FUNGIBLE PRODUCT SPECIFICATIONS

Introduction

This section contains product specifications for the following fungible products. Refer to section IV of this manual for additional requirements for the transport of fungible movements of low sulfur diesel fuel and conventional, oxygenated and reformulated gasolines.

Fungible Grades

Guidelines for Fungible Products Movements

Plantation shall impose certain guidelines for movements of fungible products in order to continue its policy of treating all customers equitably.

Nominations

Nominations of fungible batches for the month that the batches will move must be received by the fifth day of the preceding month.

Policy and Procedure for Establishing Product Quality Specifications

It is the Carrier's Policy to only receive, transport and distribute products that meet or exceed the local, state or federal requirements for product quality. Carrier reserves the right to impose more stringent product quality specifications due to operational considerations.

Procedure:

- Identify all local, state and federal laws and specifications pertaining to each grade of product transported via the pipeline network operated by Kinder Morgan.

- Identify any operational issues that may require the Carrier to adopt a specification other than required by any local, state or federal regulation.

- In cases where the specification can be met by a range of values, Carrier reserves the right to conduct a survey of current Shippers. In such cases, each "Shipper" (Company) shall be entitled to a single vote. A simple majority among the Shippers will determine the specification in question. Carrier reserves the right to solicit additional information as needed and set the specification as Carrier deems necessary. All information obtained by the Carrier during a survey shall remain confidential.

- It is the Carrier's intent to publish any changes in product specifications at least 60-days prior to implementation whenever possible.

Certification

The fungible product shall meet Plantation's fungible specifications and must conform to standards of current ASTM specifications and applicable governmental authority at the scheduled destination. An official laboratory document is required for each batch of fungible product. This document must be submitted to the Operations Control Center prior to receipt of the fungible batch into the Plantation system. This document may be faxed, mailed, or by some other means of electronic transmission. Please reference the section, Communications, page 11 for telephone numbers and addresses.

The laboratory document shall be received within the following time periods:

- Baton Rouge Origins - within 24 hours upon initial receipt of movement into the Baton Rouge tank farm

- Collins Origins - prior to the initial receipt of the movement into pipeline system

- Pascagoula Origin - within 24 hours upon initial receipt of movement into pipeline system

Customer Approval

Before a customer can transport fungible batches on the Plantation system, Plantation reserves the right to review the customer's laboratories, applicable tankage and facilities, including third party carriers, and applicable operating procedures that are utilized downstream of the laboratory certification point.

Pipeline Sampling and Testing

Plantation will be sampling and testing at origin points to ensure that all fungible batches meet or exceed Plantation's fungible products specifications. In the event there is a difference between the customer's laboratory document test results and Plantation's test results, a determination by an independent laboratory may be made. The independent laboratory's test results will prevail. If there is insufficient time to consult an independent laboratory, Plantation's test results will prevail.

Approved Additives

Gum Inhibitors and Metal Deactivators

The use of gum inhibitors and metal deactivators is permitted, but not required, as listed below:

Gum Inhibitors and Metal Deactivators
N, N' di-secondary butyl para-phenylenediamine
N, N' disalicylidene-1, 2 propanediamine
N, N' di (I-ethyl-2-methylpentyl) para-phenylenediamine
2, 6-di-tertiary butyl 4 methyl phenol
N, N' di-isopropyl-para-phenylenediamine
n-butyl para-aminophenol
N, N' bis-(I,4-diamethylpentyl)-p-phenylenediamine
2,4,6-tritertiary butylphenol
ortho-tertiary butylphenol
2,4 diamethyl-6-tertiary-butylphenol
2,4 di-tertiary butylphenol
2,6 di-tertiary butylphenol
N, secondary butyl, N' phenyl-para-phenylenediamine
Mixed propylated and butylated phenols
Butylated ethyl, methyl and dimethyl phenols
2,4,6 tri-isopropylphenol

Corrosion Inhibitors

Listed below is an approved list of corrosion inhibitors that may be used by a customer:

Corrosion Inhibitors for Gasolines			
Aqua Process 11CH77	Lubrizol 8014	SPEC-AID 8Q22	Tolad 249
Afton Chemical HiTEC 6455, 4875	MidContinental Chemical MCC5001	SPEC-AID 8Q100	Tolad 351
Champion RPS-622	Mobil C-605	SPEC-AID 8Q101	Tolad 3232
Champion 807	Nalco 5403	SPEC-AID 8Q102	Tolad 3232D
Corexit 5267	Nalco 5405	SPEC-AID 8Q103	Tolad 4410
Ethyl HiTec 580	Nalco 5406	SPEC-AID 8Q106	Unichem 7500
Innospec DCI-4A	Nalco 5407 A	SPEC-AID 8Q109	Unichem 7501
Innospec DCI-6A	Nalco EC5626 A	SPEC-AID 8Q110	Unichem 7510
Innospec DCI-11	Nalco EC624A	SPEC-AID 8Q112	UOP Unicor
Innospec DCI-30.N		SPEC-AID 8Q109ULS	UOP Unicor J
		SPEC-AID 8Q123ULS	UOP Unicor PL

Other Additives

In addition to the above additives, the following may be used in fungible fuel oils and low sulfur diesel fuels:

Other Additives Allowed		
Dupont AFA-1	Innospec DMA-4	Nalco 5400-A

Diesel fuel may contain static dissipator additive (SDA). Innospec Stadis® 450 is the only approved SDA with a maximum origin concentration of 0.75 mg/l. The origin maximum conductivity allowed is 250 pS/m at 21˚C (70˚F) by ASTM D2624

Biodiesel (FAME) is not allowed at origin.

Plantation will require all products received to be undyed.

Non-taxable fuel oils must be dyed with red dye at the destination, either by the customer or Plantation, to meet the IRS requirements for non-taxable fuels. As a service to its customers, Plantation has a dye injection facilitiy at one Plantation delivery terminal for this purpose. This charge for this service is twenty-one cents per barrel of delivered product, invoiced monthly to the shipper of record. Please verify that this charge is the most current before making commitments. The list of dye injection locations is listed below.

Plantation Delivery Location with Dye Injection Capability	
Macon, Georgia	

If the customer wishes Plantation to dye the product up to the IRS level before delivery into a customer delivery terminal, then the product must be nominated with product code 83. Plantation adds dye at Plantation's delivery terminal in sufficient quantity to be spectrally equivalent to 3.9 pounds of Solid Red #26 per thousand barrels, in accordance with IRS diesel dye requirements. This service will be discontinued after terminals transition to dying off road diesel at the rack.

Communications

Plantation will notify all customers of any changes in fungible product specifications, or any other action requiring customer action, as soon as possible.

Laboratory documents should be transmitted to the Operations Control Department through one of the following methods:

FAX: (770) 751-4068

Mailing Address: Product Quality

Plantation Pipe Line Company
1000 Windward Concourse, Suite 350
Alpharetta, GA 30005

The laboratory document must include Plantation's batch code as a means of identifying the product.

Fungible Specifications For Regular Reformulated Blendstock for Oxygenate Blending (RBOB). For Blending with 10% Denatured Fuel Ethanol (92.1% purity) as Defined in ASTM D4806.

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

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

Product Grade: Regular RBOB
PPL Product Codes: F Grades (F1, F3, F4, F5)
Effective Date: 01/01/17

Test Property	ASTM Test Method	TEST RESULTS Minimum	TEST RESULTS Maximum
Aromatics, vol. %	[a]		50
Benzene, vol. %	D3606		1.30
Color			Undyed
Corrosion (Cu), 3 hrs. @ 122°F (50°C)	D130		1
Corrosion (Ag) 3 hrs @ 122˚F (50˚C)	D7667, D7671		1
Dienes (Dicyclopentadiene)			[b]
Doctor Test -OR- Mercaptan Sulfur, wt. %[c]	D4952 D3227		Negative 0.002
Driveability Index	D4814		Report
E200, vol. %	D86	30	70
E300, vol. %	D86	70	100
Emissions Performance Reductions, % Grades (A1) VOC Control Region 1 Cycles 17 through 23 Cycles 24 through 48	[d]	Delivery 25.0 Origin 28.0 Origin 27.0	
Existent Gum, mg/100 ml After Washing	D381		4
Gravity, °API at 60°F (before blending)	D287, D1298, D4052		Report
Heavy Metals		not allowed	
Octane: RON (after blending) MON (after blending) AKI (R+M)/2 (after blending)	D2699 D2700	Report 82.0 87.0	
Olefins, vol. %	D1319, D6550		25
Oxidation Stability, Minutes	D525	240	
Oxygen Content, wt. % Grades F1, F3, F4, F5	D5599, GC-OFID [a] [e]	[g]	[g]
Phosphorous, g/gal.	D3231		0.004

[a] The test methods published in 40 CFR Charter 1, Part 80.46. ASTM D1319 and ASTM D4815 are alternative test methods for aromatics and oxygenates per federal and state regulations.

[b] Any gasoline exhibiting an offensive odor or containing more than 0.50 wt. % of dicyclopentadiene will not be accepted for shipment.

[c] Test for mercaptan sulfur not required if Doctor test results are negative.

[d] EPA guidelines must be used to calculate the emissions reductions.

[e] These product grades cannot contain blends of aliphatic ethers (oxygenates). The use of any other non-hydrocarbon blending components is prohibited.

[g] Oxygen content must meet a minimum of 1.7wt% and a maximum of 4.0wt% after blending with denatured fuel ethanol.

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Fungible Specifications For Regular Reformulated Blendstock for Oxygenate Blending (RBOB). For Blending with 10% Denatured Fuel Ethanol (92.1% purity) as Defined in ASTM D4806.
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Product Grade: Regular RBOB
PPL Product Codes: F Grades (F1, F3, F4, F5)
Effective Date: 01/01/17

Test Property	ASTM Test Method	TEST RESULTS	
		Minimum	Maximum
Port Fuel Injector (PFI) and Intake Valve Detergent Additives			(h)
Nace Corrosion (before blending)	TM0172	B+ (Origin)	
Sulfur, wt. %	D2622 (k)		0.0080
Volatility Distillation Reid Vapor Pressure (i) Vapor/Liquid Ratio (V/L)	 D86 D5191 D2533, D5188		 See Table Below

Volatility & Distillation							
Product Grade	**Distillation Temperatures, °C(°F) at % Evaporated**					**RVP psi**	**V/L Ratio °C(°F) at 20**
	10 Vol. %	**50 Vol. %**		**90 Vol. %**	**End Point**		
Code	*Max*	*min*	*max*	*max*	*max*	*max*	*Min*
F1 VOC controlled Region 1	70 (158)	66 (150)	121 (250)	190 (374)	221 (430)	(j)	50 (122)
F3 Non-VOC controlled	60 (140)	66 (150)	116 (240)	185 (365)	221 (430)	11.5	47 (116)
F4 Non-VOC controlled	55 (131)	66 (150)	113 (235)	185 (365)	221 (430)	13.5	42 (107)
F5 Non-VOC controlled	50 (122)	66 (150)	110 (230)	185 (365)	221 (430)	15.0	39 (102)

(h) The use of Port Fuel injector (PFI) and intake valve detergent additives is prohibited. This is a base gasoline, not for sale to the ultimate consumer

(i) During the VOC control period, testing must be performed in accordance with 40 CFR, Part 80, Appendix E, Method 3.

(j) EPA guidelines must be used to calculate the emissions reductions.

(k) Refer to 40 CFR, Part 80.195 (d)(2).

Fungible Specifications For Premium Reformulated Blendstock for Oxygenate Blending (RBOB). For Blending with 10% Denatured Fuel Ethanol (92.1% purity) as Defined in ASTM D4806.

This RBOB may not be combined with any other RBOB except RBOB having the same requirement for oxygenate type and amount.
All parameters must be met after blending with denatured fuel ethanol unless noted.

Product Grade: Premium RBOB
PPL Product Codes: H Grades (H1, H3, H4, H5)
Effective Date: 01/01/17

Test Property	ASTM Test Method	TEST RESULTS Minimum	TEST RESULTS Maximum
Aromatics, vol. %	[a]		50
Benzene, vol. %	D3606		1.30
Color			Undyed
Corrosion (Cu), 3 hrs. @ 122°F (50°C) [b]	D130		1
Corrosion (Ag) 3 hrs @ 122˚F (50˚C)	D7667, D7671		1
Dienes (Dicyclopentadiene)			[c]
Doctor Test -OR- Mercaptan Sulfur, wt. %[d]	D4952 D3227		Negative 0.002
Driveability Index	D4814		Report
E200, vol. %	D86	30	70
E300, vol. %	D86	70	100
Emissions Performance Reductions, % Grades (D1) VOC Control Region 1 Cycles 17 through 23 Cycles 24 through 48	[e]	Delivery 25.0 Origin 28.0 Origin 27.0	
Existent Gum, mg/100 ml After Washing	D381		4
Gravity, °API at 60°F	D287, D1298, D4052		Report
Heavy Metals		not allowed	
Octane: RON (after blending) MON (after blending) AKI (R+M)/2 (after blending)	D2699 D2700	Report Report 93.0	
Olefins, vol. %	D1319, D6550		25
Oxidation Stability, Minutes	D525	240	
Oxygen Content, wt. % Grades H1, H2, H3, H4, H5	D5599, GC-OFID [a] [f]	[g]	[g]
Phosphorous, g/gal.	D3231		0.004

[a] The test methods published in 40 CFR Charter 1, Part 80.46. ASTM D1319 and ASTM D4815 are alternative test methods for aromatics and oxygenates per federal and state regulations.

[b] No additives containing phosphorous may be used in this gasoline. Refer to the section, *Approved Additives*, page 14, for a list of acceptable gum inhibitors, metal deactivators and corrosion inhibitors.

[c] Any gasoline exhibiting an offensive odor or containing more than 0.50 wt. % of dicyclopentadiene will not be accepted for shipment.

[d] Test for mercaptan sulfur not required if Doctor test results are negative.

[e] EPA guidelines must be used to calculate the emissions reductions.

[f] These product grades cannot contain blends of aliphatic ethers (oxygenates). The use of any other non-hydrocarbon blending components is prohibited.

[g] Oxygen content must meet a minimum of 1.7wt% and a maximum of 4.0wt% after blending with denatured fuel ethanol.

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Fungible Specifications For Premium Reformulated Blendstock for Oxygenate Blending (RBOB). For Blending with 10% Denatured Fuel Ethanol (92.1% purity) as Defined in ASTM D4806.

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

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

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Product Grade: Premium RBOB
PPL Product Codes: H Grades (H1, H3, H4, H5)
Effective Date: 01/01/17

Test Property	ASTM Test Method	TEST RESULTS	
		Minimum	Maximum
Port Fuel Injector (PFI) and Intake Valve Detergent Additives			(h)
Nace Corrosion (before blending)	TM0172	B+ (Origin)	
Sulfur, wt. %	D2622 (k)		0.0080
Volatility Distillation Reid Vapor Pressure (i) Vapor/Liquid Ratio (V/L)	 D86 D5191 D2533, D5188		 See Table Below

Volatility & Distillation							
Product Grade	**Distillation Temperatures, °C(°F) at % Evaporated**					**RVP psi**	**V/L Ratio °C(°F) at 20**
	10 Vol. %	**50 Vol. %**		**90 Vol. %**	**End Point**		
Code	*Max*	*min*	*max*	*max*	*max*	*max*	*Min*
H1 VOC controlled Region 1	70 (158)	66 (150)	121 (250)	190 (374)	221 (430)	(j)	50 (122)
H3 Non-VOC controlled	60 (140)	66 (150)	116 (240)	185 (365)	221 (430)	11.5	47 (116)
H4 Non-VOC controlled	55 (131)	66 (150)	113 (235)	185 (365)	221 (430)	13.5	42 (107)
H5 Non-VOC controlled	50 (122)	66 (150)	110 (230)	185 (365)	221 (430)	15.0	39 (102)

(h) The use of Port Fuel injector (PFI) and intake valve detergent additives is prohibited. This is a base gasoline, not for sale to the ultimate consumer.

(i) During the VOC control period, testing must be performed in accordance with 40 CFR, Part 80, Appendix E, Method 3.

(j) EPA guidelines must be used to calculate the emissions reductions.

(k) Refer to 40 CFR, Part 80.195 (d)(2).

Fungible Specifications For Regular Conventional Blendstock for Oxygenate Blending (CBOB). For Blending with 10% Denatured Fuel Ethanol (92.1% purity) as Defined in ASTM D4806.

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

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

Product Grade: Regular CBOB
PPL Product Codes: L Grades (L1, L2, L3, L4)
Effective Date: 05/16/16

Test Property	ASTM Test Method	TEST RESULTS	
		Minimum	Maximum
Benzene, vol. %	D3606		3.8
Color			Undyed
Corrosion (Cu), 3 hrs. @ 122°F (50°C)	D130		1
Corrosion (Ag) 3 hrs @ 122˚F (50˚C)	D7667, D7671		1
Dienes (Dicyclopentadiene)			(a)
Doctor Test -OR- Mercaptan Sulfur, wt. %(b)	D4952 D3227		Negative 0.002
Driveability Index	D4814		Report
Existent Gum, mg/100 ml After Washing	D381		4
Gravity, °API at 60°F (before blending)	D287, D1298, D4052		Report
Heavy Metals		not allowed	
Octane: RON (after blending) MON (after blending) AKI (R+M)/2 (after blending)	D2699 D2700	Report 82.0 87.0	
Oxidation Stability, Minutes	D525	240	
Oxygen Content, wt. %	D4815 D5599, GC-OFID (c) (d)		0.05 (e)
Nace Corrosion (before blending)	TM0172	B+ (Origin)	
Phosphorous, g/gal.	D3231		0.004 (f)
Port Fuel Injector (PFI) and Intake Valve Detergent Additives			(g)
Sulfur, wt. %	D2622 (h)		0.0080

(a) Any gasoline exhibiting an offensive odor or containing more than 0.50 wt. % of dicyclopentadiene will not be accepted for shipment.

(b) Test for mercaptan sulfur not required if Doctor test results are negative.

(c) These product grades cannot contain blends of aliphatic ethers (oxygenates). The use of any other non-hydrocarbon blending components is prohibited.

(d) The test methods published in 40 CFR Charter 1, Part 80.46. ASTM D1319 and ASTM D4815 are alternative test methods for aromatics and oxygenates per federal and state regulations.

(e) Parameter must be met before blending with denatured fuel ethanol.

(f) No additives containing phosphorous may be used in this gasoline.

(g) The use of Port Fuel injector (PFI) and intake valve detergent additives is prohibited. This is a base gasoline, not for sale to the ultimate consumer.

(h) Refer to 40 CFR, Part 80.195 (d)(2).

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Fungible Specifications For Regular Conventional Blendstock for Oxygenate Blending (CBOB). For Blending with 10% Denatured Fuel Ethanol (92.1% purity) as Defined in ASTM D4806.
(continued from previous page)

Product Grade: Regular CBOB
PPL Product Codes: L Grades (L1, L2, L3, L4)
Effective Date: 05/16/16

Test Property	ASTM Test Method	TEST RESULTS	
		Minimum	Maximum
Volatility Distillation Reid Vapor Pressure (i) Vapor/Liquid Ratio (V/L)	 D86 D5191 D2533, D5188		 See Table Below

Volatility & Distillation							
Product Grade	**Distillation Temperatures, °C(°F) at % Evaporated**					**RVP psi**	**V/L Ratio °C(°F) at 20**
	10 Vol. %	**50 Vol. %**		**90 Vol. %**	**End Point**		
Code	*Max*	*min*	*max*	*max*	*max*	*max*	*Min*
L1	70 (158)	66 (150)	121 (250)	190 (374)	221 (430)	8.8	50 (122)
L2	70 (158)	66 (150)	121 (250)	190 (374)	221 (430)	10.0	50 (122)
L3	60 (140)	66 (150)	116 (240)	185 (365)	221 (430)	12.5	47 (116)
L4	55 (131)	66 (150)	113 (235)	185 (365)	221 (430)	14.5	42 (107)

(i) During the VOC control period, testing must be performed in accordance with 40 CFR, Part 80.

Fungible Specifications For Premium Conventional Blendstock for Oxygenate Blending (CBOB).
For Blending with 10% Denatured Fuel Ethanol (92.1% purity) as Defined in ASTM D4806.
This CBOB may not be combined with any other CBOB except CBOB having the same requirement for oxygenate type and amount.
All parameters must be met after blending with denatured fuel ethanol unless noted.

Product Grade: Premium CBOB
PPL Product Codes: U Grades (U1, U2, U3, U4)
Effective Date: 01/01/17

	ASTM	**TEST RESULTS**	
Test Property	**Test Method**	**Minimum**	**Maximum**
Benzene, vol. %	D3606		3.8
Color			Undyed
Corrosion (Cu), 3 hrs. @ 122°F (50°C)	D130		1
Corrosion (Ag) 3 hrs @ 122˚F (50˚C)	D7667, D7671		1
Dienes (Dicyclopentadiene)			(c)
Doctor Test -OR- Mercaptan Sulfur, wt. %(d)	D4952 D3227		Negative 0.002
Driveability Index	D4814		Report
Existent Gum, mg/100 ml After Washing	D381		4
Gravity, °API at 60°F (before blending)	D287, D1298, D4052		Report
Heavy Metals		not allowed	
Octane: RON (after blending) MON (after blending) AKI (R+M)/2 (after blending)	D2699 D2700	Report Report 93.0	
Oxidation Stability, Minutes	D525	240	
Oxygen Content, wt. %	D4815 D5599, GC-OFID (c) (d)		0.05 (e)
Nace Corrosion (before blending)	TM0172	B+ (Origin)	
Phosphorous, g/gal.	D3231		0.004 (f)
Port Fuel Injector (PFI) and Intake Valve Detergent Additives			(g)
Sulfur, wt. %	D2622 (h)		0.0080

(a) Any gasoline exhibiting an offensive odor or containing more than 0.50 wt. % of dicyclopentadiene will not be accepted for shipment.

(b) Test for mercaptan sulfur not required if Doctor test results are negative.

(c) These product grades cannot contain blends of aliphatic ethers (oxygenates). The use of any other non-hydrocarbon blending components is prohibited.

(d) The test methods published in 40 CFR Charter 1, Part 80.46. ASTM D1319 and ASTM D4815 are alternative test methods for aromatics and oxygenates per federal and state regulations.

(e) Parameter must be met before blending with denatured fuel ethanol.

(f) No additives containing phosphorous may be used in this gasoline.

(g) The use of Port Fuel injector (PFI) and intake valve detergent additives is prohibited. This is a base gasoline, not for sale to the ultimate consumer.

(h) Refer to 40 CFR, Part 80.195 (d)(2).

Fungible Specifications For Premium Conventional Blendstock for Oxygenate Blending (CBOB). For Blending with 10% Denatured Fuel Ethanol (92.1% purity) as Defined in ASTM D4806.
(continued from previous page)

Product Grade: Premium CBOB
PPL Product Codes: U Grades (U1, U2, U3, U4)
Effective Date: 01/01/17

Test Property	ASTM Test Method	TEST RESULTS	
		Minimum	Maximum
Volatility Distillation Reid Vapor Pressure [(i)] Vapor/Liquid Ratio (V/L)	D86 D5191 D2533, D5188		See Table Below

Volatility & Distillation							
Product Grade	**Distillation Temperatures, °C(°F) at % Evaporated**					**RVP psi**	**V/L Ratio °C(°F) at 20**
	10 Vol. %	**50 Vol. %**		**90 Vol. %**	**End Point**		
Code	*Max*	*min*	*max*	*max*	*max*	*max*	*Min*
U1	70 (158)	66 (150)	121 (250)	190 (374)	221 (430)	8.8	50 (122)
U2	70 (158)	66 (150)	121 (250)	190 (374)	221 (430)	10.0	50 (122)
U3	60 (140)	66 (150)	116 (240)	185 (365)	221 (430)	12.5	47 (116)
U4	55 (131)	66 (150)	113 (235)	185 (365)	221 (430)	14.5	42 (107)

[(i)] During the VOC control period, testing must be performed in accordance with 40 CFR, Part 80.

Fungible Specifications for Premium Conventional Gasoline, non-oxygenated

Product Grade: Premium Conventional Gasoline, non-oxygenated
PPL Product Codes: V Grades
Effective Date: 01/01/17

For the intrastate movement from Pascagoula, MS to Kola, MS only.

Test Property	ASTM Test Method	TEST RESULTS	
		Minimum	Maximum
Color			Undyed
Gravity, °API at 60°F	D287, D1298, D4052		Report
Heavy Metals		not allowed	
Octane: RON MON AKI (R+M)/2	D2699 D2700	Report Report 93.0	
Oxygen Content, wt. %[(a)]	D4815, D5599, GC-OFID		0.05[(a)]
Port Fuel Injector (PFI) and Intake Valve Detergent Additives			[(b)]
Reid Vapor Pressure[(c)] Grades 1(V) without ethanol with 10% ethanol 2(V) 3(V) 4(V)	D5191		 7.8 8.8 9.0 11.5 13.5
Corrosion (Ag) 3 hrs @ 122˚F (50˚C)	D7667, D7671		1
Nace Corrosion (before blending)	TM0172	B+ (Origin)	
Sulfur, wt. %	D2622 [(d)]		0.0080

[(a)] These product grades may not contain aliphatic ethers (oxygenates). The use of any other non-hydrocarbon blending components is prohibited.

[(b)] The use of Port Fuel injector (PFI) and intake valve detergent additives is prohibited. This is a base gasoline, not for sale to the ultimate consumer.

[(c)] During the VOC control period, testing must be performed in accordance with 40 CFR, Part 80, Appendix E, and Method 3.

[(d)] Refer to 40 CFR, Part 80.195 (d)(2).

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Fungible Specifications for Jet Fuel, 3000 ppm wt. sulfur max.

Product Grade: Jet-A (3000 ppm wt. sulfur max)
PPL Product Codes: 54 & 56
Effective Date: 01/01/17

Test Property	ASTM Test Method	TEST RESULTS	
		Minimum	Maximum
General Properties			
Clear & Bright[a]			
Additives[b]			Report
Gravity, °API at 60°F	D287, D1298, D4052	37	51
Net Heat of Combustion (BTU/Pound)	D3338, D4529, D4809	18,400	
Corrosion - 2 hrs. @ 212°F (100°C)	D130		1
MSEP Rating			
Origin	D3948	85	
Delivery	D7224	75	
Electrical Conductivity	D2624		Report
Particulate Analysis[c]	MIL-T-5624P, D5452		
Filtration Time Test			Report
Total Solids			Report
Low Temperature Properties			
Freezing Point, °C	D2386, D5972, D7153, D7174		-40
Viscosity, cSt @ -4°F (-20°C)	D445, D7042		8.0
Volatility			
Flash Point, °F	D56, D3828	108	
Distillation, °F	D86		
10% Recovered			400
50% Recovered		Report	
90% Recovered		Report	
End Point			572
Residue, %			1.5
Loss, %			1.5
Or Simulated Distillation, °F	D2887		
10% Recovered			365
50% Recovered		Report	
90% Recovered		Report	
End Point			644

[a] This product grade shall be clear and bright and free of suspended matter.

[b] Only those additives specified and within the concentration noted in Section 5.2 through 5.2.2.1 of the latest ASTM D-1655 are permitted. The use of any other additives is prohibited.

[c] Report actual values for filtration time test and total solids. The results are for informational purposes only.

(continued on next page)

Fungible Specifications for Jet Fuel, 3000 ppm wt. sulfur max.
(continued from previous page)

Product Grade: Jet-A (max. 3000 ppm wt. sulfur)
PPL Product Code: 54 & 56
Effective Date: 01/01/17

Test Property	ASTM Test Method	TEST RESULTS	
		Minimum	Maximum
Stability			
Existent Gum, mg/100 ml	D381, IP 540		7.0
Thermal Stability[d] @275°C for Receipt @260°C for Delivery Pressure Drop, mm/hg Tube Deposit Code	D3241		 25 <3[e]
Composition Properties			
Sulfur, ppm wt.	D2622, D5433, D1266, D4294 [f]		3000
Mercaptan Sulfur, wt. % ***OR*** Doctor Test[g]	D3227 D4952		0.003 Negative
Aromatics, vol. %	D1319		25
Acidity Total Max, mg KOH/g	D3242		0.1
Combustion Properties			
One of the following requirements must be met:			
Smoke Point, mm	D1322	25	
Smoke Point, mm ***AND*** Naphthalenes, vol. %	D1322 D1840	18	 3.0

[d] Refer to the latest ASTM D1655.

[e] No peacock or abnormal color deposits.

[f] Origin can qualify sulfur content test method per EPA Performance Based Testing Criteria (CFR 80.584). The referee test method will be ASTM D5453.

[g] Mercaptan sulfur waived if product is negative by Doctor test. Also, Doctor test is not necessary if mercaptan sulfur test is performed.

Fungible Specifications for Ultra Low Sulfur Diesel Fuel

Product Grade: Ultra Low Diesel Fuel, 15 ppm sulfur for Delivery
PPL Product Code: [W]61/**67**/68
Effective Date: [W]~~05/16/16~~ **05/01/18**

Test Property	ASTM Test Method	TEST RESULTS	
		Minimum	Maximum
Gravity, °API at 60°F	D287, D1298, D4052	30	
Flash Point, Pensky-Martens, °F	D93	130	
Distillation, °F	D86		
50% Recovered			Report
90% Recovered		540	640
End Point			690
or Simulated Distillation, °F	D2887		
50% Recovered			Report
90% Recovered		572	673
End Point			790
Color, ASTM	D1500, D6045		2.5
Color, Visual			Undyed
Viscosity, cSt @ 40°C (104°F)	D445, D7042	1.9	4.1
Pour Point, °C (°F)[(a)]	D97, D5949, D5950, D5985		
January – March (cycles 1-14)			-18 (0)
March – August (cycles 15-43)			-12 (+10)
August – December (cycles 44-72)			-18 (0)
Cloud Point, °C (°F)	D2500, D5771, D5772, D5773		
January – March (cycles 1-14)			-9 (+15)
March – August (cycles 15-43)			-7 (+20)
August – December (cycles 44-72)			-9 (+15)
Corrosion - 3 hrs. @ 50°C (122°F)	D130		1
Total Sulfur, ppm wt.	D2622, D5453, D7039[(b)]		11 Origin 15 Delivery
Cetane Number[(c)]	D613, D6890, D7170	40	
Aromatics (Volume %) Or Aromatics by Cetane Index	D1319 D976	 40	31.7
Ash, wt. %	D482		0.01
Carbon Residue: Ramsbottom on 10% Bottom	D524		0.35
BS&W, vol. %	D2709 or equivalent		<0.05

[(a)] Specifies the fluidity of the distillate at the time and place of origin.

[(b)] Origin can qualify sulfur content test method per EPA Performance Based Testing Criteria (CFR 80.584). The referee test method will be ASTM D5453.

[(c)] Where cetane number by test method D613 is not available, test method D4737 can be used as an approximation.

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Fungible Specifications for Ultra Low Sulfur Diesel Fuel
(continued from previous page)

Product Grade: Ultra Low Diesel Fuel, 15 ppm sulfur for Delivery
PPL Product Code: [W]61/**67**/68
Effective Date: [W]~~05/16/16~~ **05/01/18**

Test Property	ASTM Test Method	TEST RESULTS Minimum	TEST RESULTS Maximum
Thermal Stability, 90 Minutes 150°C Pad Rating, Dupont Scale			7
OR			
Thermal Stability	D6468		
Y/Green		73%	
W Unit		65%	
OR			
Oxidation Stability, mg/100 ml	D2274		2.5
Haze Rating @ 25°C (77°F)	D4176 (Procedure 2)		2
Nace Corrosion	TM0172	B+ (Origin)	
Electrical Conductivity, pS/m @ 21°C (70°F)	D2624		250
Additives[(d)]			

[(d)] Use of additives and concentration must be approved by carrier. Biodiesel (FAME) is not allowed at origin.

Biodiesel Requirements		
Product Code	Percent Biodiesel (FAME) [(d)]	
	Origin	Destination
61	Not allowed [(d)]	0%
[W]**67**	**Not allowed [(d)]**	**0%**
68	Not allowed [(d)]	5%

May contain up to 5% renewable diesel on delivery

Fungible Specifications for Ultra Low Sulfur Diesel Fuel Containing Up To 5% Renewable Hydrotreated Diesel

Product Grade: Ultra Low Diesel Fuel, 15 ppm sulfur for Delivery
PPL Product Code: 63/68
Effective Date: 05/16/16

Test Property	ASTM Test Method	TEST RESULTS	
		Minimum	Maximum
Renewable Fuel (volume %)			5
Gravity, °API at 60°F	D287, D1298, D4052	30	
Flash Point, Pensky-Martens, °F	D93	130	
Distillation, °F	D86		
50% Recovered			Report
90% Recovered		540	640
End Point			690
or Simulated Distillation, °F	D2887		
50% Recovered			Report
90% Recovered		572	673
End Point			790
Color, ASTM	D1500, D6045		2.5
Color, Visual			Undyed
Viscosity, cSt @ 40°C (104°F)	D445, D7042	1.9	4.1
Pour Point, °C (°F)[(a)]	D97, D5949, D5950, D5985		
January – March (cycles 1-14)			-18 (0)
March – August (cycles 15-43)			-12 (+10)
August – December (cycles 44-72)			-18 (0)
Cloud Point, °C (°F)	D2500, D5771, D5772, D5773		
January – March (cycles 1-14)			-9 (+15)
March – August (cycles 15-43)			-7 (+20)
August – December (cycles 44-72)			-9 (+15)
Corrosion - 3 hrs. @ 50°C (122°F)	D130		1
Total Sulfur, ppm wt.	D2622, D5453, D7039[(b)]		11 Origin 15 Delivery
Cetane Number[(c)]	D613, D6890, D7170	40	
Aromatics (Volume %) Or Aromatics by Cetane Index	D1319 D976	 40	31.7
Ash, wt. %	D482		0.01
Carbon Residue: Ramsbottom on 10% Bottom	D524		0.35
BS&W, vol. %	D2709 or equivalent		<0.05

(Continued on next page)

(a) Specifies the fluidity of the distillate at the time and place of origin.

(b) Origin can qualify sulfur content test method per EPA Performance Based Testing Criteria (CFR 80.584). The referee test method will be ASTM D5453.

(c) Where cetane number by test method D613 is not available, test method D4737 can be used as an approximation.

Fungible Specifications for Ultra Low Sulfur Diesel Fuel Containing Up To 5% Renewable Hydrotreated Diesel

(continued from previous page)

Product Grade: Ultra Low Diesel Fuel, 15 ppm sulfur for Delivery
PPL Product Code: 63/68
Effective Date: 05/16/16

Test Property	ASTM Test Method	TEST RESULTS	
		Minimum	Maximum
Thermal Stability, 90 Minutes 150°C Pad Rating, Dupont Scale			7
OR			
Thermal Stability	D6468		
Y/Green		73%	
W Unit		65%	
OR			
Oxidation Stability, mg/100 ml	D2274		2.5
Haze Rating @ 25°C (77°F)	D4176 (Procedure 2)		2
Nace Corrosion	TM0172	B+ (Origin)	
Electrical Conductivity, pS/m @ 21°C (70°F)	D2624		250
Additives[(d)]			

[(d)] Use of additives and concentration must be approved by carrier. Biodiesel (FAME) is not allowed at origin.

Biodiesel Requirements		
Product Code	Percent Biodiesel (FAME) [(d)]	
	Origin	Destination
63	Not allowed [(d)]	0%
68	Not allowed [(d)]	5%

May contain up to 5% renewable diesel on delivery.

Kinder Morgan Biodiesel Specifications [(a) (b)]

Product Grade: B100/B99 Biodiesel
PPL Product Codes: PPL will not transport B100/B99
Effective Date: 01/01/17

Test Property	Test Method	TEST RESULTS	
		Minimum	Maximum
Acid Number, mg KOH/g	D664		0.50
API Gravity @ 60°F Density	D 287, D1298, D4052	28 0.8871	35 0.8498
Cetane number	D613, D6890	47	
Cloud point, °C (°F) March-Aug. (Cycles 15-43) Jan.-March, Aug.-Dec. (Cycles 1-14, 44-72)	D2500		 10°C (50°F) Summer 2°C (36°F) Winter
Cold Soak Filterability, seconds March-Aug. (Cycles 15-43) Jan.-March, Aug.-Dec. (Cycles 1-14, 44-72)	D7501		 360 (Summer) 200 (Winter)
Distillation temperature, °C (°F) Atmospheric equivalent temperature 90% recovered	D1160		360°C (680°F)
Flashpoint (closed cup), °C (°F)	D93, D6450	93°C (199°F)	
Alcohol Control One of the following must be met: 1. Methanol content, mass % 2. Flashpoint, °C (°F)	 EN 14110 D93, D6450	 130°C (266°F)	 0.2
Free glycerin, mass %	D6584		0.020
Total glycerin, mass %	D6584		0.240
Kinematic Viscosity @ 40°C, mm²/s	D445	1.9	6.0
Methyl Ester, mass %	EN 14103	97	
Monoglyceride content –, % March-Aug. (Cycles 15-43) Jan.-March, Aug.-Dec. (Cycles 1-14, 44-72) Diglycerides Trigylcerides	D6584, Sec 11.1.2		 0.80 Summer 0.40 Winter 0.20 0.20
Oxidation Stability, hours @ 110°C (230°F)	EN 14112	4	
Sodium and Potassium combined, ppm (µg/g)	EN 14538		5
Sulfur, mass % (ppm)	D5453, D7039		11
Water and sediment combined, volume % Water, volume %	D2709 D6304		0.050 0.040
Haze Rating @ 25°C (77°F)	D4176 (Procedure 2)		1

(a) Direct supplier or certifying laboratory must be BQ9000 certified.

(b) Must Meet ASTM D6751.latest revision for all Table 1 properties not listed above.