NuStar Logistics, L.P.

Product Specifications

SouthWest Region

(September 15, 2025)

SPECIFICATIONS FOR 85 OCTANE INDEX CONVENTIONAL GASOLINE BLENDSTOCK (CBOB)

(This conventional before Oxygenate blending (CBOB) gasoline is intended for blending with 10% Denatured Fuel Ethanol (DFE) by volume.)
.

Requirements for both Segregated and Fungible:

Specification Points	ASTM Test Method	Minimum	Origin Shipments	Maximum
Gravity, API	D287		Report	
Color Volatility 2/			Undyed	
RVP 6/8/	D5191			
Distillation 9/	D86			
Benzene, vol% 9/	D3606			4.9
Mercaptan Sulfur, wt% 3/	D3227			0.003
Copper Corrosion	D130			1
Silver Corrosion	D7667,D7671			1
Gum, Existent, mg/100ml	D381			4
Oxidation Stability, minutes	D525	240		
Phosphorus, g/gal	D3231			0.003
Lead, g/gal	D3237			0.010
Octane 9/				
RON	D2699		Report	
MON	D2700		Report	
(R+M)/2		85.0		
Sulfur, ppm 8/	D2622			80
Oxygenates, vol% 7/	D4815,D5599			0.05
Haze Rating 4/	D4176			2
NACE Corrosion	TM0172,D7548	B+		
Odor 5/			Nonoffensive	

Foot Notes:

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

2/ Refer to Sunoco'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 temperature, 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/ Values below the detectible limit of an approved method may be reported as a zero value.

8/ Values will be reported on the 0 and 10 percent oxygenated gasoline.

9/ Value will be reported on the 10 percent oxygenate blend.

Notes:

- All parameters must be met without blending of denatured fuel ethanol unless noted.
- In accordance with 40 CFR 1190.1010(a), gasoline will be accepted when designated as E0 or E10 for oxygenate with ethanol as described by 40 CFR 1090.1110(c)(2). In accordance with 40 CFR 1090.1110(a), gasoline will be designated upon receipt as Winter CBOB or Summer CBOB ((7.8 psi, 9.0 psi or SIP-controlled) based on the RVP of the base gasoline.
- All gasoline distributed will be designated as E10 as described by 40 CFR 1090.1110©(2).
- Any sub-grade product with a 7.8 psi or 9.0 psi CBOB does not meet the requirements for summer reformulated gasoline.
- This product is non-additized gasoline.

SPECIFICATIONS FOR 86 OCTANE INDEX CONVENTIONAL GASOLINE BLENDSTOCK (CBOB)

(This conventional before Oxygenate blending (CBOB) gasoline is intended for blending with 10% Denatured Fuel Ethanol (DFE) by volume.)
.

Requirements for both Segregated and Fungible:

Specification Points	ASTM Test Method	Minimum	Origin Shipments	Maximum
Gravity, API	D287		Report	
Color Volatility 2/			Undyed	
RVP 6/8/	D5191			
Distillation 9/	D86			
Benzene, vol% 9/	D3606			4.9
Mercaptan Sulfur, wt% 3/	D3227			0.003
Copper Corrosion	D130			1
Silver Corrosion	D7667,D7671			1
Gum, Existent, mg/100ml	D381			4
Oxidation Stability, minutes	D525	240		
Phosphorus, g/gal	D3231			0.003
Lead, g/gal	D3237			0.010
Octane 9/				
RON	D2699		Report	
MON	D2700		Report	
(R+M)/2		86.0		
Sulfur, ppm 8/	D2622			80
Oxygenates, vol% 7/	D4815,D5599			0.05
Haze Rating 4/	D4176			2
NACE Corrosion	TM0172,D7548	B+		
Odor 5/			Nonoffensive	

Foot Notes:

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

2/ Refer to Sunoco'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 temperature, 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/ Values below the detectible limit of an approved method may be reported as a zero value.

8/ Values will be reported on the 0 and 10 percent oxygenated gasoline.

9/ Value will be reported on the 10 percent oxygenate blend.

Notes:

- All parameters must be met without blending of denatured fuel ethanol unless noted.
- In accordance with 40 CFR 1190.1010(a), gasoline will be accepted when designated as E0 or E10 for oxygenate with ethanol as described by 40 CFR 1090.1110(c)(2). In accordance with 40 CFR 1090.1110(a), gasoline will be designated upon receipt as Winter CBOB or Summer CBOB ((7.8 psi, 9.0 psi or SIP-controlled) based on the RVP of the base gasoline.
- All gasoline distributed will be designated as E10 as described by 40 CFR 1090.1110©(2).
- Any sub-grade product with a 7.8 psi or 9.0 psi CBOB does not meet the requirements for summer reformulated gasoline.
- This product is non-additized gasoline.

SPECIFICATIONS FOR V GRADE CBOB GASOLINE
South West Region

(This Conventional Before Oxygenate Blending (CBOB) gasoline is certified with 10% Denatured Fuel Ethanol (DFE) by volume.)

Specification Points	ASTM Test Method	Origin Shipments Minimum	Origin Shipments Maximum	Deliveries 1/ (At Terminals)
Gravity, Degrees API	D287, D1298, D4052		Report Only	
Color			Undyed	
Volatility 2/				
RVP 6/ 8/	D5191			
Distillation 9/	D86			
Benzene, vol% 9/	D5769		3.8	
Mercaptan Sulfur, wt % 3/	D3227		0.003	
Copper Corrosion	D130		1	
Silver Corrosion	D4814		1	
Gum, Existent, mg/100ml	D381		4	5
Oxidation Stability, min.	D525	240		180
Phosphorous, g/gal	D3231		0.003	0.005
Lead, g/gal	D3237		0.010	0.05
Research Octane {R} 9/	D2699	Report		
Motor Octane {M} 9/	D2700	82.0		
(R+M)/2 9/	D4814	87.0		
Sulfur, ppm 8/	D2622		80	
Oxygenates, wt % 7/	D4815, D5599		0.05	
Haze rating 4/	D4176		2	3
NACE Corrosion	TM0172 D7548	B+		
Hydrogen Sulfide	D3227		None	
Odor 5/		Nonoffensive		

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

2/ Refer to Sunoco'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/ Values below the detectible limit of an approved method may be reported as zero value.

8/ Value will be reported on the 0 and 10 percent oxygenated gasoline.

9/ Value will be reported on the 10 percent oxygenate blend.

Notes;

All parameters must be met without blending of denatured ethanol unless noted.

In accordance with 40 CFR 1190.1010(a), gasoline will be accepted when designated as E0 or E10 for oxygenate with ethanol as described by 40 CFR 1090.1110(c)(2). In accordance with 40 CFR 1090.1110(a), gasoline will be designated upon receipt as Winter CBOB or Summer CBOB (7.9 psi, 9.0 psi or SIP-controlled) based on the RVP of the base gasoline.

All CBOB distributed will be designated certified for blending with 10% ethanol described by 40 CFR 1090.1110(b).

Any product with a 7.8 psi or 9.0 psi does not meet the requirements for summer reformulated gasoline.

This product in non-additized.

SPECIFICATIONS FOR 87 OCTANE INDEX REFORMULATED GASOLINE BLENDSTOCK (RBOB)
GRADE 21

For Blending With 10% Denatured Fuel Ethanol (92% Purity) As Defined In ASTM D4806

All Grade 21 Requirements (Texas)

Specification Points	ASTM Test Method	Origin Shipments Minimum	Origin Shipments Maximum	Deliveries (At Terminals)	Note
Benzene, vol %	D5769-20		Report		2/3/
Research Octane {R}	D2699	Report			
Motor Octane {M}	D2700	82.0			
(R+M)/2	D4814	87.0			
Oxygen Content, wt %	D5599-18				1/2/6/
Ethanol Content, vol %	D5599-18	9	10		2/7/
Sulfur, ppm	D2622-16		80		8/
DVPE	D5191-20 EPA EQN		Maximum		8/9/
212, 221 (Winter)			11.0 10.0(without 10% Ethanol)		
213, 321 (Winter)			12.5 11.5(without 10% Ethanol)		
214, 421 (Winter)			14.5 13.5(without 10% Ethanol)		
211, 121 (Summer)			7.4 6.4 (without 10% Ethanol)		
Color		Undyed			
Doctor test	D4952		Negative(sweet)		4/10/
or					
Mercaptan Sulfur, wt %	D3227		0.002		10/
Copper Corrosion	D130		1		10/
Silver Corrosion	D7671		1		10/
Gum, Existent, mg/100ml	D381		4	5	10/
Gravity API @ 60F	D287,D1298,D4052		Report		6/
Oxidation Stability, min.	D525	240		180	
Phosphorous, g/gal	D3231		0.004	0.005	10/
Lead, g/gal	D3237		0.05	0.05	10/
NACE Corrosion	TM0172	B+			6/
Volatility:					
Driveability Index	D4814		See chart		
Distillation, F @ % Evap.	D86		See chart		
Vapor/Liquid Ratio (V/L), F @20	D5188		See chart		5/

Grades	Driveability Index	10 vol% Max	50 vol% Min	50 vol% Max	90vol% Max	EndPt Max	V/L Min
211	1250	158	150	250	374	430	122
212	1240	149	150	245	374	430	122
213	1230	140	150	240	365	430	116
214	1220	131	150	235	365	430	107

This is a base gasoline, not for sale to the ultimate consumer.
Heavy metals are not allowed to be present.
Any gasoline exhibiting an offensive odor and/or poses a personal health hazard will not be accepted for shipment.
Any gasoline containing more than 0.50 wt.% of dicyclopentadiene will not be accepted for shipment.
The referee method will be based on a gas chromatograph test.
Delivery test results may vary by the smaller of ASTM reproducibility for a given test or any test tolerance as allowed by state or EPA regulations at the point of delivery.

1/ All 21 grades may not contain oxygenates, such as ethers and alcohols. The use of non-hydrocarbon blending components is prohibited. Origin maximum MTBE 0.25 vol.%. Delivery maximum 0.50 vol.%.
2/ Refer to test methods published in 40 CFR 1090. Alternate test methods may be used if qualified using the PBMS process in 40 CFR 1090.1360 and meet the qualification criteria in 40 CFR 1090.1365.
3/ Alternate methods: D3606-20e1 Procedure B or EPA PBMS 1090.1365.
4/ Mercaptan Sulfur waived if fuel is negative by Doctor test.
5/ Computer and Linear methods may be used to determine V/L value. D5188 will be the referee method.
6/ Specifications must be met before blending of denatured fuel ethanol.
7/ Oxygen content must meet a minimum of 1.7 wt % and a maximum of 4.0 wt % after blending of denatured fuel ethanol.
8/ To use alternate methods you must follow the PBMS process in 40 CFR 1090.1360 and meet qualification criteria in 40 CFR 1090.1365.
9/ DVPE requirements must be met on both the base gasoline before blending with ethanol and on the ethanol blended gasoline.
10/ Requirement may be met on either the base gasoline before blending with ethanol or on the ethanol blended gasoline.

SPECIFICATIONS FOR V GRADE RBOB GASOLINE
South West Region

(This Reformulated Before Oxygenate Blending (RBOB) gasoline is certified with 10% Denatured Fuel Ethanol (DFE) by volume.)

Specification Points	ASTM Test Method	Origin Shipments Minimum	Origin Shipments Maximum	Deliveries 1/ (At Terminals)
Gravity, Degrees API	D287, D1298, D4052		Report Only	
Color			Undyed	
Volatility 2/				
RVP 6/ 8/	D5191			
Distillation 9/	D86			
Benzene, vol% 9/	D5769		3.8	
Mercaptan Sulfur, wt % 3/	D3227		0.003	
Copper Corrosion	D130		1	
Silver Corrosion	D4814		1	
Gum, Existent, mg/100ml	D381		4	5
Oxidation Stability, min.	D525	240		180
Phosphorous, g/gal	D3231		0.003	0.005
Lead, g/gal	D3237		0.010	0.05
Research Octane {R} 9/	D2699	Report		
Motor Octane {M} 9/	D2700	82.0		
(R+M)/2 9/	D4814	87.0		
Sulfur, ppm 8/	D2622		80	
Oxygenates, wt % 7/	D4815, D5599		0.05	
Haze rating 4/	D4176		2	3
NACE Corrosion	TM0172 D7548	B+		
Hydrogen Sulfide	D3227		None	
Odor 5/		Nonoffensive		

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

2/ Refer to NuStar'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/ Values below the detectible limit of an approved method may be reported as zero value.

8/ Value will be reported on the 0 and 10 percent oxygenated gasoline.

9/ Value will be reported on the 10 percent oxygenate blend.

Notes;

All parameters must be met without blending of denatured ethanol unless noted.

In accordance with 40 CFR 1190.1010(a), gasoline will be accepted when designated as E0 or E10 for oxygenate with ethanol as described by 40 CFR 1090.1110(c)(2). In accordance with 40 CFR 1090.1110(a), gasoline will be designated upon receipt as Winter RBOB or Summer RBOB (7.9 psi, 9.0 psi or SIP-controlled) based on the RVP of the base gasoline.

All gasoline distributed will be designated certified for blending with 10% ethanol described by 40 CFR 1090.1110(c)(2).

Product shall meet the Reformulated Gasoline (RFG) standard of 1090.220.

Summer RBOB- This product meets the requirements for summer reformulated or conventional gasoline.

This product is non-additized.

SPECIFICATIONS FOR V GRADE SUB-OCTANE RBOB GASOLINE
South West Region - Colorado

(This Reformulated Before Oxygenate Blending (RBOB) gasoline is certified with 10% Denatured Fuel Ethanol (DFE) by volume.)

	ASTM	Origin Shipments		Deliveries 1/
Specification Points	Test Method	Minimum	Maximum	(At Terminals)
Gravity, Degrees API	D287, D1298, D4052		Report Only	
Color			Undyed	
Volatility 2/				
RVP 6/ 8/	D5191			
Distillation 9/	D86			
Benzene, vol% 9/	D5769		3.8	
Mercaptan Sulfur, wt % 3/	D3227		0.002	
Copper Corrosion	D130		1	
Silver Corrosion	D4814		1	
Gum, Existent, mg/100ml	D381		4	5
Oxidation Stability, min.	D525	240		180
Phosphorous, g/gal	D3231		0.003	0.005
Lead, g/gal	D3237		0.010	0.05
Research Octane {R} 9/	D2699	Report		
Motor Octane {M} 9/	D2700			
(R+M)/2 9/	D4814	85.0		
Sulfur, ppm 8/	D2622		80	
Oxygenates, wt % 7/	D4815, D5599		0.05	
Haze rating 4/	D4176		2	3
NACE Corrosion	TM0172 D7548	B+		
Hydrogen Sulfide	D3227		None	
Odor 5/		Nonoffensive		

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

2/ Refer to NuStar'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/ Values below the detectible limit of an approved method may be reported as zero value.

8/ Value will be reported on the 0 and 10 percent oxygenated gasoline.

9/ Value will be reported on the 10 percent oxygenate blend.

Notes;

All parameters must be met without blending of denatured ethanol unless noted.

In accordance with 40 CFR 1190.1010(a), gasoline will be accepted when designated as E0 or E10 for oxygenate with ethanol as described by 40 CFR 1090.1110(c)(2). In accordance with 40 CFR 1090.1110(a), gasoline will be designated upon receipt as Winter RBOB or Summer RBOB (7.9 psi, 9.0 psi or SIP-controlled) based on the RVP of the base gasoline.

All gasoline distributed will be designated as certified for blending with 10% ethanol described by 40 CFR 1090.1110(c)(2).

Product shall meet Reformulated Gasoline (RFG) standard of 1090.220.

Summer RBOB – This product meets the requirements for summer reformulated or conventional gasoline.

This product is non-additized.

PREMIUM UNLEADED GASOLINE CBOB – 91 OCTANE

(This Conventional Before Oxygenate Blending (CBOB) gasoline is intended for blending with 10% Denatured Fuel Ethanol (DFE) by volume.)

Specification Points	Test Method	Shipments Minimum	Shipments Maximum	Deliveries 1/ (At Terminals)
Gravity, Degrees API	D287	Report Only		
Color		Undyed		
Volatility 2/				
RVP 6/ 8/	D5191			
Distillation 9/				
Benzene, vol % 9/	D5769		3.8	
Mercaptan Sulfur, wt % 3/	D3227		0.003	
Copper Corrosion	D130		1	
Hydrogen Sulfide	D3227		None	
Silver Corrosion	D4814		1	
Gum, Existent, mg/100ml	D381		4	5
Oxidation Stability, min.	D525	240		
Phosphorous, g/gal	D3231		0.003	0.005
Lead, g/gal	D3237		0.010	0.05
Sulfur, ppm 8/	D2622		80	
Oxygenates, vol % 7/	D4815,D5599		0.05	
Haze rating 4/	D4176		2	3
NACE Corrosion	TM0172 D7548	B+		
Octane 9/				
RON	D2699	Report		
MON	D2700	Report		
(R+M/2)		91.0		
Odor 5/		Nonoffensive		

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

2/ Refer to NuStar's 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.

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/ Values below the detectible limit of an approved method may be reported as a zero value.

8/ Values will be reported on the 0 and 10 percent oxygenated gasoline.

9/ Value will be reported on the 10 percent oxygenate blend.

Notes:

All parameters must be met without blending of denatured fuel ethanol unless noted.

In accordance with 40 CFR 1090.1010(a) gasoline will be accepted when designated as E0 or E10 for oxygenate with ethanol as described by 40 CFR 1090.1110(c)(2). In accordance with 40 CFR 1090.1010(a) gasoline will be designated upon receipt as Winter CBOB or Summer CBOB (7.8 psi, 9.0 psi or SIP-controlled) based on the RVP of the base gasoline.

All gasoline distributed will be designated as E10 as described by 40 CFR 1090.1110(c)(2).

Any product with a 7.8 psi or 9.0 psi CBOB does not meet the requirements for summer reformulated gasoline.

This product is non-additized.

PREMIUM UNLEADED GASOLINE RBOB – 91 OCTANE

(This Reformulated Before Oxygenate Blending (RBOB) gasoline is intended for blending with 10% Denatured Fuel Ethanol (DFE) by volume.)

Specification Points	Test Method	Shipments Minimum	Shipments Maximum	Deliveries 1/ (At Terminals)
Gravity, Degrees API	D287	Report Only		
Color		Undyed		
Volatility 2/				
RVP 6/ 8/	D5191			
Distillation 9/				
Benzene, vol % 9/	D5769		3.8	
Mercaptan Sulfur, wt % 3/	D3227		0.003	
Copper Corrosion	D130		1	
Hydrogen Sulfide	D3227		None	
Silver Corrosion	D4814		1	
Gum, Existent, mg/100ml	D381		4	5
Oxidation Stability, min.	D525	240		
Phosphorous, g/gal	D3231		0.003	0.005
Lead, g/gal	D3237		0.010	0.05
Sulfur, ppm 8/	D2622		80	
Oxygenates, vol % 7/	D4815,D5599		0.05	
Haze rating 4/	D4176		2	3
NACE Corrosion	TM0172 D7548	B+		
Octane 9/				
RON	D2699	Report		
MON	D2700	Report		
(R+M/2)		91.0		
Odor 5/		Nonoffensive		

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

2/ Refer to NuStar's 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.

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/ Values below the detectible limit of an approved method may be reported as a zero value.

8/ Values will be reported on the 0 and 10 percent oxygenated gasoline.

9/ Value will be reported on the 10 percent oxygenate blend.

Notes:

All parameters must be met without blending of denatured fuel ethanol unless noted.

In accordance with 40 CFR 1090.1010(a) gasoline will be accepted when designated as E0 or E10 for oxygenate with ethanol as described by 40 CFR 1090.1110(c)(2). In accordance with 40 CFR 1090.1010(a) gasoline will be designated upon receipt as Winter CBOB or Summer CBOB (7.8 psi, 9.0 psi or SIP-controlled) based on the RVP of the base gasoline.

All gasoline distributed will be designated as E10 as described by 40 CFR 1090.1110(c)(2).

Product shall meet the Reformulated Gasoline (RFG) standard of 1090.220.

Summer RBOB – This product meets the requirements for summer reformulated or conventional gasoline.

This product is non-additized.

SPECIFICATIONS FOR PREMIUM CONVENTIONAL GASOLINE BLENDSTOCK (PBOB) – 93 OCTANE

(This Conventional Before Oxygenate Blending (PBOB) gasoline is intended for blending with 10% Denatured Fuel Ethanol (DFE) by volume)

Specification Points	Test Method	Shipments Minimum	Shipments Maximum	Deliveries 1/ (At Terminals)
Gravity, Degrees API	D287	Report Only		
Color		Undyed		
Volatility 2/				
RVP 6/ 8/	D5191			
Distillation 9/				
Benzene, vol % 9/	D5769		3.8	
Mercaptan Sulfur, wt % 3/	D3227		0.003	
Copper Corrosion	D130		1	
Silver Corrosion	D4814		1	
Gum, Existent, mg/100ml	D381		4	5
Oxidation Stability, min.	D525	240		
Phosphorous, g/gal	D3231		0.003	0.005
Lead, g/gal	D3237		0.010	0.05
Octane 9/				
RON	D2699	Report		
MON	D2700	82.0		
(R+M/2)		93.0		
Sulfur, ppm 8/	D2622		80	
Oxygenates, vol % 7/	D4815,D5599		0.05	
Haze rating 4/	D4176		2	3
NACE Corrosion	TM0172 D7548	B+		
Hydrogen Sulfide	D3227		None	
Odor 5/		Nonoffensive		

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

2/ Refer to NuStar's 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.

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/ Values below the detectible limit of an approved method may be reported as a zero value.

8/ Values will be reported on the 0 and 10 percent oxygenated gasoline.

9/ Value will be reported on the 10 percent oxygenate blend.

Notes:

All parameters must be met without blending of denatured fuel ethanol unless noted.

In accordance with 40 CFR 1090.1010(a) gasoline will be accepted when designated as E0 or E10 for oxygenate with ethanol as described by 40 CFR 1090.1110(c)(2). In accordance with 40 CFR 1090.1010(a) gasoline will be designated upon receipt as Winter PBOB or Summer PBOB (7.8 psi, 9.0 psi or SIP-controlled) based on the RVP of the base gasoline.

All gasoline distributed will be designated as E10 as described by 40 CFR 1090.1110(c)(2).

Any product with a 7.8 or 9.0 psi PBOB does not meet the requirement for summer reformulated gasoline.

This product is non-additized.

SPECIFICATIONS FOR PREMIUM REFORMULATED GASOLINE BLENDSTOCK (PBOB)
GRADE 22

For blending with 10% denatured fuel ethanol (92% purity) as defined by ASTM D4806.

All Grade 22 Requirements (Texas)

Specification Points	ASTM Test Method	Origin Shipments Minimum	Origin Shipments Maximum	Deliveries (At Terminals)	Note
Benzene, vol %	D5769-20	Report			2/3/
Research Octane {R}	D2699	Report			
Motor Octane {M}	D2700	Report			
(R+M)/2	D4814	93.0			
Oxygen Content, wt %	D5599-18				1/2/6/
Ethanol Content, vol.%	D5599-18	9	10		2/7/
Sulfur, ppm	D2622-16		80		8/
DVPE	D5191-20 EPA EQN		Maximum		8/9/
212, 221 (Winter)			11.0	10.0 (without 10% Ethanol)	
213, 321 (Winter)			12.5	11.5 (without 10% Ethanol)	
214, 421 (Winter)			14.5	13.5 (without 10% Ethanol)	
211, 121 (Summer)			7.4	6.4 (without 10% Ethanol)	
Color		Undyed			
Doctor test	D4952		Negative (sweet)		4/10/
or					
Mercaptan Sulfur, wt %	D3227		0.002		10/
Copper Corrosion	D130		1		10/
Silver Corrosion	D7671		1		10/
Gum, Existent, mg/100ml	D381		4	5	10/
Gravity API @ 60F	D287,D1298,D4052	Report			6/
Oxidation Stability, min.	D525	240		180	
Phosphorous, g/gal	D3231		0.004	0.005	10/
Lead, g/gal	D3237		0.05	0.05	10/
NACE Corrosion	TM0172	B+			
Volatility:					
Driveability Index	D4814		See chart		
Distillation, F @ % Evap.	D86		See chart		
Vapor/Liquid Ratio (V/L), F @20	D5188		See chart		5/

Grades	Driveability Index	10 vol% Max	50 vol% Min	50 vol% Max	90vol% Max	EndPt Max	V/L Min
221	1250	158	150	250	374	430	122
222	1240	149	150	245	374	430	122
223	1230	140	150	240	365	430	116
224	1220	131	150	235	365	430	107

This is a base gasoline, not for sale to the ultimate consumer.
Heavy metals are not allowed.
Any gasoline exhibiting an offensive odor and/or poses a personal health hazard will not be accepted for shipment.
Any gasoline exhibiting an offensive odor and/or containing more than 0.50 wt % dicyclopentadiene will not be accepted for shipment.
The referee method will be based on a gas chromatograph test.
Delivery test results may vary by the smaller of ASTM reproducibility for a given test tolerance as allowed by state or EPA regulations a the point of delivery.

NOTES

1/ All 22 grades may not contain oxygenates, such as ethers and alcohols. The use of non-hydrocarbon blending components in these grades is prohibited. Origin maximum MTBE 0.25 vol.%. Delivery maximum 0.50 vol/%.

2/ Refer to test methods published in 40 CFR 1090. Alternative test methods may be used if qualified using the PBMS process in 40 CFR 1090.1360 and meet the qualification criteria in 40 CFR 1090.1365.

3/ Alternate methods: D3606-20e1 Procedure B or EPA PBMS 1090.1365.

4/ Mercaptan sulfur waived if fuel is negative by Doctor test.

5/ Computer and Linear methods may be used to determine V/L value. D5188 will be the referee method.

6/ Specifications must be met before blending of denatured fuel ethanol.

7/ Oxygen content must meet a minimum of 1.7 wt.% and a maximum of 4.0 wt.5 after blending of denatured fuel ethanol.

8/ To use alternate methods you must follow the PBMS process in 40 CFR 1090.1360 and meet the qualification criteria in 40 CFR 1090.1365.

9/ DVPE requirements must be met on both the base gasoline before blending with ethanol and on the ethanol blended gasoline.

10/ Requirement may be met on either the base gasoline before blending with ethanol or on the ethanol blended gasoline.

SPECIFICATIONS FOR PREMIUM CONVENTIONAL GASOLINE BLENDSTOCK (RBOB) – 93 OCTANE

(This Conventional Before Oxygenate Blending (RBOB) gasoline is intended for blending with 10% Denatured Fuel Ethanol (DFE) by volume)

Specification Points	Test Method	Shipments Minimum	Shipments Maximum	Deliveries 1/ (At Terminals)
Gravity, Degrees API	D287	Report Only		
Color		Undyed		
Volatility 2/				
RVP 6/ 8/	D5191			
Distillation 9/				
Benzene, vol % 9/	D5769		3.8	
Mercaptan Sulfur, wt % 3/	D3227		0.003	
Copper Corrosion	D130		1	
Silver Corrosion	D4814		1	
Gum, Existent, mg/100ml	D381		4	5
Oxidation Stability, min.	D525	240		
Phosphorous, g/gal	D3231		0.003	0.005
Lead, g/gal	D3237		0.010	0.05
Octane 9/				
RON	D2699	Report		
MON	D2700	82.0		
(R+M/2)		93.0		
Sulfur, ppm 8/	D2622		80	
Oxygenates, vol % 7/	D4815,D5599		0.05	
Haze rating 4/	D4176		2	3
NACE Corrosion	TM0172 D7548	B+		
Hydrogen Sulfide	D3227		None	
Odor 5/		Nonoffensive		

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

2/ Refer to NuStar's 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.

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/ Values below the detectible limit of an approved method may be reported as a zero value.

8/ Values will be reported on the 0 and 10 percent oxygenated gasoline.

9/ Value will be reported on the 10 percent oxygenate blend.

Notes:

All parameters must be met without blending of denatured fuel ethanol unless noted.

In accordance with 40 CFR 1090.1010(a) gasoline will be accepted when designated as E0 or E10 for oxygenate with ethanol as described by 40 CFR 1090.1110(c)(2). In accordance with 40 CFR 1090.1010(a) gasoline will be designated upon receipt as Winter PBOB or Summer PBOB (7.8 psi, 9.0 psi or SIP-controlled) based on the RVP of the base gasoline.

All gasoline distributed will be designated as E10 as described by 40 CFR 1090.1110(c)(2).

Product shall meet the Reformulated Gasoline (RFG) standard of 1090.220.

Summer RBOB – This product meets the requirements for summer reformulated or conventional gasoline.

This product is non-additized.

Seasonal Gasoline Volatility Classes

(Shipments from Origin)

Reid Vapor Pressure, D5191 1/

March 1 – September 15 DVPE using EPA formula 2/

September 16 – February 28 DVPE using D5191 formula

Distillation, ASTM D86 3/	Class A	Class B	Class C	Class D	Class E
10% Evaporated F, max	158.0	149.0	140.0	131.0	122.0
50% Evaporated F, min	150.0	150.0	150.0	145.0	145.0
50% Evaporated F, max	250.0	245.0	240.0	235.0	230.0
90% Evaporated F, max	374.0	374.0	365.0	365.0	365.0
Final Boiling Point F, max 4/	425.0	425.0	425.0	425.0	425.0
Residue, vol % max	2	2	2	2	2
Driveability Index, D4814 max	1250	1240	1230	1220	1200

Vapor to Liquid Ratio=20:1 F 3/5/	Class 1	Class 2	Class 3	Class 4	Class 5
D5188, min	129	122	116	107	102

1/ All gasoline deliveries will not exceed applicable Federal and State requirements.

2/ The calculation required for the EPA compliance period is published in part 1090.1355.

3/ Specifications shall be met after blending with 9% to 10% denatured fuel ethanol.

4/ The final boiling point of all gasoline deliveries will be at or below 437 F as determined by ASTM D86.

5/ D5188 is the referee test method. The alternative equations in D4814 may also be used.

SEASONAL GASOLINE VOLATILITY SCHEDULE
SHIPMENTS FROM MCKEE ORIGIN

Amarillo 8" Pipeline System
Premium Unleaded Gasoline

.	Jan. 1-30	Feb. 1-28	Mar. 1-31	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
Amarillo	13.50 D-4	8.50 A-3	8.50 A-2	9.00 A-2	9.00 A-2	9.00 A-1	9.00 A-2	9.00 A-2	9.00 A-2	10.00 B-2	11.50 C-3	11.50 C-3	13.50 D-4
Albuquerque	13.50 D-4	8.50 A-3	8.50 A-3	9.00 A-2	9.00 A-2	9.00 A-1	9.00 A-1	9.00 A-2	9.00 A-2	10.00 B-2	11.50 C-3	13.50 D-4	13.50 D-4
Abernathy	13.50 D-4	8.50 A-3	8.50 A-2	9.00 A-2	9.00 A-2	9.00 A-1	9.00 A-2	9.00 A-2	9.00 A-2	10.00 B-2	11.50 C-3	11.50 C-3	13.50 D-4

SEASONAL GASOLINE VOLATILITY SCHEDULE
SHIPMENTS FROM MCKEE ORIGIN

Amarillo 8" Pipeline System
Sub Grade Unleaded Gasoline

.	Jan. 1-30	Feb. 1-28	Mar. 1-31	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
Amarillo	13.50 D-4	11.50 C-3	8.50 A-2	9.00 A-2	9.00 A-2	9.00 A-1	9.00 A-2	9.00 A-2	9.00 A-2	10.00 B-2	11.50 C-3	11.50 C-3	13.50 D-4
Albuquerque	13.50 D-4	11.50 C-3	8.50 A-3	9.00 A-2	9.00 A-2	9.00 A-1	9.00 A-1	9.00 A-2	9.00 A-2	10.00 B-2	11.50 C-3	13.50 D-4	13.50 D-4
Abernathy	13.50 D-4	11.50 C-3	8.50 A-2	9.00 A-2	9.00 A-2	9.00 A-1	9.00 A-2	9.00 A-2	9.00 A-2	10.00 B-2	11.50 C-3	11.50 C-3	13.50 D-4

SEASONAL GASOLINE VOLATILITY SCHEDULE
SHIPMENTS FROM MCKEE ORIGIN

Colorado Springs Pipeline System
Premium Unleaded Gasoline

.	Jan. 1-30	Feb. 1-28	Mar. 1-31	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
Colorado Springs	13.50 D-4	13.50 D-4	11.50 C-3	8.50 A-3	9.00 A-2	9.00 A-1	9.00 A-1	9.00 A-2	9.00 A-2	10.00 B-2	11.50 C-3	13.50 D-4	13.50 D-4

SEASONAL GASOLINE VOLATILITY SCHEDULE
SHIPMENTS FROM MCKEE ORIGIN

Colorado Springs Pipeline System
Sub Grade Unleaded Gasoline

.	Jan. 1-30	Feb. 1-28	Mar. 1-31	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
Colorado Springs	13.50 D-4	13.50 D-4	11.50 C-3	8.50 A-3	9.00 A-2	9.00 A-1	9.00 A-1	9.00 A-2	9.00 A-2	10.00 B-2	11.50 C-3	13.50 D-4	13.50 D-4

SEASONAL GASOLINE VOLATILITY SCHEDULE
SHIPMENTS TO DESTINATION

Denver Terminal
Premium Unleaded Gasoline

.	Jan. 1-30	Feb. 1-28	Mar. 1-31	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
Denver	13.50 D-4	7.80 A-4	7.80 A-3	7.80 A-3	7.80 A-2	7.80 A-1	7.80 A-1	7.80 A-2	7.80 A-2	10.00 B-2	11.50 C-3	13.50 D-4	13.50 D-4

Note: Dates apply to receipts at Denver terminal.

SEASONAL GASOLINE VOLATILITY SCHEDULE
SHIPMENTS TO DESTINATION

Denver Terminal
Sub Grade Unleaded Gasoline

.	Jan. 1-30	Feb. 1-28	Mar. 1-31	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
Denver	13.50 D-4	13.50 D-4	7.80 A-3	7.80 A-3	7.80 A-2	7.80 A-1	7.80 A-1	7.80 A-2	7.80 A-2	10.00 B-2	11.50 C-3	13.50 D-4	13.50 D-4

Note: Dates apply to receipts at Denver terminal.

SEASONAL GASOLINE VOLATILITY SCHEDULE
SHIPMENTS FROM MCKEE ORIGIN

El Paso Pipeline System
Premium Unleaded Gasoline

.	Jan. 1-30	Feb. 1-28	Mar. 1-31	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
El Paso - Local	13.50 D-4	7.00 A-4	7.00 A-2	7.00 A-2	7.00 A-1	7.00 A-1	7.00 A-1	7.00 A-1	7.00 A-1	10.00 B-2	11.50 C-3	13.50 D-4	13.50 D-4
El Paso – Tucson	13.50 D-4	9.00 A-3	9.00 A-2	9.00 A-2	9.00 A-2	9.00 A-1	9.00 A-1	9.00 A-2	9.00 A-2	10.00 B-2	11.50 C-3	13.50 D-4	13.50 D-4
El Paso – Phoenix	8.00 A-2	7.00 A-2	7.00 A-2	7.00 A-2	7.00 A-1	7.00 A-1	7.00 A-1	7.00 A-1	7.00 A-1	7.00 A-1	8.00 A-2	8.00 A-2	8.00 A-2

SEASONAL GASOLINE VOLATILITY SCHEDULE
SHIPMENTS FROM MCKEE ORIGIN

El Paso Pipeline System
Sub Grade Unleaded Gasoline

.	Jan. 1-30	Feb. 1-28	Mar. 1-31	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
El Paso - Local	13.50 D-4	11.50 C-4	7.00 A-2	7.00 A-2	7.00 A-1	7.00 A-1	7.00 A-1	7.00 A-1	7.00 A-1	10.00 B-2	11.50 C-3	13.50 D-4	13.50 D-4
El Paso – Tucson	13.50 D-4	9.00 A-3	9.00 A-2	9.00 A-2	9.00 A-2	9.00 A-1	9.00 A-1	9.00 A-2	9.00 A-2	10.00 B-2	11.50 C-3	13.50 D-4	13.50 D-4
El Paso – Phoenix	8.00 A-2	8.00 A-2	7.00 A-2	7.00 A-2	7.00 A-1	7.00 A-1	7.00 A-1	7.00 A-1	7.00 A-1	7.00 A-1	8.00 A-2	8.00 A-2	8.00 A-2

SEASONAL GASOLINE VOLATILITY SCHEDULE
SHIPMENTS FROM THREE RIVERS ORIGIN

Laredo Pipeline System
Premium Unleaded Gasoline

	Jan. 1-30	Feb. 1-28	Mar. 1-31	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
Laredo	14.50 D-4	12.50 C-3	11.00 B-2	8.50 A-2	8.80 A-2	8.80 A-1	8.80 A-2	8.80 A-2	8.80 A-2	11.00 B-2	12.50 C-3	14.50 D-4	14.50 D-4 1/

1/ Winter season RVP's listed are based on E10 hand blends.

SEASONAL GASOLINE VOLATILITY SCHEDULE
SHIPMENTS FROM THREE RIVERS ORIGIN

Laredo Pipeline System
Subgrade Unleaded Gasoline

.	Jan. 1-30	Feb. 1-28	Mar. 1-31	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
Laredo	14.50 D-4	12.50 C-3	11.00 B-2	8.50 A-2	8.80 A-2	8.80 A-1	8.80 A-2	8.80 A-2	8.80 A-2	11.00 B-2	12.50 C-3	14.50 D-4	14.50 D-4 1/

1/ Winter season RVP's listed are based on E10 hand blends.

SEASONAL GASOLINE VOLATILITY SCHEDULE
SHIPMENTS FROM THREE RIVERS ORIGIN

San Antonio terminals Pipeline System
Premium Unleaded Gasoline

.	Jan. 1-30	Feb. 1-28	Mar. 1-31	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
San Antonio area	13.50	11.50	10.00	7.50	7.80	7.80	7.80	7.80	7.80	6.80	11.50	13.50	13.50

Note: This is maximum RVP after blending with Ethanol.

SEASONAL GASOLINE VOLATILITY SCHEDULE
SHIPMENTS FROM THREE RIVERS ORIGIN

San Antonio area Pipeline System
Subgrade Unleaded Gasoline

.	Jan. 1-30	Feb. 1-28	Mar. 1-31	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
San Antonio area	13.50	11.50	10.00	10.00	10.00	7.80	7.80	7.80	7.80	7.80	11.50	13.50	13.50

Note: This is maximum RVP after blending with Ethanol.

SEASONAL GASOLINE VOLATILITY SCHEDULE
SHIPMENTS TO DESTINATION

Southlake Terminal
Premium Unleaded Gasoline

.	Jan. 1-30	Feb. 1-28	Mar. 1-31	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
Southlake	13.50 D-4	7.80 A-3	7.80 A-3	7.80 A-3	7.80 A-3	7.80 AA-3	7.80 AA-2	7.80 AA-2	7.80 AA-2	10.00 B-2	11.50 C-3	13.50 D-4	13.50 D-4

Note: Dates apply to receipts at Southlake terminal.

SEASONAL GASOLINE VOLATILITY SCHEDULE
SHIPMENTS TO DESTINATION

Southlake Terminal
Sub Grade Unleaded Gasoline

.	Jan. 1-30	Feb. 1-28	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
Southlake	13.50 D-4	13.50 D-4	11.50 C-3	7.80 A-3	7.80 A-3	7.80 A-3	7.80 AA-3	7.80 AA-2	7.80 AA-2	7.80 AA-2	10.00 B-2	11.50 C-3	13.50 D-4	13.50 D-4

Note: Dates apply to receipts at Southlake terminal.

SEASONAL GASOLINE VOLATILITY SCHEDULE
SHIPMENTS FROM CORPUS CHRISTI ORIGIN

Valley Pipeline System
Premium Unleaded Gasoline

.	Jan. 1-30	Feb. 1-28	Mar. 1-31	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
Valley system	13.50 D-4	13.50 D-4	11.50 C-3	8.50 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-4

SEASONAL GASOLINE VOLATILITY SCHEDULE
SHIPMENTS FROM CORPUS CHRISTI ORIGIN

Valley Pipeline System
Sub Grade Unleaded Gasoline

.	Jan. 1-30	Feb. 1-28	Mar. 1-31	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
Valley system	13.50 D-4	13.50 D-4	11.50 C-3	8.50 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-4

SPECIFICATIONS FOR E GRADE ETHANOL

Specification Points	Test Method	Shipments	Deliveries
Apparent proof, 60 F	Hydrometer	Report	
Or Density, 60F	D4052	Report	
Water, Vol %, max	E203 or E1064	1.0	
Ethanol, Volume %, min	D5501	93.5	93.0
Methanol, Volume %, max	D5501	0.5	
Sulfur, ppm (wt/wt), max	D5453	10	
Solvent Washed Gum, D381 Mg/100ml, max	Air jet method	5	
Potential Sulfate, mass ppm, max	D7319	4	
Chloride, mg/L, Max	D7319	5	
Copper, mg/L, Max	D1688 Procedure A, Modified per D4806	0.08	
Acidity (as Acetic Acid), Mass %, max	D1613	0.007	
pHe	D6423		
Minimum		6.5	
Maximum		9.0	
Appearance @ 60 F	Visual examination	Visibly free of suspended or precipitated contaminants. Must be clear and bright.	
Denaturant Content and Type	Only approved denaturants and amounts listed in D4806		

Corrosion Inhibitor Additive,	**Minimum treat rate**	**Vendor**	**Additive**
One of the following is required:	6 lbs./1000 bbls.	Innospec	DCI-11 Plus
	20 lbs./1000 bbls.	G.E. Betz	Endcor GCC9711
	20 lbs./1000 bbls.	Octel	DCI-11
	20 lbs./1000 bbls.	Petrolite	Tolad 3222
	20 lbs./1000 bbls.	Nalco	5403
	20 lbs./1000 bbls.	Betz	ACN 13
	20 lbs./1000 bbls.	Midcontinental	MCC5011E
	13 lbs./1000 bbls.	Midcontinental	MCC5011PHE
	13 lbs./1000 bbls.	Petrolite	Tolad 3224
	13 lbs./1000 bbls.	US Water Services	Corrpro 654
	13 lbs./1000 bbls.	US Water Services	Corrpro 656
	6 lbs./1000 bbls.	Ashland	Anergy ECI-6
	3 lbs./1000 bbls.	G.E. Power & Water	8Q123ULS
	5 lbs./1000 bbls.	Nalco	EC5624A Plus
	6 lbs./1000 bbls.	US Water Services	Corrpro Pro NT

SPECFICATION FOR FUNGIBLE B5 ULSD
#2 Fuel Oil`

Specification Points	ASTM Test Methods	Shipments (At Origin) Minimum	Shipments (At Origin) Maximum	Deliveries 1/ (At Terminals) May Be
Gravity, Degrees A.P.I.	D287	30.0		
Color	D1500		4.0	
Color visual		Undyed		
Distillation,	D86			
50% Recovered, F			Report	
90% Recovered, F		540	640	
OR				
Simulated distillation	D2887			
50% Recovered, F			Report	
90% Recovered, F		572	672	
Corrosion, Copper Strip @122 F	D130		1	
Cetane				
(1) Cetane Number	D613	40.0		
Or (2) Cetane Index, Procedure A	D4737	40.0		
Cetane Index 2/	D976	40		
Flash, F	D93	130		125
Thermal Stability,				
(1) Thermal, % reflectance	D6468 (W)	75		
	D6468(Y)	82		
Aging Period (minutes)	D6468	90		
OR (2) Oxidation, mg/100ml	D2274		2.5	
Carbon Residue on 10% Bottoms (Ramsbottom) - Percent	D524		0.35	
Cloud Point, F	D2500, D5771 D5772, D5773			3/
Pour Point, F	D97, D5949 D5950, D5985			3/
Viscosity, cSt @104 F	D445	1.9	4.1	
FAME, vol %	D7371		5	4/
Haze Rating 5/	D4176		2	3

Ash, wt %	D482		0.01
Sulfur, ppm 6/	D2622		11
NACE Corrosion	TM0172, D7548	B+	
Aromatics (Volume %)	D1319		35
Or Aromatics by Cetane Index	D976	40	
BS&W, vol.%	D2709		<0.05

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

2/ ASTM D976 data is required for low sulfur oils to demonstrate aromatics compliance per the EPA.

3/ Due to fungible specifications, the cloud/pour point for diesel products must comply with the ASTM specifications for the region in which the diesel is produced. It should be noted that diesel products distributed into colder climates may require lower cloud and/or pour points or suppressors, i.e., winterization.

4/ Biodiesel Direct Supplier or certifying laboratory must be BQ9000/ISO9000 certified.

5/ The finished product shall be visually free of undissolved water, sediment, and suspended matter in proffered tankage and at the point of delivery. Compliance with this workmanship clause will be determined by ASTM D4176, Procedure 2 at 77 F or at actual conditions present at the point and time of sampling, whichever is lower.

6/ Origin laboratory certifying sulfur content must qualify the test method used per EPA Performance Based Testing Criteria (see CFR 80.584). The referee method will be ASTM D5453.

Additional Requirements:

Dyes: ULSD grade shipments may not be dyed.

-

SPECFICATION FOR B GRADE BIO-DIESEL FUEL

Specification Points	ASTM * Test Methods	Shipments (At Origin) Minimum	Maximum	Deliveries 1/ (At Terminals) May Be
Density, Kg/L	D4052	Report		
Distillation,	D1160			
Atmospheric equivalent temperature 90% Recovered, F or			680	
Simulated Distillation (Modified)	D2887		680	
Corrosion, Copper Strip @122 F	D130		1	
Cetane Number	D613	47		
Flash, P.M., F	D93	200		
Alcohol control (Must meet one of the following)				
Methanol content, % mass	EN14110		0.2	
Flash, P.M., F	D93	266		
Oxidation Stability	EN14112	6 hrs		3 hrs
Carbon Residue on 100% sample, %	D4530		0.050	
Cloud Point, F	D2500		36	
Viscosity, cSt @104 F	D445	1.9	6.0	
Sulfated Ash, % mass	D874		0.020	
Haze Rating @ 60 F	D4176		No. 2	
Sulfur, ppm 2/	D5453		15	
NACE Corrosion	TM0172	B+		
Free Glycerin, % mass	D6584		0.020	
Monoglyceride, % mass	D6584		0.400	
Total Glycerin, % mass	D6584		0.240	
Acid Number, mgKOH/g	D664		0.40	0.50
Phosphorus content wt %	D4951		0.001	
Water & Sediment vol %	D2709		0.050	
Calcium and Magnesium, combined, ppm	EN14538		5.0	
Sodium and Potassium, combined, ppm	EN14538		5.0	
Minimum Delivery Temperature 3/	MMP			
Workmanship 4/	MMP			
Filtration, Seconds (modified),max	D7501		125	

Biodiesel Supplier must be BQ9000 certified. No Methyl Esters derived from yellow grease.

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

2/ All results provided must use an EPA qualified instrument.

3/ Minimum delivery temperature of +50 F for acceptance for delivery.

4/ **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.

Additives:	BioExtend 30
	Eastman – Tenox 21
	Kemin BF 320
	Nalco EC5609A

* Alternative methods found in association the D6751 the ASTM specification for biodiesel are accepted.

SPECFICATION FOR Y GRADE No.1 FUEL OIL DISTILLATE
Grade 58

Specification Points	ASTM Test Methods	Shipments (At Origin) Minimum	Shipments (At Origin) Maximum	Deliveries (At Terminals) May Be
Gravity, Degrees A.P.I.	D287	35.0		
Distillation,	D86			
10% Recovered, F			419	
90% Recovered, F			550	
OR				
Simulated Distillation	D2887			
10% Recovered, F			383	
90% Recovered, F			580	
Corrosion, Copper Strip @122 F	D130		1	
Cetane				
(1)Cetane Number	D613	40.0		
(2)Cetane Index, procedure A	D4737	40.0		
Cetane Index 1/	D976	40		
Flash, F	D93	125	160	115
Carbon Residue on 10% Bottoms				
(Ramsbottom) - Percent	D524		0.15	
Pour Point, F	D97		-25	
Haze Rating 2/	D4176	2	3	
Sulfur - ppm 3/	D2622		11	15
Mercaptan Sulfur, wt % 4/	D3227		0.004	
Viscosity at 104 F, cSt	D445	1.3	2.1	
Ash, wt %	D482		0.01	
NACE Corrosion	TM0172, D7548	B+		

1/ ASTM D976 data is required for low sulfur fuel oils to demonstrate aromatics compliance per the EPA.

2/ The finished product shall be visually free of undissolved water, sediment, and suspendedmatter in proffered tankage and at the point of delivery. Compliance with this workmanship clause will be determined by ASTM D4176, Procedure 2 at 77 F or at actual conditions present at the point and time of sampling, whichever is lower.

3/ ASTM D7039 and D5453 may be used as an alternate method providing adequate correlation to ASTM D2622 is provided. *Sulfur limit, 12 ppm for interconnecting pipelines.

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

Dyes: Y-Grade petroleum fuel oil distillate shipments shall not be dyed.

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

SPECFICATION FOR FUNGIBLE ULTRA LOW SULFUR FUEL DIESEL
GRADE 37

Specification Points	ASTM Test Methods	Shipments (At Origin) Minimum	Maximum	Deliveries (At Terminals)1/ May Be
Gravity, Degrees A.P.I.	D287	30		
Color	D1500		2.5	3.0
Color visual		Undyed		
Distillation,	D86			
50% Recovered, F			Report	
90% Recovered, F		540	640	
OR				
Simulated distillation	D2887			
50% Recovered, F			Report	
90% Recovered, F		572	672	
Corrosion, Copper Strip @122 F	D130		1	
Cetane				
(1) Cetane Number	D613	40.0		
Or (2) Cetane Index, Procedure A	D4737	40.0		
Cetane Index 1/	D976	40		
Flash, F	D93	130		125
Thermal Stability,				
(1) Thermal, % reflectance	D6468 (W)	75		
	D6468(Y)	82		
Aging Period (minutes)	D6468	90		
OR (2) Oxidation, mg/100ml	D2274		2.5	
Carbon Residue on 10% Bottoms (Ramsbottom) - Percent	D524		0.35	
Cloud Point, F	D2500, D5771 D5772, D5773			2/
Pour Point, F	D97, D5949 D5950, D5985			2/
Viscosity, cSt @104 F	D445	1.9	4.1	
Haze Rating 3/	D4176		2	3
Ash, wt %	D482		0.01	

Sulfur, ppm 4/	D2622		11
NACE Corrosion	TM0172, D7548	B+	
Aromatics (Volume %)	D1319		31.7
Or Aromatics by Cetane Index	D976	40	
BS&W, vol.%	D2709		<0.05

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

2/ ASTM D976 data is required for low sulfur oils to demonstrate aromatics compliance per the EPA.

3/ Due to fungible specifications, the cloud/pour point for diesel products must comply with the ASTM specifications for the region in which the diesel is produced. It should be noted that diesel products distributed into colder climates may require lower cloud and/or pour points or suppressors, i.e., winterization.

4/ The finished product shall be visually free of undissolved water, sediment, and suspended matter in proffered tankage and at the point of delivery. Compliance with this workmanship clause will be determined by ASTM D4176, Procedure 2 at 77 F or at actual conditions present at the point and time of sampling, whichever is lower.

5/ Origin laboratory certifying sulfur content must qualify the test method used per EPA Performance Based Testing Criteria (see CFR 80.584). The referee method will be ASTM D5453. *Sulfur limit, 12 ppm for interconnecting pipelines.

Additional Requirements:

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

Dyes: ULSD grade shipments may not be dyed.

SPECFICATION FOR TEXAS X GRADE ULTRA LOW EMISSION DIESEL FUEL
Grade 49

Specification Points	ASTM Test Methods	Shipments (At Origin) Minimum	Shipments (At Origin) Maximum	Deliveries (At Terminals) May Be	Note
Gravity, Degrees A.P.I.	D287	33.0	39.0		
Color	D1500		2.5	3.0	
Distillation,	D86				
IBP			Report		
10% Recovered, F		340	420		
50% Recovered, F		400	490		
90% Recovered, F		540	640		
EP		610	690		
Corrosion, Copper Strip @122 F	D130		1		
Cetane					
(1) Cetane Number	D613	48.0			
OR (2) Cetane Index, procedure B	D4737	48.0			
Cetane Index _	D976	48			1/
Flash, F	D93	140		125	
Stability					
(1) Thermal, % reflectance	D6468 (W)	75			
	D6468 (Y)	82			
Aging Period (Minutes)	D6468	90			
OR (2) Potential Color			6		2/
Potential Gum, mg/100ml			50		3/
OR (3) Oxidation, mg/100ml	D2274		2.5		
Carbon Residue on 10% Bottoms (Ramsbottom) - Percent	D524		0.35		
Cloud Point, F	D2500,D5771,D5772,D5773				4/
Viscosity, cSt @104 F	D445	1.9	4.1		
Haze Rating	D4176		2	3	5/
Ash, wt %	D482		0.01		
Sulfur, ppm	D2622		11	15	6/
NACE Corrosion	TM0172	B+			
Total Aromatic Hydrocarbon, wt%	D5186		10		
Polycyclic Aromatic Hydrocarbon, wt%	D5186		1.4		
Nitrogen, ppm	D4629		10		

1/ ASTM D976 data is required for low sulfur fuel oils to demonstrate aromatics compliance per the EPA.

2/ The Potential Color will be determined by ASTM Method D1500 on a filtered sample after a 16 hour induction period by ASTM Method D525 Modified.

3/ The Potential Gum will be determined by ASTM Method D381 Modified (Steam Jet Evaporated @ 485 F) after a 16 hour induction period by ASTM Method D525 Modified.

4/ Due to fungible specifications, the cloud/pour point for diesel products must comply with the ASTM specifications for the region in which the diesel is produced. It should be noted that diesel products distributed into colder climates may require lower cloud and/or pour points or suppressors, i.e., winterization.

5/ The finished product shall be visually free of undissolved water, sediment, and suspended matter in proffered tankage and at the point of delivery. Compliance with this workmanship clause will be determined by ASTM D4176, Procedure 2 at 77 F or at actual conditions present at the point and time of sampling, whichever is lower.

6/ All results provided must use an EPA qualified instrument.

Dyes: Texas X-Grade ULSD low emission diesel fuel shipments shall not be dyed

B5 blends: Biodiesel for use in blending up to B5 shall contain a total Monoglyceride content of less than 0.40wt% on the B100 during winter (October through March).

Biodiesel blends must adhere to low temperature criteria set forth in ASTM D975, Appendix 5, Table 5.1 *10^{th} percentile temperature* limitations by CFPP or LTFT during winter months (October through March).

SPECFICATION FOR Q GRADE COMMERCIAL JET FUEL

Specification Points	ASTM Test Methods	Shipments (At Origin) Minimum	Shipments (At Origin) Maximum	Deliveries 1/ (At Terminals) May Be*
Gravity, API	D287	37.5	50.5	37.0 – 51.0
Acidity, Total, Mg KOH/g	D3242		0.1	
Freezing Point, F	D2386		-40	
Existent Gum, mg/100ml	D381		5	7
Sulfur, Total, ppm	D2622		3000	
Mercaptan Sulfur, ppm 2/	D3227		30	
Color, Saybolt	D156	+16		+14
Corrosion, Copper	D130		1	
Water Separation Index	D3948	85		75
Aromatics, vol. %	D6379		25	
Net Heat of Combustion, BTU/lb 3/	D4809	18,400		
Flash Point, F	D56,D93	108		100
Viscosity @ -4 F, cSt	D7945		8	
Electrical Conductivity, pSm	D2624	Report		
Thermal Stability;	D3241 4/			5/
Filter pressure drop, mm Hg.			25	
Heater tube rating			< 3	
Distillation, F @ 760 mm Hg	D86			
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	
OR				
Simulated Distillation	D2887			
10% Recovered, F			396	
50% Recovered, F		Report		
90% Recovered, F		Report		
Final Boiling Point, F			562	
Combustion				

	(1) Smoke Point, mm	D1322	25	
OR				
	(2) Smoke Point, mm	D1322	18	
AND	Napthalenes vol. %	D1840		3.0
Particulate Matter		D5452		Report

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

2/ The Mercaptan Sulfur determination may be waived if the result of a Doctor Test by 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 262 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.

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 lbs per 1,000 barrels (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.

SPECFICATION FOR T GRADE TURBINE FUEL
Grade 14

Specification Points	ASTM Test Methods	Shipments (At Origin) Minimum	Shipments (At Origin) Maximum	Deliveries (At Terminals) May Be*
Gravity, API	D287	37.0	51.0	
Freezing Point, F	D2386		-40	
Existent Gum, mg/100ml	D381		7	
Sulfur, ppm	D2622		3000	
Corrosion, Copper	D130		1	
Water Separation Index	D3948	85		
Flash Point, F	D56	105		100
Distillation, F @ 760 mm Hg	D86			
Initial Boiling Point, F			Report	
10% Recovered, F			401	
20% Recovered, F			Report	
50% Recovered, F			Report	
90% Recovered, F			Report	
Final Boiling Point, F			572	
Residue, Vol. %			1.5	
Loss, Vol. %			1.5	
OR				
Simulated Distillation	D2887			
Initial Boiling Point, F			Report	
10% Recovered, F			401	
20% Recovered, F			Report	
50% Recovered, F			Report	
90% Recovered, F			Report	
Final Boiling Point, F			572	
Particulate Matter, mg/L	D5452 1/		2.0	
Workmanship		Clear and Bright		

1/ A minimum sample size of 3.79 liters (one gallon) shall be filtered. Filtration time will be determined in accordance with the procedure in Appendix A of MIL-DTL-83133E (or most current version); this procedure may be used to determine the particulate matter as an alternate to ASTM D5452 or ASTM D2276.

In addition to above specifications, product must meet ASTM D1655 latest revision.

Any included additives approved for use in ASTM D1655 must be declared by type and volume.

SPECFICATION FOR LIGHT NAPHTHA

Specification Points	ASTM Test Methods	Shipments (At Origin) Minimum	Shipments (At Origin) Maximum	Deliveries (At Terminals) May Be
Specific Gravity	D1298	0.680	0.850	
Color	D1500		5	
Reid Vapor Pressure, psi	D5191		12.5	
Distillation,	D86			
IBP		60		
Water and Sediment	D1786		2.0	

Product shall be clear and bright and free of suspended matter.

SPECFICATION FOR L GRADE PROPANE
Grade 12

Specification Points	ASTM Test Methods	Shipments (At Origin) Minimum	Shipments (At Origin) Maximum	Deliveries (From Terminals) 1/
Composition				
Chromatograph analysis	D2163			
Percent by liquid volume:				
Propane		90		
Propylene			5.0	
Butanes and heavier			2.5	
Pentanes and heavier		None		
Specific gravity, at 60/60 F	D1657	0.500	0.510	
Vapor pressure, psig at 100 F	D1267	175	208	D2598, D6897
Weathering, 95% evaporated Temp., F (corrected)	D1837		-37	
Residues,	D2158			
Nonvolatile residue at 100 F, ml			0.05	
Oil, no oil stain observation, ml		0.3		
Sulfur,	D2784,D6667			
grains per hundred cubic feet			10	(or 123 ppmw)
Corrosion, copper strip at 100 F	D1838		No. 1	
Dryness				
Valve freeze, seconds	D2713	60		

1/ Same as shipment specifications except for normal testing and handling tolerances.

Additives: L-grade propane shipments at origin shall be unstenched and contain no additives. Unless otherwise notified in writing by shipper, L-grade propane deliveries will be odorized at the rate of 1 ½ pounds Ethyl Mercaptan/10,000 gallons. (roughly 25 ppm ethyl mercaptan)

Method of Inspection: Inspection shall be in accordance with MSTI, "Instructions Governing the Measurement, Sampling and Testing of Products for Acceptance and Delivery," currently in effect on inspection date.

SPECFICATION FOR HD5 GRADE PROPANE

Specification Points	ASTM Test Methods	Shipments (At Origin) Minimum	Shipments (At Origin) Maximum	Deliveries (From Terminals) 1/
Composition				
Chromatograph analysis	D2163			
Percent by liquid volume:				
Propane		90		
Propylene			5.0	
Butanes and heavier			2.5	
Pentanes and heavier		None		
Specific gravity, at 60/60 F	D1657,D2598	Report		
Vapor pressure, psig at 100 F	D1267,D2598		208	
Weathering, 95% evaporated	D1837		-37	
Nonvolatile residue at 100 F, ml	D2158		0.05	
Oil, no oil stain observation, ml	D2158		Pass	2/
Sulfur, ppmW	D2784,D6667		120	3/
Corrosion, copper strip at 100 F	D1838		No. 1	
Dryness				
Valve freeze, seconds	D2713 or		Pass	(60)
	Cobalt Bromide Test		Pass	4/
Hydrogen Sulfide	D2420		Pass	5/
Odorant				6/

1/ Same as shipment specifications except for normal testing and handling tolerances.

2/ The requirement is for no persistent oil ring when 0.3 ml of solvent residue mixture is added to a filter paper in prescribed manner.

3/ Sulfur content includes any sulfur compounds used for odorizing purposes.

4/ The Cobalt Bromide Test is an alternative to D2713 (the Freeze Valve Test) which is approved by the Gas Processors Association and described in their Publication No. 2140. This method is not listed as approved in ASTM D1835.

5/ An acceptable product does not show a distinct coloration.

6/ Products for pipeline shipment or tank car, truck or barge shipments to storage or for further processing are exempted from this requirement and will not contain odorant.

Method of Inspection: Inspection shall be in accordance with MSTI, "Instructions Governing the Measurement, Sampling and Testing of Products for Acceptance and Delivery," currently in effect on inspection date.

SPECFICATION FOR SPECIALTY PRODUCTS
Shipped on the South West Pipeline System

Specification Points	ASTM Test Methods	Shipments (At Origin) Minimum	Shipments (At Origin) Maximum	Deliveries (At Terminals) May Be
Gravity, API	D287, D4052	Report		
Copper Corrosion	D130		1	
NACE Corrosion	TM0172, D7548	B+		

Products may include, but are not limited to:

Light Naphtha, Heavy Naphtha, Alkylate, Cat Naphtha, Gasoline Blend stock, Light Cycle Run Gasoline, Toluene and Xylene.

Additional requirements may be requested by the customer at the end point destination.

NuStar reserves the right to ask for additional specification points on a case by case basis as needed.

87.0 Regular Unleaded (Export) Gasoline Specifications

(This fuel is for export from the United States only.)

Specification Points	Test Method	Shipments Minimum	Shipments Maximum	Deliveries 1/ (At Terminals)
Gravity, Degrees API	D287	Report Only		
Color		Undyed		
RVP 2/				
Distillation	D86	Class A	Class B	Class C
10% Evap F, max		158	149	140
50% Evap F, min		170	170	170
50% Evap F, max		250	245	240
90% Evap F, max		374	374	365
Final Boiling Pt F, max		430	430	430
Residue, vol% max		2	2	2
Drivability Index, max		1250	1240	1230
		Class 1	Class 2	Class 3
Vapor Liquid Ratio F, min	D5188	129	122	116
Benzene, vol %	D5769		2.0	
Mercaptan Sulfur, wt % 3/	D3227		0.002	
Copper Corrosion	D130		1	
Silver Corrosion	D7667,7671		1	
Gum, Existent, mg/100ml	D381		4	5
Oxidation Stability, min.	D525	240		
Phosphorous, 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 4/	D4176		2	3
NACE Corrosion	TM0172 D7548	B+		
Octane				
RON	D2699	Report		
MON	D2700	82.0		
(R+M/2)		87.0		
Odor 5/		Nonoffensive		

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

2/ Refer to NuStar's 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.

6/ Values below the detectible limit of an approved method may be reported as a zero value.

Notes:

All parameters must be met without blending of denatured fuel ethanol unless noted.

Fuel shall comply with the exemptions for export fuels as listed in 40 CFR 1090.645.

91.0 Premium Unleaded (Export) Gasoline Specifications

(This fuel is for export from the United States only.)

Specification Points	Test Method	Shipments Minimum	Shipments Maximum	Deliveries 1/ (At Terminals)
Gravity, Degrees API	D287	Report Only		
Color		Undyed		
RVP 2/				
Distillation	D86	Class A	Class B	Class C
10% Evap F, max		158	149	140
50% Evap F, min		170	170	170
50% Evap F, max		250	245	240
90% Evap F, max		374	374	365
Final Boiling Pt F, max		430	430	430
Residue, vol% max		2	2	2
Drivability Index, max		1250	1240	1230
		Class 1	Class 2	Class 3
Vapor Liquid Ratio F, min	D5188	129	122	116
Benzene, vol %	D5769		2.0	
Mercaptan Sulfur, wt % 3/	D3227		0.002	
Copper Corrosion	D130		1	
Silver Corrosion	D7667,7671		1	
Gum, Existent, mg/100ml	D381		4	5
Oxidation Stability, min.	D525	240		
Phosphorous, 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 4/	D4176		2	3
NACE Corrosion	TM0172 D7548	B+		
Octane				
RON	D2699	94.0		
MON	D2700		Report	
(R+M/2)		91.0		
Odor 5/			Nonoffensive	

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

2/ Refer to NuStar's 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.

6/ Values below the detectible limit of an approved method may be reported as a zero value.

Notes:

All parameters must be met without blending of denatured fuel ethanol unless noted.

Fuel shall comply with the exemptions for export fuels as listed in 40 CFR 1090.645.

SPECFICATION FOR MEXICO GRADE (EXPORT) ULTRA LOW SULFUR FUEL DIESEL

GRADE 88

	ASTM Test	Shipments (At Origin)	
Specification Points	Methods	Automotive	Agri/Marine
Specific Gravity	D4052, D1298	Report	Report
Color	D1500	2.5	2.5
Color visual		Undyed	Undyed
Distillation,	D86, D7344, D7345		
Initial boiling temp, C		Report	Report
10% Recovered, C		275 max	Report
50% Recovered, C		Report	Report
90% Recovered, C		345 max	345 max
Final Boiling temp, C		Report	Report
Corrosion, Copper Strip @ 50 C	D130	1	1
Cetane			
(1) Cetane Number	D613	45 min	45 min
(2) Or (2) Cetane Index, Procedure A	D4737	45 min	45 min
Cetane Index 1/	D976	45 min	45 min
Flash, C	D93,D7094,D3828	45 min	65 min

Carbon Residue on 10% Bottoms (Ramsbottom) - Percent	D524	0.35 max	0.35 max
Cloud Point, C 2/	D2500	Report	Report
Pour Point, C	D97	0 (Mar to Oct)	0 (Mar to Oct)
Pour Point, C	D97	-5 (Nov to Feb)	-5 (Nov to Feb)
Kinematic Viscosity, mm^2/s @40 C	D445	1.9 to 4.1	1.9 to 4.1
Ash, % mass	D482	0.01 max	0.01 max
Sulfur, mg/kg (ppm)	D5453,D2622,D7039,D7220	15 max	15 max
Aromatics (Volume %)	D1319, D5186	35 max	35 max
Water & Sediment, vol.%	D2709	0.05 max	0.05 max
Conductivity, pS/m @ 70 F 4/	D2624, D4308	25 min	25 min
Lubricity, microns 3/	D6079, D7688	520 max	520 max

1/ In the case the Cetane Number is measured, it shall be performed on the un-additized fuel.

2/ The maximum temperature must be less than or equal to the expected minimum ambient temperature.

3/ To comply with the lubricity specification, additive may be added in storage or distribution facilities prior to sale. The test shall be carried out by the Permittee carrying out the additvation.

4/ Conductivity must be measured at the temperature of diesel prior to sale to the public.

SPECIFICATION FOR MEXICO GRADE (EXPORT) GASOLINE
87 Octane Gasoline – Monterrey
Grade 76

Monterrey Finished Gasoline Spec After Blending with Ethanol

Specification Points	ASTM Test Method	Origin Shipments Minimum	Maximum
Specific Gravity	D1298,4052	Report Only	
Vapor Pressure, kPa	D4953,D5191,D5482,D6378		69 (B-2), 79 (C-3)
Vapor Pressure, psi	D4953,D5191,D5482,D6378		10.0 (B-2), 11.5 (C-3)
Distillation temp			
Initial boiling temp, F	D86		
10% Recovered, F	D86		158 (B-2 & C-3)
50% Recovered, F	D86	170.6	249.8(B-2 & C-3)
90% Recovered, F	D86		374 (B-2 & C-3)
Final boiling temp, F	D86		437 (B-2 & C-3)
Distillation Residue, vol%	D86		2 (B-2 & C-3)
Benzene, vol %	D3606,D5580,D6277		1.0
Aromatics, vol %	D1319		25.0
Olefins, vol %	D1319		10.0
Mercaptan Sulfur, mg/kg	D3227		20
One of the following requirements must be met:			
Copper Corrosion	D 130		1
Silver Corrosion	D7667,D7671		1
Gum, Washed, mg/100ml	D 381		5
Gum, Unwashed, mg/100ml	D 381		70
Induction Period, min.	D 525	240	
Vapor lock protection temp, F			
@ V:L=20		122.0 (B-2), 116.6 (C-3)	
Research Octane {R}	D2699	Report	
Motor Octane {M}	D2700	82.0	
(R+M)/2	D4814	87.0	
Sulfur, ppm	D5453,D2622,D7039,D7220		30 avg, 80 max
Oxygen, % mass	D4815	1.0	2.7
BTX, vol %	D5580	Report	
Appearance (70 F)	D4176	Clear & Bright	

ZMM Monterrey Metropolitan Zone

Volatility class specification by geographic region and season

	ZMM	
January	C-3	C = RVP 11.5
February	C-3	
March	B-2	B = RVP 10.0
April	B-2	

May	B-2	3 = V/L 116.6
June	B-2	
July	B-2	2 = V/L 122.0
August	B-2	
September	B-2	
October	B-2	
November	C-3	
December	C-3	

Monterrey Gasoline Spec Before Blending with 15% MTBE

Specification Points	ASTM Test Method	Origin Shipments Minimum	Maximum
Specific Gravity	D1298,4052	Report	Only
Vapor Pressure, psi	D4953,D5191,D5482,D6378		(Target 9.9/11.5)
Benzene, vol %	D3606,D5580,D6277	Report	
Aromatics, vol %	D1319	Report	
Olefins, vol %	D1319	Report	
Mercaptan Sulfur, mg/kg	D3227	Report	
One of the following requirements must be met:			
Copper Corrosion	D 130		1
Silver Corrosion	D7667,D7671		1
Gum, Washed, mg/100ml	D 381	Report	
Gum, Unwashed, mg/100ml	D 381	Report	
Induction Period, min.	D 525	Report	
(R+M)/2	D4814	82.8	(Target)
Sulfur, ppm	D5453,D2622,D7039,D7220		80 max
Oxygen, % mass (MTBE)	D4815	Report	
BTX, vol %	D5580	Report	
Appearance (70 F)	D4176	Clear & Bright	

SPECIFICATION FOR MEXICO GRADE (EXPORT) GASOLINE
87 Octane Gasoline – Rest of Country
Grades 86

Finished Gasoline Spec – Neat or After Ethanol

Specification Points	ASTM Test Method	Origin Shipments Minimum	Maximum
Specific Gravity	D1298,4052	Report Only	
Vapor Pressure, kPa	D4953,D5191,D5482,D6378		69 (B-2), 79 (C-3)
Vapor Pressure, psi	D4953,D5191,D5482,D6378		10.0 (B-2), 11.5 (C-3)
Distillation temp			
Initial boiling temp, F	D86		
10% Recovered, F	D86		149 (B-2), 140 (C-3)
50% Recovered, F	D86	170.6	244.4(B-2), 240.9 (C-3)
90% Recovered, F	D86		374 (B-2), 365 (C-3)
Final boiling temp, F	D86		437 (B-2 & C-3)
Distillation Residue, vol%	D86		2 (B-2 & C-3)
Benzene, vol %	D3606,D5580,D6277		2.0
Aromatics, vol %	D1319	Report	
Olefins, vol %	D1319	Report	
Mercaptan Sulfur, mg/kg	D3227		20
One of the following requirements must be met:			
Copper Corrosion	D 130		1
Silver Corrosion	D7667,D7671		1
Gum, Washed, mg/100ml	D 381		5
Gum, Unwashed, mg/100ml	D 381		70
Induction Period, min.	D 525	240	
Vapor lock protection temp, F			
@ V:L=20		122.0 (B-2), 116.6 (C-3)	
Research Octane {R}	D2699	Report	
Motor Octane {M}	D2700	82.0	
(R+M)/2	D4814	87.0	
Sulfur, ppm	D5453,D2622,D7039,D7220		30 avg, 80 max
Oxygen, % mass	D4815		2.7
BTX, vol %	D5580	Report	
Appearance (70 F)	D4176	Clear & Bright	

ZMM Monterrey Metropolitan Zone

Volatility class specification by geographic region and season

	North	
January	C-3	
February	C-3	C = RVP 11.5
March	B-2	
April	B-2	B = RVP 10.0

May	B-2	
June	B-2	3 = V/L 116.6
July	B-2	
August	B-2	2 = V/L 122.0
September	B-2	
October	B-2	
November	C-3	
December	C-3	

Northern Rest of Country Gasoline Spec Before Blending with 14% MTBE

	ASTM Test	Origin Shipments	
Specification Points	Method	Minimum	Maximum
(R+M)/2	D4814	82.8	(Target)
RVP for 10.0 gas			9.9 (Target)
RVP for 11.5 gas			11.5 (Target)

SPECIFICATION FOR MEXICO GRADE (Export) GASOLINE
91 Octane Gasoline – Rest of Country
Grades 87

Finished Gasoline Spec – Neat or After Ethanol

Specification Points	ASTM Test Method	Origin Shipments Minimum	Maximum
Specific Gravity	D1298,4052	Report Only	
Vapor Pressure, kPa	D4953,D5191,D5482,D6378		69 (B-2), 79 (C-3)
Vapor Pressure, psi	D4953,D5191,D5482,D6378		10.0 (B-2), 11.5 (C-3)
Distillation temp			
Initial boiling temp, F	D86		
10% Recovered, F	D86		149 (B-2), 140 (C-3)
50% Recovered, F	D86	170.6	244.4(B-2), 240.9 (C-3)
90% Recovered, F	D86		374 (B-2), 365 (C-3)
Final boiling temp, F	D86		437 (B-2 & C-3)
Distillation Residue, vol%	D86		2 (B-2 & C-3)
Benzene, vol %	D3606,D5580,D6277		2.0
Aromatics, vol %	D1319		32
Olefins, vol %	D1319		12.5
Mercaptan Sulfur, mg/kg	D3227		20
One of the following requirements must be met:			
Copper Corrosion	D 130		1
Silver Corrosion	D7667,D7671		1
Gum, Washed, mg/100ml	D 381		5
Gum, Unwashed, mg/100ml	D 381		70
Induction Period, min.	D 525	240	
Vapor lock protection temp, F			
@ V:L=20		122.0 (B-2), 116.6 (C-3)	
Research Octane {R}	D2699	94.0	
Motor Octane {M}	D2700	Report	
(R+M)/2	D4814	91.0	
Sulfur, ppm	D5453,D2622,D7039,D7220		30 avg, 80 max
Oxygen, % mass	D4815		2.7
BTX, vol %	D5580	Report	
Appearance (70 F)	D4176	Clear & Bright	

ZMM Monterrey Metropolitan Zone

Volatility class specification by geographic region and season

	North	
January	C-3	
February	C-3	C = RVP 11.5
March	B-2	
April	B-2	B = RVP 10.0

May	B-2	
June	B-2	3 = 116.6
July	B-2	
August	B-2	2 = 122.0
September	B-2	
October	B-2	
November	C-3	
December	C-3	

Northern Rest of Country Gasoline Spec Before Blending with 14% MTBE

	ASTM Test	Origin Shipments	
Specification Points	Method	Minimum	Maximum
(R+M)/2	D4814	87.7	(Target)
RVP for 10.0 gas			9.9 (Target)
RVP for 11.5 gas			11.5 (Target)

SPECIFICATION FOR MEXICO GRADE (Export) GASOLINE
91 Octane Gasoline – Rest of Country
Grades 87

Finished Gasoline Spec – Neat or After Ethanol

Specification Points	ASTM Test Method	Origin Shipments Minimum	Maximum
Specific Gravity	D1298,4052	Report Only	
Vapor Pressure, kPa	D4953,D5191,D5482,D6378		69 (B-2), 79 (C-3)
Vapor Pressure, psi	D4953,D5191,D5482,D6378		10.0 (B-2), 11.5 (C-3)
Distillation temp			
Initial boiling temp, F	D86		
10% Recovered, F	D86		149 (B-2), 140 (C-3)
50% Recovered, F	D86	170.6	244.4(B-2), 240.9 (C-3)
90% Recovered, F	D86		374 (B-2), 365 (C-3)
Final boiling temp, F	D86		437 (B-2 & C-3)
Distillation Residue, vol%	D86		2 (B-2 & C-3)
Benzene, vol %	D3606,D5580,D6277		2.0
Aromatics, vol %	D1319		32
Olefins, vol %	D1319		12.5
Mercaptan Sulfur, mg/kg	D3227		20
One of the following requirements must be met:			
Copper Corrosion	D 130		1
Silver Corrosion	D7667,D7671		1
Gum, Washed, mg/100ml	D 381		5
Gum, Unwashed, mg/100ml	D 381		70
Induction Period, min.	D 525	240	
Vapor lock protection temp, F			
@ V:L=20		122.0 (B-2), 116.6 (C-3)	
Research Octane {R}	D2699	94.0	
Motor Octane {M}	D2700	Report	
(R+M)/2	D4814	91.0	
Sulfur, ppm	D5453,D2622,D7039,D7220		30 avg, 80 max
Oxygen, % mass	D4815		2.7
BTX, vol %	D5580	Report	
Appearance (70 F)	D4176	Clear & Bright	

ZMM Monterrey Metropolitan Zone

Volatility class specification by geographic region and season

	North	
January	C-3	
February	C-3	C = RVP 11.5
March	B-2	
April	B-2	B = RVP 10.0

May	B-2	
June	B-2	3 = 116.6
July	B-2	
August	B-2	2 = 122.0
September	B-2	
October	B-2	
November	C-3	
December	C-3	

Northern Rest of Country Gasoline Spec Before Blending with 14% MTBE

	ASTM Test	Origin Shipments	
Specification Points	Method	Minimum	Maximum
(R+M)/2	D4814	87.7	(Target)
RVP for 10.0 gas			9.9 (Target)
RVP for 11.5 gas			11.5 (Target)

SPECIFICATIONS FOR PREMIUM CONVENTIONAL (Export) GASOLINE BLENDSTOCK (PBOB) – 91 OCTANE

For blending with 10% denatured fuel ethanol (92% purity) as defined by ASTM D4806.

This PBOB may not be combined with any other PBOB except PBOB having the same requirement for oxygenate type and amount

All parameters must be met after blending with denatured fuel ethanol unless noted.

Requirements for both Segregated and Fungible:

	Test	Shipments		Deliveries
Specification Points	Method	Minimum	Maximum	(At Terminals)
Research Octane (R)	D2699	Report Only		
Motor Octane (M)	D2700	Report Only		
(R+M)/2	D4814	91.0		
Oxygen Content, wt%	D4815,D5599,GC-OFID		0.05	1/, 2/, 8/
DVPE 3/	D4953,D5191 Grabner EPA			
	P2		7.8	
	P9		9.0	
	P6		10.0	
	P3		10.5	
	P7		11.5	
	P5		12.5	
	P8		13.5	
	P4		14.0	
	PA		15.0	

This is a base gasoline, not for sale to the ultimate consumer.

Heavy metals are not allowed.

Any gasoline exhibiting an offensive odor and/or poses a personal health hazard will not be accepted for shipment.

Any gasoline exhibiting an offensive odor and/or containing more than 0.50 wt % dicyclopentadiene will not be accepted for shipment.

The referee method will be based on a gas chromatograph test. Emissions reductions must be calculated using EPA guidelines.

Fungible only requirements:

Test Specification Points	Shipments Method	Deliveries Minimum	Maximum	(At Terminals)
Gravity, Degrees API	D287	Report Only		7/
Color		Undyed		
Mercaptan Sulfur, wt% 4/	D3227		0.003	
Hydrogen Sulfide	D3227		None	
Copper Corrosion	D130		1	
Silver Corrosion	D4814		1	
Gum, Existent, mg/100ml	D381		4	5
Oxidation, Stability, min.	D525	240		180
Phosphorus, g/gal	D3231		0.003	0.005
Sulfur, ppm 5/	D2622		80	
Haze rating 9/	D4176		2	3
NACE Corrosion	TM0172	B+		
Benzene, vol%	D3606,D4053		1.3	
Aromatics, vol%	D1319		50	
Olefins, vol%	D1319		25	
Volatility:				
Driveability Index	D4814	See chart		
Distillation, F @ %Evap	D86	See chart		
Vapor/Liquid Ratio (V/L),F@20	D5188	See chart		6/

	Driveability	10 vol%	50 vol%		90vol%	EndPt	V/L(where applicable)	
Class	Index	Max	Min	Max	Max	Max	Class	Min
AA	1250	158	150	250	374	430	1	129
A	1250	158	150	250	374	430	2	122
B	1240	149	150	245	374	430	3	116
C	1230	140	150	240	365	430	4	107
D	1220	131	145	235	365	430	5	102
E	1200	122	145	230	365	430		

NOTES (Apply to Fungible and Segregated):

1/ P grades may not contain oxygenates, such as ethers and alcohols. The use of non-hydrocarbon blending components in these grades is prohibited.

2/ Refer to test methods published in 40 CFR Chapter 1, Part 80.46. Alternative aromatics and oxygenates test methods, ASTM D1319 and D4815, may be used according to federal and state regulations.

3/ For products blended to meet EPA or state imposed summer VOC requirements, tests must be performed in accordance with the procedures described in 40 CFR, Part 80.

4/ Mercaptan sulfur determination is waived if the result of the Doctor Test ASTM D4952 is negative

5/ Refer to 40 CFR Part 80.195 (d)(2). Alternate sulfur test methods, ASTM D5453, D4294 and D7039, may be used according to federal and state regulations.

6/ Refer to test methods in 40 CFR Chapter 1, Part 80.46.

7/ Specifications must be met before blending of denatured fuel ethanol.

8/ Oxygen content must meet a minimum of 1.7 wt.% and a maximum of 4.0 wt.% after blending of denatured fuel ethanol.

9/ 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

SPECIFICATIONS FOR SUB OCTANE GRADE EXPORT GASOLINE

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

Specification Points	ASTM Test Method	Origin Shipments Minimum	Origin Shipments Maximum	Deliveries 1/ (At Terminals)
Gravity, Degrees API	D287,D1298,D4052	Report Only		
Color		Undyed		
Distillation 2/	D86			
Volatility 2/	D5191			
E200, vol%	D86	Report		
E300, vol%	D86	Report		
Drivability Index 2/				
Mercaptan Sulfur, wt % 3/	D3227		0.003	
Hydrogen Sulfide	D3227		None	
Copper Corrosion	D130		1	
Silver Corrosion	D7667,D7671		1	
Gum, Existent, mg/100ml	D381		4	5
Oxidation Stability, min.	D525	240		
Phosphorous, g/gal	D3231		0.003	0.005

Lead, g/gal	D3237		0.010	0.05
Research Octane {R}	D2699		4/	
Motor Octane {M}	D2700	4/		
(R+M)/2	D4814	4/		
Sulfur, ppm	D2622		80	
Benzene, vol%	D3606		4.9	
Aromatics, vol%	D1319		Report	
Olefins, vol%	D1319		Report	
Oxygenates, wt %	D4815,D5599		0.05	
Haze rating 5/	D4176		2	3
NACE Corrosion	TM0172	B+		
Odor 6/		Nonoffensive		

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

Product property	Test method	Origin limits
Distillation,		
10% Evap(T10),F	D86	Report
20% Evap(T20),F	D86	Report
50% Evap(T50),F min	D86	150, (145 for classes D & E)
RVP 6/	D5191	Report

Vapor to Liquid Ratio	Class 1	Class 2	Class 3	Class 4	Class 5
D5188, min 2/,7/	129	122	116	107	102

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

1/ Refer to Seasonal Gasoline Volatility Schedule

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

3/ Shipments must meet one of the following requirements before or before and after with denatured fuel ethanol:

(1) Test the base gasoline before and after the addition of 10% ethanol

	Base Gasoline	Blend with 10% Ethanol
RON, min.	Report	Report
MON, min.	Report	82.0
(R+M)/2	83.0	87.0

OR (2) Test the base gasoline

	Base Gasoline
RON, min.	Report
MON, min.	79.0
(R+M)/2	84.0

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 D4814 may also be used.