>	<b>1-15</b>	<b>16-30</b>	<b>1-31</b>	<b>1-30</b>	<b>1-31</b>
<b>Texas</b>	(DVPE)	11.50	11.50	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	11.50	11.50
	(Class)	C-3	C-3	B-2	B-2	B-2	B-2	B-2	B-2	B-2	B-2	B-2	B-2	B-2	B-2	C-3	C-3
<b>El Paso</b>	(DVPE)	11.50	11.50	11.50	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	11.50	11.50
	(Class)	C-3	C-3	C-3	B-2	B-2	B-2	B-2	B-2	B-2	B-2	B-2	B-2	B-2	B-2	C-3	C-3



**Schedule of Origin Volatility Requirements**

<b><u>V GRADE</u></b>		<b>Jan.</b>	<b>Jan.</b>	<b>Feb.</b>	<b>Feb.</b>	<b>Mar.</b>	<b>Mar.</b>	<b>Apr.</b>	<b>May</b>	<b>June</b>	<b>July</b>	<b>Aug.</b>	<b>Sept.</b>	<b>Sept.</b>	<b>Oct.</b>	<b>Nov.</b>	<b>Dec.</b>
		<b>1-15</b>	<b>16-31</b>	<b>1-15</b>	<b>16-29</b>	<b>1-15</b>	<b>16-31</b>	<b>1-30</b>	<b>1-31</b>	<b>1-30</b>	<b>1-31</b>	<b>1-31</b>	<b>1-15</b>	<b>16-30</b>	<b>1-31</b>	<b>1-30</b>	<b>1-31</b>
<b>Kansas</b>	(DVPE)	15.00	13.50	13.50	13.50	8.50	8.50	8.50	9.00	9.00	9.00	9.00	9.00	10.00	11.50	13.50	15.00
	(Class)	E-5	D-5	D-5	D-5	A-4	A-4	A-3	A-3	A-2	A-2	A-2	A-2	B-2	C-3	D-4	E-5
<b>Illinois</b>	(DVPE)	15.00	13.50	13.50	13.50	13.50	9.00	9.00	9.00	9.00	9.00	9.00	9.00	11.50	13.50	13.50	15.00
	(Class)	E-5	D-5	D-5	D-5	D-5	A-4	A-4	A-4	A-3	A-3	A-3	A-3	C-3	D-4	D-4	E-5
<b>Minnesota</b>	(DVPE)	15.00	15.00	13.50	13.50	8.50	8.50	8.50	9.00	9.00	9.00	9.00	9.00	11.50	13.50	15.00	15.00
	(Class)	E-5	E-5	D-5	D-5	A-4	A-4	A-4	A-4	A-3	A-3	A-3	A-3	C-3	D-4	E-5	E-5
<b>N. Dakota</b>	(DVPE)	15.00	15.00	13.50	13.50	8.50	8.50	8.50	9.00	9.00	9.00	9.00	9.00	11.50	13.50	15.00	15.00
	(Class)	E-5	E-5	D-5	D-5	A-4	A-4	A-4	A-4	A-3	A-3	A-3	A-3	C-3	D-4	E-5	E-5
<b>Oklahoma</b>	(DVPE)	13.50	13.50	13.50	13.50	8.50	8.50	8.50	9.00	9.00	9.00	9.00	9.00	10.00	11.50	13.50	15.00
	(Class)	D-5	D-5	D-4	D-4	A-4	A-4	A-3	A-3	A-2	A-2	A-2	A-2	B-2	C-3	D-4	E-5
<b>Texas</b>	(DVPE)	13.50	13.50	13.50	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	10.00	11.50	13.50	13.50
	(Class)	D-5	D-5	D-4	A-4	A-4	A-4	A-3	A-3	A-2	A-2	A-2	A-2	B-2	C-3	D-4	D-5
<b>El Paso</b>	(DVPE)	13.50	13.50	11.50	10.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	10.00	11.50	13.50	13.50
	(Class)	D-5	D-5	C-4	B-2	A-4	A-4	A-3	A-3	A-2	A-2	A-2	A-2	B-2	C-3	D-4	D-5
<b>Wisconsin</b>	(DVPE)	15.00	15.00	13.50	13.50	8.50	8.50	8.50	9.00	9.00	9.00	9.00	9.00	11.50	13.50	15.00	15.00
	(Class)	E-5	E-5	D-5	D-5	A-4	A-4	A-4	A-4	A-3	A-3	A-3	A-3	C-3	D-4	E-5	E-5

Revision Date: November 1, 2017

NOTE: Gulf Coast origin changeover dates will precede this schedule by approximately 10 days, depending upon the applicable Explorer Pipeline cycle. Shipments via Explorer Pipeline must meet the specification applicable to the anticipated West Tulsa delivery date. Gulf Coast shippers will be advised of these dates through seasonal letters.

**Schedule of Origin Volatility Requirements**

**V1 GRADE**

		Jan. 1-15	Jan. 16-31	Feb. 1-15	Feb. 16-29	Mar. 1-15	Mar. 16-31	Apr. 1-30	May 1-31	June 1-30	July 1-31	Aug. 1-31	Sept. 1-15	Sept. 16-30	Oct. 1-31	Nov. 1-30	Dec. 1-31
<b>Colorado</b>	(DVPE)	15.00	15.00	15.00	13.50	11.50	11.50	9.00	9.00	9.00	9.00	9.00	9.00	10.00	11.50	13.50	15.00
	(Class)	E-5	E-5	E-5	D-5	C-3	C-3	A-3	A-3	A-2	A-2	A-2	A-2	B-2	C-3	D-4	E-5
<b>Kansas</b>	(DVPE)	15.00	15.00	13.50	13.50	11.50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	10.00	11.50	13.50	15.00
	(Class)	E-5	E-5	D-5	D-5	C-3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	B-2	C-3	D-4	E-5
<b>Oklahoma</b>	(DVPE)	15.00	15.00	13.50	13.50	11.50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	10.00	11.50	13.50	15.00
	(Class)	E-5	E-5	D-5	D-5	C-3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	B-2	C-3	D-4	E-5
<b>Wyoming</b>	(DVPE)	15.00	15.00	15.00	13.50	11.50	11.50	9.00	9.00	9.00	9.00	9.00	9.00	10.00	11.50	13.50	15.00
	(Class)	E-5	E-5	E-5	D-5	C-3	C-3	A-3	A-3	A-2	A-2	A-2	A-2	B-2	C-3	D-4	E-5

**V2 GRADE**

		Jan. 1-15	Jan. 16-31	Feb. 1-15	Feb. 16-29	Mar. 1-15	Mar. 16-31	Apr. 1-30	May 1-31	June 1-30	July 1-31	Aug. 1-31	Sept. 1-15	Sept. 16-30	Oct. 1-31	Nov. 1-30	Dec. 1-31
<b>Wyoming</b>	(DVPE)	15.00	15.00	15.00	15.00	11.50	11.50	9.00	9.00	9.00	9.00	9.00	9.00	11.50	13.50	15.00	15.00
	(Class)	E-5	E-5	E-5	E-5	C-3	C-3	A-4	A-4	A-3	A-3	A-3	A-3	C-3	D-4	E-5	E-5
<b>Colorado</b>	(DVPE)	15.00	15.00	15.00	15.00	11.50	11.50	9.00	9.00	9.00	9.00	9.00	9.00	11.50	13.50	15.00	15.00
	(Class)	E-5	E-5	E-5	E-5	C-3	C-3	A-4	A-4	A-3	A-3	A-3	A-3	C-3	D-4	E-5	E-5

Revision Date: November 1, 2017

NOTE: Gulf Coast origin changeover dates will precede this schedule by approximately 10 days, depending upon the applicable Explorer Pipeline cycle. Shipments via Explorer Pipeline must meet the specification applicable to the anticipated West Tulsa delivery date. Gulf Coast shippers will be advised of these dates through seasonal letters.

**Schedule of Origin Volatility Requirements**

**V3 GRADE**

		<b>Jan. 1-15</b>	<b>Jan. 16-31</b>	<b>Feb. 1-15</b>	<b>Feb. 16-29</b>	<b>Mar. 1-15</b>	<b>Mar. 16-31</b>	<b>Apr. 1-30</b>	<b>May 1-31</b>	<b>June 1-30</b>	<b>July 1-31</b>	<b>Aug. 1-31</b>	<b>Sept. 1-15</b>	<b>Sept. 16-30</b>	<b>Oct. 1-31</b>	<b>Nov. 1-30</b>	<b>Dec. 1-31</b>
<b>El Paso</b>	(DVPE)	13.50	13.50	11.50	11.50	10.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	10.00	11.50	13.50	13.50
	(Class)	D-4	D-4	C-3	C-3	B-2	A-2	A-2	A-2	A-2	A-2	A-2	A-2	B-2	C-3	D-4	D-4

**V3S GRADE**

		<b>Jan. 1-15</b>	<b>Jan. 16-31</b>	<b>Feb. 1-15</b>	<b>Feb. 16-29</b>	<b>Mar. 1-15</b>	<b>Mar. 16-31</b>	<b>Apr. 1-30</b>	<b>May 1-31</b>	<b>June 1-30</b>	<b>July 1-31</b>	<b>Aug. 1-31</b>	<b>Sept. 1-15</b>	<b>Sept. 16-30</b>	<b>Oct. 1-31</b>	<b>Nov. 1-30</b>	<b>Dec. 1-31</b>
<b>El Paso</b>	(DVPE)	N/A	N/A	N/A	N/A	N/A	5.70	5.70	5.70	5.70	5.70	5.70	5.70	N/A	N/A	N/A	N/A
	(Class)						AA-1	AA-1	AA-1	AA-1	AA-1	AA-1	AA-1				

Revision Date: November 1, 2017

NOTE: Gulf Coast origin changeover dates will precede this schedule by approximately 10 days, depending upon the applicable Explorer Pipeline cycle. Shipments via Explorer Pipeline must meet the specification applicable to the anticipated West Tulsa delivery date. Gulf Coast shippers will be advised of these dates through seasonal letters.

**Schedule of Origin Volatility Requirements**

**V8 GRADE**

		Jan. 1-15	Jan. 16-31	Feb. 1-15	Feb. 16-29	Mar. 1-31	Apr. 1-15	Apr. 16-30	May 1-31	June 1-30	July 1-31	Aug. 1-31	Sept. 1-15	Sept. 16-30	Oct. 1-31	Nov. 1-30	Dec. 1-31
<b>Kansas</b>	(DVPE)	N/A	15.00	15.00	15.00	13.50	11.50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	(Class)		E-5	E-5	E-5	D-4	C-3										
<b>Minnesota</b>	(DVPE)	N/A	N/A	15.00	15.00	13.50	11.50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	(Class)			E-5	E-5	D-4	C-3										
<b>Oklahoma</b>	(DVPE)	N/A	15.00	13.50	13.50	13.50	11.50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	(Class)		E-5	D-4	D-4	D-4	C-3										
<b>Wisconsin</b>	(DVPE)	N/A	N/A	15.00	15.00	13.50	11.50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	(Class)			E-5	E-5	D-4	C-3										

**V66 GRADE**

		Jan. 1-15	Jan. 16-31	Feb. 1-15	Feb. 16-29	Mar. 1-15	Mar. 16-31	Apr. 1-30	May 1-31	June 1-30	July 1-31	Aug. 1-31	Sept. 1-15	Sept. 16-30	Oct. 1-31	Nov. 1-30	Dec. 1-31
	(DVPE)	N/A	N/A	N/A	N/A	N/A	N/A	6.60	6.60	6.60	6.60	6.60	6.60	6.60	N/A	N/A	N/A
	(Class)							A-3	A-3	A-2	A-2	A-2	A-2	A-2			

Revision Date: November 1, 2017

NOTE: Gulf Coast origin changeover dates will precede this schedule by approximately 10 days, depending upon the applicable Explorer Pipeline cycle. Shipments via Explorer Pipeline must meet the specification applicable to the anticipated West Tulsa delivery date. Gulf Coast shippers will be advised of these dates through seasonal letters.

**Schedule of Origin Volatility Requirements**

**V68 GRADE**

	<b>Jan. 1-15</b>	<b>Jan. 16-31</b>	<b>Feb. 1-15</b>	<b>Feb. 16-29</b>	<b>Mar. 1-15</b>	<b>Mar. 16-31</b>	<b>Apr. 1-30</b>	<b>May 1-31</b>	<b>June 1-30</b>	<b>July 1-31</b>	<b>Aug. 1-31</b>	<b>Sept. 1-15</b>	<b>Sept. 16-30</b>	<b>Oct. 1-31</b>	<b>Nov. 1-30</b>	<b>Dec. 1-31</b>
(DVPE) (Class)	N/A	N/A	N/A	N/A	N/A	N/A	6.80 A-3	6.80 A-2	6.80 A-2	6.80 A-2	6.80 A-2	6.80 A-2	N/A	N/A	N/A	N/A

**VTX GRADE**

	<b>Jan. 1-15</b>	<b>Jan. 16-31</b>	<b>Feb. 1-15</b>	<b>Feb. 16-29</b>	<b>Mar. 1-15</b>	<b>Mar. 16-31</b>	<b>Apr. 1-30</b>	<b>May 1-31</b>	<b>June 1-30</b>	<b>July 1-31</b>	<b>Aug. 1-31</b>	<b>Sept. 1-15</b>	<b>Sept. 16-30</b>	<b>Oct. 1-31</b>	<b>Nov. 1-30</b>	<b>Dec. 1-31</b>
(DVPE) (Class)	13.50 D-5	13.50 D-5	13.50 D-4	11.50 C-4	9.00 A-4	9.00 A-4	9.00 A-3	9.00 A-3	9.00 A-2	9.00 A-2	9.00 A-2	9.00 A-2	10.00 B-2	11.50 C-3	13.50 D-4	13.50 D-5

Revision Date: November 1, 2017

NOTE: Gulf Coast origin changeover dates will precede this schedule by approximately 10 days, depending upon the applicable Explorer Pipeline cycle. Shipments via Explorer Pipeline must meet the specification applicable to the anticipated West Tulsa delivery date. Gulf Coast shippers will be advised of these dates through seasonal letters.

**Schedule of Origin Volatility Requirements**

**VMS GRADE**

		<b>Jan. 1-15</b>	<b>Jan. 16-31</b>	<b>Feb. 1-15</b>	<b>Feb. 16-29</b>	<b>Mar. 1-15</b>	<b>Mar. 16-31</b>	<b>Apr. 1-30</b>	<b>May 1-31</b>	<b>June 1-30</b>	<b>July 1-31</b>	<b>Aug. 1-31</b>	<b>Sept. 1-15</b>	<b>Sept. 16-30</b>	<b>Oct. 1-31</b>	<b>Nov. 1-30</b>	<b>Dec. 1-31</b>
<b>Colorado</b>	(DVPE) (Class)	N/A	N/A	N/A	N/A	N/A	N/A	7.80 A-3	7.80 A-3	7.80 A-2	7.80 A-2	7.80 A-2	7.80 A-2	N/A	N/A	N/A	N/A
<b>Kansas</b>	(DVPE) (Class)	N/A	N/A	N/A	N/A	N/A	7.80 A-3	7.80 A-3	7.80 A-3	7.80 A-2	7.80 A-2	7.80 A-2	7.80 A-2	N/A	N/A	N/A	N/A
<b>Oklahoma</b>	(DVPE) (Class)	N/A	N/A	N/A	N/A	N/A	7.80 A-3	7.80 A-3	7.80 A-3	7.80 A-2	7.80 A-2	7.80 A-2	7.80 A-2	N/A	N/A	N/A	N/A
<b>Texas</b>	(DVPE) (Class)	N/A	N/A	N/A	N/A	N/A	7.80 A-3	7.80 A-3	7.80 A-3	7.80 A-2	7.80 A-2	7.80 A-2	7.80 A-2	N/A	N/A	N/A	N/A
<b>Wyoming</b>	(DVPE) (Class)	N/A	N/A	N/A	N/A	N/A	N/A	7.80 A-3	7.80 A-3	7.80 A-2	7.80 A-2	7.80 A-2	7.80 A-2	N/A	N/A	N/A	N/A

Revision Date: March 15, 2016

NOTE: Gulf Coast origin changeover dates will precede this schedule by approximately 10 days, depending upon the applicable Explorer Pipeline cycle. Shipments via Explorer Pipeline must meet the specification applicable to the anticipated West Tulsa delivery date. Gulf Coast shippers will be advised of these dates through seasonal letters.

## A Grade Premium Unleaded Gasoline Specifications

(Conventional Gasoline - This product does not meet the requirements for reformulated gasoline and may not be used in any reformulated gasoline covered area.)

Product Property	Test Method	Origin		Deliveries <sup>1/</sup>
		Minimum	Maximum	
Gravity, ° API	D287		Report	
Color			Undyed	
Volatility <sup>2/</sup>				
Benzene, vol %	D3606		4.9	
Mercaptan Sulfur, wt % <sup>3/</sup>	D3227		0.003	
Copper Corrosion	D130		1	
Silver Corrosion	D7667, 7671		1	
Gum, Existent, mg/100 ml	D381		4	5
Oxidation Stability, minutes	D525	240		
Phosphorus, g/gal	D3231		0.003	0.005
Lead, g/gal	D3237		0.010	0.05
Octane				
RON	D2699		Report	
MON	D2700		Report	
(R+M)/2		91.0		
Sulfur, ppm	D2622		80	
Oxygenates, vol%	D4815, D5599		0.05	
Haze Rating <sup>4/</sup>	D4176		2	3
NACE Corrosion	TM0172, D7548	B+		
Odor <sup>5/</sup>			Nonoffensive	

1/ Delivered products meets all applicable requirements at time and place of delivery.

2/ Refer to Seasonal Gasoline Volatility Schedule.

3/ Mercaptan Sulfur determination is waived if the result of the Doctor Test ASTM D4952 is negative.

4/ Compliance with ASTM D4176 will be determined using Procedure 2 at the following temperatures, adjusted seasonally:

February 16 – September 30	55 °F max
October 1– February 15	45 °F max

5/ Any gasoline exhibiting an offensive odor and/or containing more than 0.30 wt % dicyclopentadiene will not be accepted for shipment.

### A1 Grade Premium Unleaded Gasoline Specifications

(Conventional Gasoline – This product does not meet the requirements for reformulated gasoline and may not be used in any reformulated gasoline covered area.)

Product Property	Test Method	Origin		Deliveries <sup>1/</sup>
		Minimum	Maximum	
Gravity, ° API	D287	Report		
Color		Undyed		
Volatility <sup>2/</sup>				
Benzene, vol %	D3606		4.9	
Mercaptan Sulfur, wt % <sup>3/</sup>	D3227		0.003	
Copper Corrosion	D130		1	
Silver Corrosion	D4814		1	
Gum, Existent, mg/100 ml	D381		4	5
Oxidation Stability, minutes	D525	240		
Phosphorus, g/gal	D3231		0.003	0.005
Lead, g/gal	D3237		0.010	0.05
Octane				
RON	D2699		Report	
MON	D2700		Report	
(R+M)/2		91.0		
Sulfur, ppm <sup>4/</sup>	D2622		80	
Oxygenates, vol %	D4815, D5599		0.05	
Haze Rating <sup>5/</sup>	D4176		2	3
NACE Corrosion	TM0172, D7548	B+		
Odor <sup>6/</sup>			Nonoffensive	

1/ Delivered products meets all applicable requirements at time and place of delivery.

2/ Refer to Seasonal Gasoline Volatility Schedule.

3/ Mercaptan Sulfur determination is waived if the result of the Doctor Test ASTM D4952 is negative.

4/ Gasoline exceeding the origin specification will be accepted from small refineries as defined in 40 CFR part 80 of the EPA regulations, subject to the special handling fee specified in Magellan Pipelines rules and regulations tariff.

5/ Compliance with ASTM D4176 will be determined using Procedure 2 at the following temperatures, adjusted seasonally:  
    February 16 – September 30                      55 °F max  
    October 1– February 15                              45 °F max

6/ Any gasoline exhibiting an offensive odor and/or containing more than 0.30 wt % dicyclopentadiene will not be accepted for shipment.



## A1X Grade Premium Unleaded Gasoline Specifications

This is for export only and not for retail use in the United States

Product Property	Test Method	Minimum	Origin		Deliveries <sup>1/</sup>
			Maximum		
Gravity, ° API	D287		Report		
Color			Undyed		
Volatility <sup>2/</sup>					
Distillation	D86	<u>Class A</u>	<u>Class B</u>	<u>Class C</u>	
10% Evaporated °F, max		158	149	140	
50% Evaporated °F, min		170	170	170	
50% Evaporated °F, max		250	245	240	
90% Evaporated °F, max		374	374	365	
Final Boiling Point °F, max		430	430	430	
Residue, vol% max		2	2	2	
Drivability Index, max		1250	1240	1230	
		<u>Class 1</u>	<u>Class 2</u>	<u>Class 3</u>	
Vapor Liquid Ratio °F, min	D5188	129	122	116	
Benzene, vol %	D3606		2.0		
Mercaptan Sulfur, wt % <sup>3/</sup>	D3227		0.002		
Copper Corrosion	D130		1		
Silver Corrosion	D7667,7671		1		
Gum, Existent, mg/100 ml	D381		4	5	
Oxidation Stability, minutes	D525	240			
Phosphorus, g/gal	D3231		0.003	0.005	
Lead, g/gal	D3237		0.010	0.05	
Octane					
RON	D2699	94.0			
MON	D2700		Report		
Report (R+M)/2		91.0			
Sulfur, ppm	D2622		80		
Oxygenates, vol %	D4815, D5599		0.05		
Haze Rating <sup>4/</sup>	D4176		2	3	
NACE Corrosion	TM0172, D7548	B+			
Odor <sup>5/</sup>			Nonoffensive		

- 1/ Delivered products meet all applicable requirements at time and place of delivery.
- 2/ Refer to Seasonal Gasoline Volatility Schedule.
- 3/ Mercaptan Sulfur determination is waived if the result of the Doctor Test ASTM D4952 is negative.
- 4/ Compliance with ASTM D4176 will be determined using Procedure 2 at the following temperatures, adjusted seasonally:

February 16 – September 30	55 °F max
October 1– February 15	45 °F max
- 5/ Any gasoline exhibiting an offensive odor and/or containing more than 0.30 wt % dicyclopentadiene will not be accepted for shipment.

### A3 Premium Unleaded Gasoline Specifications

(Conventional Gasoline - This product does not meet the requirements for reformulated gasoline and may not be used in any reformulated gasoline covered area.)

Product Property	Test Method	Origin		Deliveries <sup>1/</sup>
		Test Results Minimum	Test Results Maximum	
Gravity, °API	D287	Report		
Color		Undyed		
Volatility <sup>2/</sup>				
Benzene, vol %	D3606		4.9	
Mercaptan Sulfur, wt % <sup>3/</sup>	D3227		0.003	
Copper Corrosion	D130		1	
Silver Corrosion	D7667, D7671		1	
Gum, Existent, mg/100 ml	D381		4	5
Oxidation Stability, minutes	D525	240		
Phosphorus, g/gal	D3231		0.003	0.005
Lead, g/gal	D3237		0.010	0.05
Octane				
RON	D2699	94.0		
MON	D2700	87.0		
(R+M)/2		93.0		
Sulfur, ppm <sup>4/</sup>	D2622		80	
Oxygenates, vol %	D4815, D5599		0.05	
Haze Rating <sup>5/</sup>	D4176		2	3
NACE Corrosion	TM0172, D7548	B+		
Odor <sup>6/</sup>			Nonoffensive	

1/ Delivered products meets all applicable requirements at time and place of delivery.

2/ Refer to Seasonal Gasoline Volatility Schedule.

3/ Mercaptan Sulfur determination is waived if the result of the Doctor Test ASTM D4952 is negative.

4/ Gasoline exceeding the origin specification will be accepted from small refineries as defined in 40 CFR part 80 of the EPA regulations, subject to the special handling fee specified in Magellan Pipelines rules and regulations tariff.

5/ Compliance with ASTM D4176 will be determined using Procedure 2 at the following temperatures, adjusted seasonally:

February 16 – September 30                      55 °F max

October 1– February 15                              45 °F max

6/ Any gasoline exhibiting an offensive odor and/or containing more than 0.30 wt % dicyclopentadiene will not be accepted for shipment.

**A5. AMS Grade 88.5 Sub-Octane Premium Unleaded Gasoline Specifications**

(Conventional Gasoline - This product does not meet the requirements for reformulated gasoline and may not be used in any reformulated gasoline covered area.)

Product Property	Test Method	Minimum	Origin	Deliveries <sup>1/</sup>
			Maximum	
Gravity, ° API	D287		Report	
Color			Undyed	
Volatility <sup>2/</sup>				
Benzene, vol %	D3606		4.9	
Mercaptan Sulfur, wt % <sup>3/</sup>	D3227		0.002	
Copper Corrosion	D130		1	
Silver Corrosion	D7667,7671		1	
Gum, Existent, mg/100 ml	D381		4	5
Oxidation Stability, minutes	D525	240		
Phosphorus, g/gal	D3231		0.003	0.005
Lead, g/gal	D3237		0.010	0.05
Octane				
RON	D2699		Report	
MON	D2700		Report	
(R+M)/2		88.5		
Sulfur, ppm	D2622		80	
Oxygenates, vol %	D4815, 5599		0.05	
Haze Rating <sup>4/</sup>	D4176		2	3
NACE Corrosion	TM0172, D7548	B+		
Odor <sup>5/</sup>			Nonoffensive	

1/ Delivered products meets all applicable requirements at time and place of delivery.

2/ Refer to Seasonal Gasoline Volatility Schedule.

3/ Mercaptan Sulfur determination is waived if the result of the Doctor Test ASTM D4952 is negative.

4/ Compliance with ASTM D4176 will be determined using Procedure 2 at the following temperatures, adjusted seasonally: February 16 – September 30      55 °F max  
October 1– February 15                                      45 °F max

5/ Any gasoline exhibiting an offensive odor and/or containing more than 0.30 wt % dicyclopentadiene will not be accepted for shipment.

**AR Grade Premium Gasoline Blendstock (RBOB)**

For Blending With 10.0% Denatured Fuel Ethanol (92% Purity) As Defined In ASTM D4806  
VOC-Controlled Region 1 Complex Model Phase II

Product Property	Test Method	Origin		Deliveries <sup>1/</sup>		
		Minimum	Maximum			
Gravity, ° API <sup>8/</sup>	D287	Report				
Color		Undyed				
Volatility <sup>2/ 8/ 9/</sup>						
Distillation	D86					
	<u>Class AA</u>	<u>Class A</u>	<u>Class B</u>	<u>Class C</u>	<u>Class D</u>	<u>Class E</u>
10% Evaporated °F, max	158	158	149	140	131	122
50% Evaporated °F, min	150	150	150	150	150	150
50% Evaporated °F, max	250	250	245	240	235	230
90% Evaporated °F, max	374	374	374	365	365	365
Final Boiling Point °F, max	430	430	430	430	430	430
Residue, vol% max	2	2	2	2	2	2
Drivability Index, max	D4814					
	1250	1250	1240	1230	1220	1200
Vapor/Liquid Ratio = 20:1; °F min <sup>4/</sup>	D5188					
		<u>Class 1</u>	<u>Class 2</u>	<u>Class 3</u>	<u>Class 4</u>	<u>Class 5</u>
		129	122	116	107	102
E200 (vol%)	D86			30	70	
E300 (vol%)	D86			70	100	
Emission Performance Reduction (%)				-27		
Mercaptan Sulfur, wt % <sup>3/</sup>	D3227				0.003	
Copper Corrosion	D130				1	
Silver Corrosion	D7667,7671				1	
Gum, Existent, mg/100 ml	D381				4	5
Oxidation Stability, minutes <sup>8/</sup>	D525			240		
Octane						
RON	D2699				Report	
MON	D2700				Report	
(R+M)/2				93		
Phosphorus, g/gal	D3231				0.003	0.005
Benzene, vol %	D3606				1.3	
Aromatics (vol %) <sup>4/</sup>					50	
Olefins (vol %)	D1319				25	
Sulfur, ppm	D2622				80	
Oxygen Content wt % <sup>5/</sup>	D5599			1.5	4	
Oxygenates, (vol %) <sup>8/</sup>	D4815				0.05	
Haze Rating <sup>6/ 8/</sup>	D4176				2	3
NACE Corrosion <sup>8/</sup>	TM0172, D7548			B+		
Odor <sup>7/ 8/</sup>					Nonoffensive	

**AR Grade Premium Gasoline Blendstock (RBOB) (continued)**

- 1/ Delivered products meets all applicable requirements at time and place of delivery.
- 2/ Refer to Seasonal Gasoline Volatility Schedule.
- 3/ Mercaptan Sulfur determination is waived if the result of the Doctor Test ASTM D4952 is negative.
- 4/ Refer to test methods in 40 CFR Chapter 1, Part 80.46.
- 5/ Oxygen content must meet a minimum of 1.5 wt. % and a maximum of 4.0 wt. % after blending of denatured fuel ethanol.
- 6/ Compliance with ASTM D4176 will be determined using Procedure 2 at the following temperatures, adjusted seasonally:

February 16 – September 30	55 °F max
October 1– February 15	45 °F max
- 7/ Any gasoline exhibiting an offensive odor and/or containing more than 0.30 wt % dicyclopentadiene will not be accepted for shipment.
- 8/ Specifications must be met before blending of denatured fuel ethanol except for vapor pressure during the VOC compliance period, March 20<sup>th</sup> through September 15<sup>th</sup>, will be reported on the blended fuel.
- 9/ For products blended to meet EPA or state imposed summer VOC requirements, test must be performed for RVP in accordance with procedure described in 40 CFR, PART 80, Appendix E, Method 3.

**\*\*NOTE: This RBOB may not be combined with any other RBOB except RBOB having the same requirement for oxygenate type and amount. "Base Gasoline" Not for sale to the ultimate consumer.**

**\*\*NOTE: Heavy metals are not allowed to be present.**

**\*\*NOTE: All parameters must be met after blending with denatured fuel ethanol unless noted.**

**AZ6 Grade Arizona Winter Cleaner Burning Gasoline (AZRBOB)**

Product Property	Test Method	Origin	
		Minimum	Maximum
Gravity °API @ 60°F	D 287	Report	
Octane (after 10% E Fuel ethanol per ASTM D4806)			
RON	D 2699	Report	
MON	D 2700	Report	
(R+M)/2		91.0	
Oxygen Content (wt%) <sup>1/</sup>	D 4815		0.05
RVP (psi)	D 5191		8.00
Distillation (°F)	D86		
50%			237
90%			335
End Point			430
Benzene (vol%)	D 3606		4.9
Aromatics (vol%)	D 5769, D5580		30.0
Olefins (vol%)	D 1319, D6650		10.0
Corrosion (Cu)3 hrs @ 122°F(50°C)	D 130		1
Corrosion (Ag) 3 hrs @122°F (50°C)	D 7667,7671		1
Mercaptan sulfur (wt.%) <sup>2/</sup>	D 3227		0.002
Existent Gum (mg/100 ml)	D 381		4
Oxidation stability (minutes)	D 525	240	
Phosphorous (gms/gal)	D 3231		0.003
Lead (gms/gal)	D 5059		0.01
Sulfur (ppm)	D 5453, D2622		80
NACE	TM0172, D7548	B+	
Haze <sup>3/</sup>	D 4176		2
CARB Predictive Model			Pass
Color			Undyed
Odor	Olfactory		Non-Offensive

**AZ6 Grade Arizona Winter Cleaner Burning Gasoline (AZRBOB) (continued)**

- 1/ Total oxygen levels shall not exceed de minimums levels. The use of non-hydrocarbon blending components such as MTBE is prohibited.
- 2/ Mercaptan Sulfur determination is waived if the result of the Doctor Test ASTM D4952 is negative.
  
- 3/ Product must be tested at 55°F or tank temperature whichever is lower.
  - Product must be certified according to current Arizona AZRBOB regulations from a state of Arizona registered supplier.
  - In addition to the above a LPP Product Transfer Document for AZRBOB must be filled out and provided to Magellan Pipe Line Quality Control.
  - All gasoline must meet latest revision of ASTM D 4814.
  - Corrosion inhibitors, gum inhibitors and metal deactivators must be approved by Magellan Pipeline
  - No additives or corrosion inhibitors containing phosphorus may be used in this gasoline.
  - The shipment of fuels containing Port Fuel Injector (PFI) and intake valve detergent additives is prohibited. This is a base gasoline, not for sale to the ultimate consumer
  - Any gasoline exhibiting an offensive and/or containing more than 0.50wt % dicyclopentadiene will not be accepted for shipment.
  - AZRBOB does not comply with the standards for Arizona CBG without the addition of oxygenate.
  - This AZRBOB is intended for blending with 10% volume ethanol and may not be combined with AZRBOB's requiring oxygenate blending with any other type or amount of oxygenate.



**AZ9 Grade Arizona Summer Cleaner Burning Gasoline (AZRBOB)**

Product Property	Test Method	Origin	
		Test Results	
		Minimum	Maximum
Gravity °API @ 60°F	D 287	Report	
Octane (after 10% E Fuel ethanol per ASTM D4806)			
RON	D 2699	Report	
MON	D 2700	Report	
(R+M)/2		91.0	
Oxygen Content (wt%) <sup>1/</sup>	D 4815		0.05
RVP (psi)	D 5191		5.70
Distillation (°F)	D86		
E200		25%	65%
E300		65%	100%
End Point			430
Benzene (vol%)	D 3606		4.9
Aromatics (vol%)	D 5769/ D5580		55
Olefins (vol%)	D 1319, D6650		25
Corrosion (Cu)3 hrs @ 122°F(50°C)	D 130		1
Corrosion (Ag) 3 hrs @122°F (50°C)	D 7667,7671		1
Mercaptan sulfur (wt.) <sup>2/</sup>	D 3227		0.002
Existent Gum (mg/100 ml)	D 381		4
Oxidation stability (minutes)	D 525	240	
Phosphorous (gms/gal)	D 3231		0.003
Lead (gms/gal)	D 5059		0.01
Sulfur (ppm)	D 5453, D2622		80
NACE	TM0172, D7548	B+	
Haze <sup>3/</sup>	D 4176		2
VOC Emission Performance Reduction (%)		-27.5	
Color		Undyed	
Odor	Olfactory	Non-Offensive	

**AZ9 Grade Arizona Winter Cleaner Burning Gasoline (AZRBOB) (continued)**

- 1/ Total oxygen levels shall not exceed the minimums levels. The use of non-hydrocarbon blending components such as MTBE is prohibited.
- 2/ Mercaptan Sulfur determination is waived if the result of the Doctor Test ASTM D4952 is negative.
- 3/ Product must be tested at 55°F or tank temperature whichever is lower.
  - Product must be certified according to current Arizona AZRBOB regulations from a state of Arizona registered supplier.
  - In addition to the above a LPP Product Transfer Document for AZRBOB must be filled out and provided to Magellan Pipe Line Quality Control.
  - All gasoline must meet latest revision of ASTM D 4814.
  - Corrosion inhibitors, gum inhibitors and metal deactivators must be approved by Magellan Pipeline
  - No additives or corrosion inhibitors containing phosphorus may be used in this gasoline.
  - The shipment of fuels containing Port Fuel Injector (PFI) and intake valve detergent additives is prohibited. This is a base gasoline, not for sale to the ultimate consumer
  - Any gasoline exhibiting an offensive and/or containing more than 0.50wt % dicyclopentadiene will not be accepted for shipment.
  - AZRBOB does not comply with the standards for Arizona CBG without the addition of oxygenate.
  - This AZRBOB is intended for blending with 10% volume ethanol and may not be combined with AZRBOB's requiring oxygenate blending with any other type or amount of oxygenate.

### D Grade Premium Diesel Fuel Specifications

Product Property	Test Method	Origin Test Results		Deliveries <sup>1/</sup>
		Minimum	Maximum	
Gravity, °API	D287	Report		
Color	D1500		2.0	2.5
Distillation <sup>5/</sup>	D86, D2887			
IBP, °F		340		
50% Recovered, °F		460		
90% Recovered, °F		540	640	
Copper Corrosion	D130		1	
Cetane				
Cetane Number	D613	48		
Or				
Cetane Index, A or B	D4737	48		
Cetane Index <sup>2/</sup>	D976	40		
Flash Point, □F	D93	140		140
Stability				
Thermal, % reflectance (W or Y)	D6468 (W)	75		
	D6468 (Y)	82		
Aging Period (Minutes)	D6468	90		
Carbon Residue on 10% Bottoms, wt %	D524		0.20	
Cloud Point, □F <sup>3/</sup>	D2500			
Pour Point, °F <sup>3/</sup>	D97			
Viscosity, cSt at 104 □F	D445	1.9	4.1	
Ash, wt %	D482		0.01	
Haze Rating <sup>4/</sup>	D4176		2	3
NACE Corrosion	TM0172, D7548	B+		
Sulfur, ppm	D2622		11	

**D Grade Premium Diesel Fuel Specifications (continued)**

- 1/ Delivered products meets all applicable requirements at time and place of delivery
- 2/ ASTM D976 result is required for low sulfur fuel oils to demonstrate aromatics compliance per the EPA.

<u>Month</u>	<u>Pour Point °F, max</u>	<u>Cloud Point °F, max</u>
January	0	+14
February	0	+14
March	0	+14
April	+10	+20
May	+10	+20
June	+10	+20
July	+10	+20
August	0	+14
September	0	+14
October	0	+14
November	0	+14
December	0	+14

- 4/ Compliance with ASTM D4176 will be determined using Procedure 2 at 77 °F or tank temperature at the time of sampling, whichever is lower.
- 5/ ASTM D2887 Simulated Distillation results must be reported after D86 correlation.

**Additional Requirements:**

Biodiesel: The presence of biodiesel is prohibited.

Dyes: D Grade shipments may not be dyed.

### E Grade Denatured Fuel Ethanol Specifications

Specification Points	Test Method	Shipments	Deliveries <sup>1/</sup>
Apparent Proof, 60°F Or Density, 60°F	Hydrometer ASTM D-4052	Report Report	
Water, Volume %, Maximum	ASTM E-203 or E-1064	1.0	
Ethanol, Volume % Minimum	ASTM D-5501	93.5	93.0
Methanol, Volume %, Maximum	ASTM D-5501	0.5	
Sulfur, ppm (wt/wt), Maximum	ASTM D5453	10	
Solvent Washed Gum, mg/100mL Maximum	ASTM D-381 Air Jet Method	5.0	
Potential Sulfate, mass ppm Maximum	ASTM D7319	4	
Chloride, mg/L Maximum	ASTM D-7319	5	
Copper, mg/L Maximum	ASTM D-1688 Method A, Modified per D-4806	0.08	
Acidity (as acetic acid), Mass % Maximum	ASTM D-1613 or D-7795	0.007	
pHe Minimum Maximum	ASTM D-6423	6.5 9.0	
Appearance @ 60°F	Visual Examination	Visibly free of suspended or precipitated contaminants. Must be clear and bright.	
Denaturant Content and Type <sup>2/</sup> Volume %		2	

Corrosion Inhibitor Additive, one of the following is required:					
<u>Minimum treat rate</u>	<u>Vendor</u>	<u>Additive</u>	<u>Minimum treat rate</u>	<u>Vendor</u>	<u>Additive</u>
6 lbs/1000 bbls	Ashland	Amergy ECI-6	5 lbs/1000 bbls.	Nalco Water	EC5624A Plus
20 lbs/1000 bbls.	Betz	ACN 13	20 lbs/1000 bbls.	Petrolite	Tolad 3222
20 lbs/1000 bbls.	G. E. Betz	Endcor GCC9711	13 lbs/1000 bbls.	Petrolite	Tolad 3224
3 lbs/1000 bbls.	G.E. Power & Water	8Q123ULS	10 lbs/1000 bbls.	US Water Services	CorrPro 656X
6 lbs/1000 bbls.	Innospec	DCI-11 Plus	13 lbs/1000 bbls.	US Water Services	CorrPro 656 or 656T
3 lbs/1000 bbls.	Midcontinental	MCC5011PHE	5 lbs/1000 bbls.	US Water Services	CorrPro N or NT

**E Grade Denatured Fuel Ethanol Specifications (continued)**

- 1/ Delivered products meets all applicable requirements at time and place of delivery.
- 2/ Only approved denaturants listed in D4806. The denaturant range must be within the guidelines provided for in IRS Notice 2009.06, which is 1.96% to no more than 2.5

### H Grade Normal Butane Specifications

Product Property	Test Method	Origin		Deliveries <sup>1/</sup>
		Test Results Minimum	Test Results Maximum	
Composition, POD or Chromatography analysis	D2163			
Liquid vol %				
Normal Butane		95		
Isobutane			3	
Pentanes			3	
Propane			3	
Specific Gravity	D1657	0.580	0.588	
Vapor Pressure at 100 °F, psi	D1267		43	
Weathering,	D1837			
95% Evaporated Temp, °F (Corrected)			36	
Residues,	D2158			
Non-Volatile Residue at 100°F, ml			0.05	
Oil, No oil stain observation, ml			0.3	
Sulfur, ppm	D3246		30	
Copper Corrosion Dryness, Inspection	D1838		1	
Free Water Content			0	

Additives: H grade normal butane shipments must be unstenched and contain no additives.

1/ Delivered products meet all applicable requirements at time and place of delivery.

### I Grade Iso-Butane Specifications

Product Property	Test Method	Origin Test Results		Deliveries <sup>1/</sup>
		Minimum	Maximum	
Composition, POD or Chromatography analysis	D2163			
Liquid vol %				
Isobutane		95		
Propane			3.0	
Normal Butane			5.0	
Pentanes			0.5	
Specific Gravity	D1657	0.560	0.570	
Vapor Pressure at 100 °F, psi	D1267		62	
Weathering,	D1837			
95% Evaporated Temp, °F (Corrected)			31	
Residues,	D2158		0.05	
Non-Volatile Residue at 100 °F, ml				
Oil, No oil stain observation, ml			0.3	
Sulfur,	D1266			
grains per hundred cubic feet			15	
Copper Corrosion	D1838		1	
Dryness, Inspection				
Free Water Content			0	

Additives: I grade Isobutane shipments must be unstenched and contain no additives.

1/ Delivered products meets all applicable requirements at time and place of delivery.



### L Grade Propane Specifications

Product Property	Test Method	Origin		Deliveries <sup>1/</sup>
		Minimum	Maximum	
<b>Composition</b>				
Chromatography analysis	D2163			
Liquid vol %				
Propane		90		
Propylene			5.0	
Butanes and C4+			2.5	
Pentanes and C5+		None		
Specific gravity	D1657	0.500	0.510	
Vapor pressure at 100 °F, psi	D1267	175	208	
Weathering, 95% evaporated	D1837		-37	
Temp, °F (corrected)				
Residues,	D2158			
Nonvolatile residue at 100 °F, ml			0.05	
Oil, no oil stain observation, ml		0.3		
Sulfur,	D2784		10	
grains per hundred cubic feet				
Copper Corrosion	D1838		1	
Dryness, Valve Freeze, seconds	D2713	60		

Additives: L Grade shipments must be unstented and contain no additives. Unless otherwise notified in writing by shipper, L Grade propane deliveries will be odorized at the rate of 1.5 pounds Ethyl Mercaptan/10,000 gallons.

1/ Delivered products meets all applicable requirements at time and place of delivery.

### NEP Grade Regular Unleaded Gasoline Specifications

This is for export only and not for retail use in the United States.

Product Property	Test Method	Origin		Deliveries <sup>1/</sup>
		Minimum	Maximum	
Gravity, ° API	D287		Report	
Color			Undyed	
Volatility <sup>2/</sup>				
Distillation	D86	<u>Class A</u>	<u>Class B</u>	<u>Class C</u>
10% Evaporated °F, max		158	149	140
50% Evaporated °F, min		170	170	170
50% Evaporated °F, max		250	245	240
90% Evaporated °F, max		374	374	365
Final Boiling Point °F, max		430	430	430
Residue, vol% max		2	2	2
Drivability Index, max		1250	1240	1230
		<u>Class 1</u>	<u>Class 2</u>	<u>Class 3</u>
Vapor Liquid Ratio °F, min	D5188	129	122	116
Benzene, vol %	D3606		2.0	
Mercaptan Sulfur, wt % <sup>3/</sup>	D3227		0.002	
Copper Corrosion	D130		1	
Silver Corrosion	D7667,7671		1	
Gum, Existent, mg/100 ml	D381		4	5
Oxidation Stability, minutes	D525	240		
Phosphorus, g/gal	D3231		0.003	0.005
Lead, g/gal	D3237		0.010	0.05
Octane				
RON	D2699		Report	
MON	D2700	82.0		
Report (R+M)/2		87.0		
Sulfur, ppm	D2622		80	
Oxygenates, vol %	D4815, D5599		0.05	
Haze Rating <sup>4/</sup>	D4176		2	3
NACE Corrosion	TM0172, D7548	B+		
Odor <sup>5/</sup>			Nonoffensive	

- 1/ Delivered products meet all applicable requirements at time and place of delivery.
- 2/ Refer to Seasonal Gasoline Volatility Schedule.
- 3/ Mercaptan Sulfur determination is waived if the result of the Doctor Test ASTM D4952 is negative.
- 4/ Compliance with ASTM D4176 will be determined using Procedure 2 at the following temperatures, adjusted seasonally:

February 16 – September 30	55°F max
October 1– February 15	45°F max
- 5/ Any gasoline exhibiting an offensive odor and/or containing more than 0.30 wt % dicyclopentadiene will not be accepted for shipment.

**NR Grade Regular Gasoline Blendstock (RBOB)**

**For Blending With 10.0% Denatured Fuel Ethanol (92% Purity) As Defined In ASTM D4806  
VOC-Controlled Region 1 Complex Model Phase II**

Product Property	Test Method	Origin		Minimum	Maximum	Deliveries <sup>1/</sup>
Gravity, ° API <sup>8/</sup>	D287				Report	
Color					Undyed	
Volatility <sup>2/ 8/ 9/</sup>						
Distillation	D86					
	<u>Class AA</u>	<u>Class A</u>	<u>Class B</u>	<u>Class C</u>	<u>Class D</u>	<u>Class E</u>
10% Evaporated °F, max	158	158	149	140	131	122
50% Evaporated °F, min	150	150	150	150	150	150
50% Evaporated °F, max	250	250	245	240	235	230
90% Evaporated °F, max	374	374	374	365	365	365
Final Boiling Point °F, max	430	430	430	430	430	430
Residue, vol% max	2	2	2	2	2	2
Drivability Index, max	D4814					
	1250	1250	1240	1230	1220	1200
Vapor/Liquid Ratio = 20:1; °F min <sup>4/</sup>	D5188					
		<u>Class 1</u>	<u>Class 2</u>	<u>Class 3</u>	<u>Class 4</u>	<u>Class 5</u>
		129	122	116	107	102
E200 (vol%)	D86			30	70	
E300 (vol%)	D86			70	100	
Emission Performance Reduction (%)				-27		
Mercaptan Sulfur, wt % <sup>3/</sup>	D3227				0.003	
Copper Corrosion	D130				1	
Silver Corrosion	D7667,7671				1	
Gum, Existent, mg/100 ml	D381				4	5
Oxidation Stability, minutes <sup>8/</sup>	D525			240		
Octane						
RON	D2699				Report	
MON	D2700			82		
(R+M)/2				87		
Phosphorus, g/gal	D3231				0.003	0.005
Benzene, vol %	D3606				1.3	
Aromatics (vol %) <sup>4/</sup>					50	
Olefins (vol %)	D1319				25	
Sulfur, ppm	D2622				80	
Oxygen Content wt % <sup>5/</sup>	D5599			1.5	4	
Oxygenates, (vol %) <sup>8/</sup>	D4815				0.05	
Haze Rating <sup>6/ 8/</sup>	D4176				2	3
NACE Corrosion <sup>8/</sup>	TM0172, D7548			B+		
Odor <sup>7/ 8/</sup>					Nonoffensive	

**NR Grade Regular Gasoline Blendstock (RBOB) (continued)**

- 1/ Delivered products meets all applicable requirements at time and place of delivery.
- 2/ Refer to Seasonal Gasoline Volatility Schedule.
- 3/ Mercaptan Sulfur determination is waived if the result of the Doctor Test ASTM D4952 is negative.
- 4/ Refer to test methods in 40 CFR Chapter 1, Part 80.46.
- 5/ Oxygen content must meet a minimum of 1.5 wt. % and a maximum of 4.0 wt. % after blending of denatured fuel ethanol.
- 6/ Compliance with ASTM D4176 will be determined using Procedure 2 at the following temperatures, adjusted seasonally:

February 16 – September 30	55 °F max
October 1– February 15	45 °F max
- 7/ Any gasoline exhibiting an offensive odor and/or containing more than 0.30 wt % dicyclopentadiene will not be accepted for shipment.
- 8/ Specifications must be met before blending of denatured fuel ethanol except for vapor pressure during the VOC compliance period, March 20<sup>th</sup> through September 15<sup>th</sup>, will be reported on the blended fuel.
- 9/ For products blended to meet EPA or state imposed summer VOC requirements, test must be performed for RVP in accordance with procedure described in 40 CFR, PART 80, Appendix E, Method 3.

**\*\*NOTE: This RBOB may not be combined with any other RBOB except RBOB having the same requirement for oxygenate type and amount. “Base Gasoline” Not for sale to the ultimate consumer.**

**\*\*NOTE: Heavy metals are not allowed to be present.**

**\*\*NOTE: All parameters must be met after blending with denatured fuel ethanol unless noted.**

**NZ6 Grade Arizona Winter Cleaner Burning Gasoline (AZRBOB)**

Product Property	Test Method	Origin	
		Minimum	Maximum
Gravity °API @ 60°F	D 287	Report	
Octane (after 10% E Fuel ethanol per ASTM D4806)			
RON	D 2699	Report	
MON	D 2700	Report	
(R+M)/2		87.0	
Oxygen Content (wt%) <sup>1/</sup>	D 4815		0.05
RVP (psi)	D 5191		8.00
Distillation (°F)	D86		
50%			237
90%			335
End Point			430
Benzene (vol%)	D 3606		4.9
Aromatics (vol%)	D 5769, D5580		30.0
Olefins (vol%)	D 1319, D6650		10.0
Corrosion (Cu)3 hrs @ 122°F(50°C)	D 130		1
Corrosion (Ag) 3 hrs @122°F (50°C)	D 7667,7671		1
Mercaptan sulfur (wt.) <sup>2/</sup>	D 3227		0.002
Existent Gum (mg/100 ml)	D 381		4
Oxidation stability (minutes)	D 525	240	
Phosphorous (gms/gal)	D 3231		0.003
Lead (gms/gal)	D 5059		0.01
Sulfur (ppm)	D 5453, D2622		80
NACE	TM0172, D7548	B+	
Haze <sup>3/</sup>	D 4176		2
CARB Predictive Model			Pass
Color			Undyed
Odor	Olfactory		Non-Offensive

**NZ6 Grade Arizona Winter Cleaner Burning Gasoline (AZRBOB) (continued)**

- 1/ Total oxygen levels shall not exceed de minimums levels. The use of non-hydrocarbon blending components such as MTBE is prohibited.
- 2/ Mercaptan Sulfur determination is waived if the result of the Doctor Test ASTM D4952 is negative.
- 3/ Product must be tested at 55°F or tank temperature whichever is lower.
  - Product must be certified according to current Arizona AZRBOB regulations from a state of Arizona registered supplier.
  - In addition to the above a LPP Product Transfer Document for AZRBOB must be filled out and provided to Magellan Pipe Line Quality Control.
  - All gasoline must meet latest revision of ASTM D 4814.
  - Corrosion inhibitors, gum inhibitors and metal deactivators must be approved by Magellan Pipeline
  - No additives or corrosion inhibitors containing phosphorus may be used in this gasoline.
  - The shipment of fuels containing Port Fuel Injector (PFI) and intake valve detergent additives is prohibited. This is a base gasoline, not for sale to the ultimate consumer
  - Any gasoline exhibiting an offensive and/or containing more than 0.50wt % dicyclopentadiene will not be accepted for shipment.
  - AZRBOB does not comply with the standards for Arizona CBG without the addition of oxygenate.
  - This AZRBOB is intended for blending with 10% volume ethanol and may not be combined with AZRBOB's requiring oxygenate blending with any other type or amount of oxygenate

**NZ9 Grade Arizona Summer Cleaner Burning Gasoline (AZRBOB)**

Product Property	Test Method	Origin	
		Minimum	Maximum
Gravity °API @ 60°F	D 287	Report	
Octane (after 10% E Fuel ethanol per ASTM D4806)			
RON	D 2699	Report	
MON	D 2700	Report	
(R+M)/2		87.0	
Oxygen Content (wt%) <sup>1/</sup>	D 4815		0.05
RVP (psi)	D 5191		5.70
Distillation (°F)	D86		
E200		25%	65%
E300		65%	100%
End Point			430
Benzene (vol%)	D 3606		4.9
Aromatics (vol%)	D 5769/ D5580		55
Olefins (vol%)	D 1319, D6650		25
Corrosion (Cu) 3 hrs @ 122°F(50°C)	D 130		1
Corrosion (Ag) 3 hrs @ 122°F (50°C)	D 7667,7671		1
Mercaptan sulfur (wt.) <sup>2/</sup>	D 3227		0.002
Existent Gum (mg/100 ml)	D 381		4
Oxidation stability (minutes)	D 525	240	
Phosphorous (gms/gal)	D 3231		0.003
Lead (gms/gal)	D 5059		0.01
Sulfur (ppm)	D 5453, D2622		80
NACE	TM0172, D7548	B+	
Haze <sup>3/</sup>	D 4176		2
VOC Emission Performance			
Reduction (%)		-27.5	
Color		Undyed	
Odor	Olfactory	Non-Offensive	



### **NZ9 Grade Arizona Winter Cleaner Burning Gasoline (AZRBOB) (continued)**

- 1/ Total oxygen levels shall not exceed de minimums levels. The use of non-hydrocarbon blending components such as MTBE is prohibited.
- 2/ Mercaptan Sulfur determination is waived if the result of the Doctor Test ASTM D4952 is negative.
- 3/ Product must be tested at 55°F or tank temperature whichever is lower.
  - Product must be certified according to current Arizona AZRBOB regulations from a state of Arizona registered supplier.
  - In addition to the above a LPP Product Transfer Document for AZRBOB must be filled out and provided to Magellan Pipe Line Quality Control.
  - All gasoline must meet latest revision of ASTM D 4814.
  - Corrosion inhibitors, gum inhibitors and metal deactivators must be approved by Magellan Pipeline
  - No additives or corrosion inhibitors containing phosphorus may be used in this gasoline.
  - The shipment of fuels containing Port Fuel Injector (PFI) and intake valve detergent additives is prohibited. This is a base gasoline, not for sale to the ultimate consumer
  - Any gasoline exhibiting an offensive and/or containing more than 0.50wt % dicyclopentadiene will not be accepted for shipment.
  - AZRBOB does not comply with the standards for Arizona CBG without the addition of oxygenate.
  - This AZRBOB is intended for blending with 10% volume ethanol and may not be combined with AZRBOB's requiring oxygenate blending with any other type or amount of oxygenate.

**O Grade Commercial Jet Fuel Specifications**

Product Property	Test Method	Origin Test Results		Deliveries <sup>1/</sup>
		Minimum	Maximum	
Gravity, °API	D287	37.5	50.5	37.0-51.0
Total Acidity, mg KOH/g	D3242		0.10	
Freezing Point, °F	D2386		-40	
Existent Gum, mg/100 ml	D381		5	7
Sulfur, ppm	D2622		3,000	
Mercaptan Sulfur, wt % <sup>2/</sup>	D3227		0.003	
Color, Saybolt	D156	+16		+14
Copper Corrosion	D130		1	
Water Separation Index	D3948	85		75
Aromatics, vol %	D1319		25	
Net Heat of Combustion, BTU/lb <sup>3/</sup>	D4809	18,400		
Flash Point, °F	D56, D93	108		100
Viscosity at -4 °F, cSt	D445		8	
Electrical Conductivity, pSm	D2624, D3241	Report		
Thermal Stability <sup>4/ 5/</sup>				
Filter pressure drop, mm Hg			25	
Heater tube deposit rating			< 3	
Distillation <sup>6/</sup>	D86, D2887			
10% Recovered, °F			396	400
50% Recovered, °F		Report		
90% Recovered, °F		Report		
Final Boiling Point, °F			562	572
Residue, vol %			1.5	
Loss, vol %			1.5	
Combustion				
Smoke Point, mm	D1322	25		
Or				
Smoke Point, mm	D1322	18		
And				
Naphthalenes, vol %	D1840		3.0	
Particulate Matter, mg/L	D5452	Report		

### **O Grade Commercial Jet Fuel Specifications (continued)**

- 1/ Delivered products meets all applicable requirements at time and place of delivery.
- 2/ Mercaptan Sulfur determination is waived if the result of the Doctor Test ASTM D4952 is negative.
- 3/ Equation 2 in D3338 may be used as an alternate method.
- 4/ ASTM D3241 Thermal Stability test must be conducted at 275 °C for 2.5 hours at origin. Peacock or abnormal color deposits result in a failure and are not accepted.
- 5/ ASTM D3241 Thermal Stability test results for deliveries will be generated at a minimum test temperature of 260 °C
- 6/ ASTM D2887 Simulated Distillation results must be reported after D86 correlation.

#### **Additives:**

**Antioxidants:** Shipments may, but are not required to, contain a maximum of 8.4 pounds per 1,000 barrels (not including weight of solvent) of the following anti-oxidants:

- (1) N, N-diisopropylparaphenylene diamine.
- (2) 75% (min) of 2, 6-ditertiary-butyl phenol plus 25% (max) of tertiary and tritertiary butyl phenols.
- (3) 72% (min) 2, 4-dimethyl-6-tertiary-butyl phenol plus 28% (max) of monomethyl and dimethyl tertiary-butyl phenols.
- (4) 55% (min) 2, 4-dimethyl-6-tertiary-butyl phenol plus 45% (max) of mixed tertiary and ditertiary butyl phenols.

**Metal Deactivators:** Shipments may, but are not required to, contain the following metal deactivators at a maximum of 2.0 mg/L (not including weight of solvent):

- (1) n, N-disalicylidene-1, 2-propane diamine.

No other additives are permitted.

The carrier shall not be responsible for the concentration of additives in jet fuel deliveries at terminals.

**Sub-Octane Unleaded Gasoline Specifications**

**Grades: V, V8, V66, V68, VTX 83.0 Octane Unleaded Gasoline**

(Conventional Gasoline - This product does not meet the requirements for reformulated gasoline and may not be used in any reformulated gasoline covered area.)

Product Property	Test Method	Origin		Deliveries <sup>1/</sup>
		Minimum	Maximum	
Gravity, °API	D287		Report	
Color			Undyed	
Volatility <sup>2/</sup>				
E200 (vol %)	D86		Report	
E300 (vol %)	D86		Report	
Benzene, vol %	D3606		4.9	
Aromatics (vol %)	D1319		Report	
Olefins (vol %)	D1319		Report	
Mercaptan Sulfur, wt % <sup>3/</sup>	D3227		0.003	
Copper Corrosion	D130		1	
Silver Corrosion	D7667, D7671		1	
Gum, Existent, mg/100 ml	D381		4	5
Oxidation Stability, minutes	D525	240		
Phosphorus, g/gal	D3231		0.003	0.005
Lead, g/gal	D3237		0.010	0.05
Sulfur, ppm	D2622		80	
Oxygenates, vol %	D4815, D5599		0.05	
Haze Rating <sup>4/</sup>	D4176		2	3
NACE Corrosion	TM0172, D7548	B+		
Odor <sup>5/</sup>			Nonoffensive	

**The following parameters apply either before or before and after blending with denatured fuel ethanol at 10%**

Octane	Method	Base Gasoline	
RON, min	D2699	Report	
MON, min	D2700	79.0	
(R+M)/2, min		84.0	
Octane		Base Gasoline	and Blended with 10% Ethanol
RON, min	D2699	Report	Report
MON, min	D2700	Report	82.0
(R+M)/2, min		83.0	87.0

The following parameters apply after blending with denatured fuel ethanol at 10%

<u>Product Property</u>	<u>Method</u>	<u>Origin</u>			
Distillation,	D86				
10% Evap (T10), °F		Report			
20% Evap (T20), °F		Report			
50% Evap		150°F			
(T50), °F, min					
RVP <sup>6/</sup>	D5191	Report			
Vapor to Liquid Ratio	<u>Class 1</u>	<u>Class 2</u>	<u>Class 3</u>	<u>Class 4</u>	<u>Class 5</u>
D5188, min <sup>2/7/</sup>	<b>129</b>	<b>122</b>	<b>116</b>	<b>107</b>	<b>102</b>

- 1/ Delivered products meets all applicable requirements at time and place of delivery.
- 2/ Refer to Magellan’s Seasonal Gasoline Volatility Classes and Schedule of Origin Volatility requirements.
- 3/ Mercaptan Sulfur determination is waived if the result of the Doctor Test ASTM D4952 is negative.
- 4/ Compliance with ASTM D4176 will be determined using Procedure 2 at the following temperatures, adjusted seasonally:
 

February 16 – September 30	55 °F max
October 1– February 15	45 °F max
- 5/ Any gasoline exhibiting an offensive odor and/or containing more than 0.30 wt % dicyclopentadiene will not be accepted for shipment.
- 6/ RVP limits on ethanol blended gasoline are controlled by various federal and state regulations and waivers, which are generally greater than the limits for base gasoline.
- 7/ D5188 is the referee test method. The alternate equation in D 4814 may

## Sub-Octane Unleaded Gasoline Specifications

### Grades: V1, VMS 80.5 Sub-Octane Unleaded Gasoline

(Conventional Gasoline - This product does not meet the requirements for reformulated gasoline and may not be used in any reformulated gasoline covered area.)

**The following parameter applies before blending with 10% denatured fuel ethanol.**

<u>Product Property</u>	<u>Test Method</u>	<u>Origin</u>		<u>Deliveries</u> <sup>1/</sup>
		<u>Minimum</u>	<u>Maximum</u>	
Gravity, °API	D287		Report	
Color			Undyed	
Distillation <sup>2/</sup>	D86			
RVP <sup>2/</sup>	D5191			
Vapor to Liquid Ratio <sup>2/</sup>	D5188			
Drivability Index <sup>2/</sup>	D4814			
Benzene, vol %	D3606		4.9	
Mercaptan Sulfur, wt % <sup>3/</sup>	D3227		0.002	
Copper Corrosion	D130		1	
Silver Corrosion	D7667, D7671		1	
Gum, Existent, mg/100 ml	D381		4	5
Oxidation Stability, minutes	D525	240		
Phosphorus, g/gal	D3231		0.003	0.005
Lead, g/gal	D3237		0.010	0.05
Sulfur, ppm	D2622		80	
Oxygenates, vol %	D4815, D5599		0.05	
Haze Rating <sup>4/</sup>	D4176		2	3
NACE Corrosion	TM0172, D7548	B+		
Odor <sup>5/</sup>			Nonoffensive	

**The following parameters apply either before or before and after blending with denatured fuel ethanol at 10%**

Octane	<u>Method</u>	<u>Base Gasoline</u>	
RON, min	D2699	Report	
MON, min	D2700	Report	
(R+M)/2, min		82.0	
Octane		<u>Base Gasoline</u>	and <u>Blended with 10% Ethanol</u>
RON, min	D2699	Report	Report
MON, min	D2700	Report	Report
(R+M)/2, min		80.5	85.0

**The following parameters apply after blending with denatured fuel ethanol at 10%**

<u>Product Property</u>	<u>Method</u>	<u>Origin</u>			
Distillation,	D86				
10% Evap (T10), °F		Report			
50% Evap (T50), °F, min		150			
RVP <sup>6/</sup>	D5191	Report			
Vapor to Liquid Ratio	<u>Class 1</u>	<u>Class 2</u>	<u>Class 3</u>	<u>Class 4</u>	<u>Class 5</u>
D5188, min <sup>2/</sup>	<b>129</b>	<b>122</b>	<b>116</b>	<b>107</b>	<b>102</b>

- 1/ Delivered products meets all applicable requirements at time and place of delivery.
- 2/ Refer to Magellan’s Seasonal Gasoline Volatility Classes and Schedule of Origin Volatility requirements.
- 3/ Mercaptan Sulfur determination is waived if the result of the Doctor Test ASTM D4952 is negative.
- 4/ Compliance with ASTM D4176 will be determined using Procedure 2 at the following temperatures, adjusted seasonally:

February 16 – September 30	55 °F max
October 1– February 15	45 °F max
- 5/ Any gasoline exhibiting an offensive odor and/or containing more than 0.30 wt % dicyclopentadiene will not be accepted for shipment.
- 6/ RVP limits on ethanol blended gasoline are controlled by various federal and state regulations and waivers, which are generally greater than the limits for base gasoline.

**Sub-Octane Unleaded Gasoline Specifications**  
**Grades: V3, V3S 82.0 Octane Unleaded Gasoline**

(Conventional Gasoline - This product does not meet the requirements for reformulated gasoline and may not be used in any reformulated gasoline covered area.)

**The following parameter applies before blending with 10% denatured fuel ethanol.**

Product Property	Test Method	Origin		Deliveries <sup>1/</sup>
		Minimum	Maximum	
Gravity, °API	D287		Report	
Color			Undyed	
Volatility <sup>2/</sup>				
E200 (vol %)	D86		Report	
E300 (vol %)	D86		Report	
Benzene, vol %	D3606		4.9	
Aromatics (vol %)	D1319		Report	
Olefins (vol %)	D1319		Report	
Mercaptan Sulfur, wt % <sup>3/</sup>	D3227		0.003	
Copper Corrosion	D130		1	
Silver Corrosion	D7667, D7671		1	
Gum, Existent, mg/100 ml	D381		4	5
Oxidation Stability, minutes	D525	240		
Phosphorus, g/gal	D3231		0.003	0.005
Lead, g/gal	D3237		0.010	0.05
Sulfur, ppm	D2622		80	
Oxygenates, vol %	D4815, D5599		0.05	
Haze Rating <sup>4/</sup>	D4176		2	3
NACE Corrosion	TM0172, D7548	B+		
Odor <sup>5/</sup>			Nonoffensive	

**The following parameters apply either before or before and after blending with denatured fuel ethanol at 10%**

Octane	Method	Base Gasoline	
RON, min	D2699	Report	
MON, min	D2700	79.0	
(R+M)/2, min		83.0	
Octane		Base Gasoline	and Blended with 10% Ethanol
RON, min	D2699	Report	Report
MON, min	D2700	Report	Report
(R+M)/2, min		82.0	86.0



The following parameters apply after blending with denatured fuel ethanol at 10%

<u>Product Property</u>	<u>Method</u>	<u>Origin</u>			
Distillation,	D86				
10% Evap (T10), °F		Report			
20% Evap (T20), °F		Report			
50% Evap		150°F			
(T50), °F, min					
RVP <sup>6/</sup>	D5191	Report			
Vapor to Liquid Ratio	<u>Class 1</u>	<u>Class 2</u>	<u>Class 3</u>	<u>Class 4</u>	<u>Class 5</u>
D5188, min <sup>2/7/</sup>	<b>129</b>	<b>122</b>	<b>116</b>	<b>107</b>	<b>102</b>

- 1/ Delivered products meets all applicable requirements at time and place of delivery.
- 2/ Refer to Magellan’s Seasonal Gasoline Volatility Classes and Schedule of Origin Volatility requirements.
- 3/ Mercaptan Sulfur determination is waived if the result of the Doctor Test ASTM D4952 is negative.
- 4/ Compliance with ASTM D4176 will be determined using Procedure 2 at the following temperatures, adjusted seasonally:
 

February 16 – September 30	55 °F max
October 1– February 15	45 °F max
- 5/ Any gasoline exhibiting an offensive odor and/or containing more than 0.30 wt % dicyclopentadiene will not be accepted for shipment.
- 6/ RVP limits on ethanol blended gasoline are controlled by various federal and state regulations and waivers, which are generally greater than the limits for base gasoline.
- 7/ D5188 is the referee test method. The alternate equation in D 4814 may also be used.

## V2 Grade 84.0 Octane Unleaded Gasoline

(Conventional Gasoline - This product does not meet the requirements for reformulated gasoline and may not be used in any reformulated gasoline covered area.)

Product Property	Test Method	Origin Test Results		Deliveries <sup>1/</sup>
		Minimum	Maximum	
Gravity, ° API	D287	Report		
Color		Undyed		
Volatility <sup>2/</sup>				
Benzene, vol%	D3606		4.9	
Mercaptan Sulfur, wt % <sup>3/</sup>	D3227		0.002	
Copper Corrosion	D130		1	
Silver Corrosion	D7667, D7671		1	
Gum, Existent, mg/100 ml	D381		4	5
Oxidation Stability, minutes	D525	240		
Phosphorus, g/gal	D3231		0.003	0.005
Lead, g/gal	D3237		0.010	0.05
Octane				
RON	D2699	Report		
MON	D2700	Report		
(R+M)/2		84.0		
Sulfur, ppm <sup>4/</sup>	D2622		80	
Oxygenates, vol %	D4815, D5599		0.05	
Haze Rating <sup>5/</sup>	D4176		2	3
NACE Corrosion	TM0172, D7548	B+		
Odor <sup>6/</sup>		Nonoffensive		

1/ Delivered products meets all applicable requirements at time and place of delivery.

2/ Refer to Seasonal Gasoline Volatility Schedule.

3/ Mercaptan Sulfur determination is waived if the result of the Doctor Test ASTM D4952 is negative.

4/ Gasoline exceeding the origin specification will be accepted from small refineries as defined in 40 CFR part 80 of the EPA regulations, subject to the special handling fee specified in Magellan Pipelines rules and regulations tariff.

5/ Compliance with ASTM D4176 will be determined using Procedure 2 at the following temperatures, adjusted seasonally:

February 16 – September 30	55 °F max
October 1– February 15	45 °F max

6/ Any gasoline exhibiting an offensive odor and/or containing more than 0.30 wt % dicyclopentadiene will not be accepted for shipment.

## W Grade Natural Gasoline Specifications

Product Property	Test Method	Origin Test Results		Deliveries <sup>1/</sup>
		Minimum	Maximum	
Specific Gravity	D1657	0.654	0.685	
Gravity, °API	D287	75.0	85.0	
Reid Vapor Pressure, psi	D5191	12.0	15.0	
Distillation,	NGPA 1138			
% Evaporated at 140 °F		25	85	
% Evaporated at 275 °F		90		
Final Boiling Point, °F			375	
Color	D156	+25		
Benzene, vol %	D3606		1.5	
Doctor	D484	Negative		
Sulfur, ppm	D2622		30	
Dryness, Free Water by Inspection			None	
Copper Corrosion	D130		1	

Additives: W Grade shipments may not contain additives.

1/ Delivered products meets all applicable requirements at time and place of delivery.

## W2 Grade Certified Ethanol Denaturant Specifications

Product Property	Test Method	Origin Test Results		Deliveries <sup>1/</sup>
		Minimum	Maximum	
Gravity, °API	D287	75.0	85.0	
Reid Vapor Pressure, psi	D5191	12	14	
Distillation, 90% Evaporated at Degree °F	D86		365	
Final Boiling Point at Degree °F			437	
Color	D156	+25		
Benzene, vol %	D5580/ D3606		1.10	
Aromatics, vol %, max	D5580/ D1319		35.0	
Olefins Content, vol %, max	D6550/ D1319		10.0	
Doctor Sulfur, ppm	D4952 D5453/ D2622/ D7039	Negative	120	
Copper Corrosion	D130		1	
Haze Rating <sup>2/</sup>	D4176		2	3
NACE Corrosion	TM0172	B+		

Additives: W2 Grade shipments may not contain additives.

- 1/ Delivered products meets all applicable requirements at time and place of delivery.
- 2/ Compliance with ASTM D4176 will be determined using Procedure 2 at the following temperatures, adjusted seasonally:
- |                            |           |
|----------------------------|-----------|
| February 16 – September 30 | 55 °F max |
| October 1 – February 15    | 45 °F max |

EPA Standards and Requirements: W2 Grade must meet the standards and requirements specified in 40 CFR 80.1611, except W2 Grade sulfur must be 120 ppm maximum.

**X. TB, TC Grades of Ultra Low Sulfur Diesel Fuel Specifications**  
**Central and Southern Systems**

**Central System:**

Product Property	Test Method	Origin Test Results		Deliveries <sup>1/</sup>
		Minimum	Maximum	
Gravity, °API	D287		Report	
Color	D1500	2.5		3
Distillation <sup>4/</sup>	D86, D2887			
50% Recovered, °F			Report	
90% Recovered, °F		540	640	
Copper Corrosion	D130	1		
Cetane				
Cetane Number	D613	40		
Or				
Cetane Index, A or B	D4737	40		
Cetane Index <sup>2/</sup>	D976	40		
Flash Point, °F	D93	140		130
Stability				
Thermal, % reflectance (W or Y)	D6468 (W)	75		
	D6468 (Y)	82		
Aging Period (Minutes)	D6468	90		
Or				
Oxidation, mg/100 ml	D2274		2.5	
Carbon Residue on 10% Bottoms, wt %	D524		0.35	
Cloud Point, °F	D2500			
September-March			+15	
April-August			+20	
Pour Point, °F	D97			
September-March			+0	
April-August			+10	
Viscosity, cSt at 104 °F	D445	1.9	4.1	
Ash, wt %	D482		0.01	
Haze Rating <sup>3/</sup>	D4176		2	3
NACE Corrosion	TM0172, D7548	B+		
Sulfur, ppm	D2622		11	

**X, TB, TC Grade Ultra Low Sulfur Diesel Fuel Specifications**  
**Central and Southern Systems**

**Southern System:**

Product Property	Test Method	Origin Test Results		Deliveries <sup>1/</sup>
		Minimum	Maximum	
Gravity, °API	D287		Report	
Color	D1500	2.5		3
Distillation <sup>4/</sup>	D86, D2887			
50% Recovered, °F			Report	
90% Recovered, °F		540	640	
Copper Corrosion	D130	1		
Cetane				
Cetane Number	D613	40		
Or				
Cetane Index, A or B	D4737	40		
Cetane Index <sup>2/</sup>	D976	40		
Flash Point, °F	D93	135		130
Stability				
Thermal, % reflectance (W or Y)	D6468 (W)	75		
	D6468 (Y)	82		
Aging Period (Minutes)	D6468	90		
Or				
Oxidation, mg/100 ml	D2274		2.5	
Carbon Residue on 10% Bottoms, wt %	D524		0.35	
Cloud Point, °F	D2500			
October-February			+15	
March-August			+28	
September			+20	
Pour Point, °F	D97		Report	
Viscosity, cSt at 104 °F	D445	1.9	4.1	
Ash, wt %	D482		0.01	
Haze Rating <sup>3/</sup>	D4176		2	3
NACE Corrosion	TM0172, D7548	B+		
Sulfur, ppm	D2622		11	

**Foot Notes:**

- 1/ Delivered products meet all applicable requirements at time and place of delivery.
- 2/ ASTM D976 result is required for low sulfur fuel oils to demonstrate aromatics compliance per the EPA.
- 3/ Compliance with ASTM D4176 will be determined using Procedure 2 at 77 °F or tank temperature at the time of sampling, whichever is lower.
- 4/ ASTM D2887 Simulated Distillation results must be reported after D86 correlation.

**Additional Requirements:**

Biodiesel: The presence of biodiesel is prohibited.

Dyes: X Grade shipments may not be dyed.

**XU Grade Ultra Low Sulfur #2 Diesel Fuel Specifications**  
**Rocky Mountain System**

Product Property	Test Method	Origin		Deliveries <sup>1/</sup>
		Test Results	Minimum	
Gravity, °API	D287	Report		
Color	D1500		2.5	3.0
Distillation	D86			
50% Recovered, °F		Report		
90% Recovered, °F		540	640	
OR				
Simulated Distillation	D2887			
50% Recovered, °F		Report		
90% Recovered, °F		572	672	
Copper Corrosion	D130	1		
Cetane				
(1) Cetane Number	D613	40.0		
OR (2) Cetane Index, procedure A	D4737	40.0		
Cetane Index <sup>2/</sup>	D976	40		
Flash Point, °F	D93	134		
Stability				
(1) Thermal, % reflectance	D6468 (W)	75		
	D6468 (Y)	82		
Aging Period (Minutes)	D6468	90		
OR (3) Oxidation, mg/100 ml	D2274		2.5	
Carbon Residue on 10% Bottoms, %	D524		0.35	
Cloud Point, °F	D2500		5/	
Pour Point, °F	D97		5/	
Viscosity, cSt at 104 °F	D445	1.9	4.1	
Ash, wt %	D482	0.01		
Haze Rating <sup>6/</sup>	D4176	2		3
NACE Corrosion	TM0172, D7548	B+		
Sulfur, ppm <sup>7/8/</sup>	D2622		12	



**XU Grade Ultra Low Sulfur #2 Diesel Fuel Specifications (continued)**  
**Rocky Mountain System**

- 1/ Delivered products meets all applicable requirements at time and place of delivery.
- 2/ ASTM D976 data is required for low sulfur fuel oils to demonstrate aromatics compliance per the EPA.

<u>Month</u>	<u>Pour Point °F, max.</u>	<u>Cloud Point °F, max</u>
January	-20	+5
February	-20	+5
March	-20	+5
April	Report	+20
May	Report	+20
June	Report	+20
July	Report	+20
August	Report	+20
September	Report	+20
October	-20	+5
November	-20	+5
December	-20	+5

- 4/ Compliance with ASTM D4176 will be determined using Procedure 2 at 77 °F or tank temperature at the time of sampling, whichever is lower.
- 5/ All results provided must use an EPA qualified instrument.

**Additional Requirements:**

Biodiesel: The use of any biodiesel fuel as a blending component is prohibited.

Dyes: X Grade shipments may not be dyed.

## Y Grade No. 1 Diesel Fuel Specifications

Product Property	Test Method	Origin Test Results		Deliveries <sup>1/</sup>
		Minimum	Maximum	
Gravity, °API	D287	35.0		
Distillation <sup>4/</sup>	D86, D2887			
10% Recovered, °F			419	
90% Recovered, °F			550	
Copper Corrosion	D130	1		
Cetane				
Cetane Number	D613	40.0		
Or				
Cetane Index, A or B	D4737	40.0		
Cetane Index <sup>2/</sup>	D976	40		
Flash Point, °F	D93	125	160	115
Carbon Residue on 10% Bottoms, wt %	D524		0.15	
Pour Point, °F	D97	-25		
Viscosity at 104 °F, cSt	D445	1.3	2.1	
Ash, wt %	D482		0.01	
Haze Rating <sup>3/</sup>	D4176		2	3
NACE Corrosion	TM172, D7548	B+		
Sulfur, ppm	D2622		11	

- 1/ Delivered products meet all applicable requirements at time and place of delivery.
- 2/ ASTM D976 result is required for low sulfur fuel oils to demonstrate aromatics compliance per the EPA.
- 3/ Compliance with ASTM D4176 will be determined using Procedure 2 at 77 °F or tank temperature at the time of sampling, whichever is lower.
- 4/ ASTM D2887 Simulated Distillation results must be reported after D86 correlation.

### Additional Requirements:

Biodiesel: The presence of biodiesel is prohibited

Dyes: Y Grade shipments may not be dyed.

**YM Grade No. 1 Diesel Fuel Specifications**

Product Property	Test Method	Minimum	Origin	
			Test Results Maximum	Deliveries <sup>1/</sup>
Gravity, °API	D287	35.0		
Flash Point, °F <sup>6/</sup>	D93	108	160	100
Pour Point, °F	D97		-25	
Carbon Residue on 10% Bottoms, %	D524		0.15	
Sulfur, ppm <sup>2/</sup>	D2622		12	
Mercaptan Sulfur, wt % <sup>3/</sup>	D3227		0.004	
Copper Corrosion	D130		1	
Cetane				
(1) Cetane Number	D613	40.0		
OR (2) Cetane Index, procedure A	D4737	40.0		
Cetane Index <sup>4/</sup>	D976	40		
Distillation	D86			
10% Recovered, °F			419	
90% Recovered, °F			550	
OR				
Simulated Distillation	D2887			
10% Recovered, °F			383	
90% Recovered, °F			580	
Viscosity at 104 °F, cSt	D445	1.3	2.1	
Ash, wt %	D482		0.01	
Haze Rating <sup>5/</sup>	D4176		2	3
NACE Corrosion	TM0172, D7548	B+		

**YM Grade No. 1 Diesel Fuel Specifications (continued)**

- 1/ Delivered products meets all applicable requirements at time and place of delivery.
- 2/ All results provided must use an EPA qualified instrument.
- 3/ Mercaptan Sulfur determination is waived if the result of the Doctor Test ASTM D4952 is negative.
- 4/ ASTM D976 data is required for low sulfur fuel oils to demonstrate aromatics compliance per the EPA.
- 5/ Compliance with ASTM D4176 will be determined using Procedure 2 at 77 °F or tank temperature at the time of sampling, whichever is lower.

**Additional Requirements:**

Biodiesel: The use of any biodiesel fuel as a blending component is prohibited.

Dyes: Y Grade shipments may not be dyed.

## ZB Grade Ultra Low Sulfur Biodiesel Fuel Blend Stock Specifications

Product Property	Test Method <sup>2/</sup>	Origin	
		Minimum	Maximum
Density, g/mL	D4052	Report	
Filtration, Seconds	D7501		125
Alcohol Control (must meet one of the following)			
Flash Point, °C	D93	130	
Methanol content, wt%	EN14110		0.2
Cloud Point, °F, max	D2500		
Summer (May 1 <sup>st</sup> – August 31 <sup>st</sup> )	Central System <sup>4/</sup>		46
Winter (September 1 <sup>st</sup> – April 30 <sup>th</sup> )			36
Cloud Point, °F, max	D2500		
Summer (April 1 <sup>st</sup> – September 30 <sup>th</sup> )	South System <sup>5/</sup>		56
Winter (October 1 <sup>st</sup> – March 31 <sup>st</sup> )			36
Carbon Residue on 100% Sample, wt %	D4530		0.050
Sulfur, ppm (mg/kg)	D5453		15
Stability <sup>3/</sup>			
Rancimat, (hrs.)	EN15751, EN14112	6	
Copper Corrosion	D130		1
Cetane Number	D613	47	
Distillation			
Atmospheric equivalent temperature 90% recovered, °F or Simulated Distillation, (Modified)	D1160, D2887		680
Viscosity at 104 °F, cSt	D445	1.9	6.0
Sulfated Ash, wt %	D874		0.020
Free Glycerin, wt %	D6584		0.020
Monoglyceride, wt%	D6584		
Winter and Summer	Central System <sup>4/</sup>		0.400
Summer (April 1 <sup>st</sup> – September 30 <sup>th</sup> )			0.600
Winter (October 1 <sup>st</sup> – March 31 <sup>st</sup> )	South System <sup>5/</sup>		0.400
Total Glycerin, wt %	D6584		0.240
Acid Number, mg KOH/g	D664		0.50
Haze Rating @ 60 °F	D4176		2
Phosphorus content, wt%	D4951		0.001

**ZB Grade Ultra Low Sulfur Biodiesel Fuel Blend Stock Specifications**

Product Property	Test Method <sup>2/</sup>	Origin	
		Minimum	Maximum
Calcium and Magnesium, combined, ppm (mg/g)	EN14538		
	Central System <sup>4/</sup>		5
	South System <sup>5/</sup>		2
Sodium & Potassium combined, ppm (mg/g)	EN14538		
	Central System <sup>4/</sup>		5
	South System <sup>5/</sup>		3.5
Total Contamination mg/kg <sup>5/</sup>	D7321		15
Water & Sediment, vol%	D2709		0.050
Total Water, ppm	D6304		500
Delivery Temperature	MMP	+50	
Workmanship <sup>1/</sup>	MMP		

- 1/ **Workmanship:** At the time of acceptance, the finished fuel shall be visually free from undissolved water, sediment, or suspended matter and shall be clear and bright.
- 2/ Alternative methods found in ASTM D6751 are accepted
- 3/ **Additives:**
  - BioExtend 30
  - Eastman - Tenox 21
  - Kemin BF 320
  - NALCO EC 5609A
- 4/ **Central Locations:** Includes Aurora, Des Moines, Mason City, Marshall, Mankato, Rochester, Minneapolis, Wrenshall, Alexandria, Fargo, Grand Forks
- 5/ **South Locations:** Includes East Houston, Herne