



SUNOCO PIPELINE
An ENERGY TRANSFER Partnership

Sunoco Pipeline L.P.

Eastern Area & Hebert Pipeline Systems

Product Specifications

DRAFT

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PRODUCT GRADE SPECIFICATIONS

CONVENTIONAL GASOLINE BLENDSTOCK FOR OXYGENATE BLENDING

CBOB - 87 Octane after DFE blending at 10 percent ethanol by volume

Product Code ⁽¹⁾	Product Designation	Max RVP (psi)	Page
87CB78	Summer CBOB	7.8	9
87CB80	Summer CBOB	8.0	9
87CB90	Summer CBOB	9.0	9
87CB100	Summer CBOB	10.0	9
87CB125	Winter CBOB	12.5	9
87CB135	Winter CBOB	13.5	9
87CB145	Winter CBOB	14.5	9
87CB150	Winter CBOB	15.0	9
87CB155	Winter CBOB	15.5	9

CBOB - 93 Octane after DFE blending at 10 percent ethanol by volume

93CB78	Summer CBOB	7.8	9
93CB80	Summer CBOB	8.0	9
93CB90	Summer CBOB	9.0	9
93CB100	Summer CBOB	10.0	9
93CB125	Winter CBOB	12.5	9
93CB135	Winter CBOB	13.5	9
93CB145	Winter CBOB	14.5	9
93CB150	Winter CBOB	15.0	9
93CB155	Winter CBOB	15.5	9

REFORMULATED GASOLINE BLENDSTOCK FOR OXYGENATE BLENDING

RBOB - 87 Octane after DFE blending at 10 percent ethanol by volume

Product Code ⁽¹⁾	Product Designation	Max RVP (psi)	Page
87RB74	Summer RBOB	7.4	11
87RB115	Winter RBOB	11.5	11
87RB125	Winter RBOB	12.5	11
87RB135	Winter RBOB	13.5	11
87RB145	Winter RBOB	14.5	11
87RB150	Winter RBOB	15.0	11
87RB155	Winter RBOB	15.5	11

RBOB - 93 Octane after DFE blending at 10 percent ethanol by volume

93RB74	Summer RBOB	7.4	11
93RB115	Winter RBOB	11.5	11
93RB125	Winter RBOB	12.5	11
93RB135	Winter RBOB	13.5	11
93RB145	Winter RBOB	14.5	11
93RB150	Winter RBOB	15.0	11
93RB155	Winter RBOB	15.5	11

SEGREGATED GASOLINE GRADES

CBOB - This gasoline is for export from the United States only

Product Code ⁽¹⁾	Product Designation	Max RVP (psi)	Page
87CX90 / 93CX90	Export Gasoline	9.0	13
87CX100 / 93CX100	Export Gasoline	10.0	13
87CX125 / 93CX125	Export Gasoline	12.5	13
87CX145 / 93CX145	Export Gasoline	14.5	13
87CX155 / 93CX155	Export Gasoline	15.5	13

FUNGIBLE DISTILLATES GRADES

Product Code	Product Name Designation	Cetane Minimum	Origin (ppm) Sulfur Maximum	Page
15HO2	Certified NTDF, 15 ppm sulfur Heating Oil #2	40	11	14
15MV2	ULSD, Ultra Low Sulfur Diesel Fuel #2	40	11	16
15MV1	ULSD, Ultra Low Sulfur Diesel Fuel #1	40	11	22 18
15K1	Certified NTDF, 15 ppm sulfur Kerosene #1	40	11	19
JETA	High Sulfur Aviation Kerosene	N/A	3000	25 20

SEGREGATED DISTILLATES-GRADES

15EXP2	Export Ultra Low Sulfur Diesel Fuel #2	40	11	27 22
JETA-FTZ	Export High Sulfur Aviation Kerosene	N/A	3000	28 23

FUNGIBLE LIQUEFIED PETROLEUM GAS (LPGs) GRADES

Product Code	Product Name	Page
MIXBUT	Mixed Butane	29 24

(1) Gasoline product codes identify both into the pipeline Product Designation (short description) and the intended E10 blended finished gasoline octane number (R+M/2) minimum and RVP maximum.

SHIPMENT ACCEPTANCE TERMS

The following are general terms and conditions regarding product quality for all products shipped on the Sunoco Pipeline L.P. (SPL) system, both fungible and segregated:

- 1.0 A pre-shipment Certificate of Analysis (C of A), or a full C of A, must be received at SPL origin points, at least two hours prior to lifting. A full C of A, reflecting all tests listed in the SPL current specifications, must be received within 48 hours.
 - 1.1 Jet Fuel requires a full laboratory C of A meeting ASTM D1655 prior to lifting. **Connecting carriers** will provide a pre-shipment FAX to include properties listed under section 1.4 below.
 - 1.2 The C of A must be based on a representative sample of the product to be tendered into the SPL system. The C of A cannot be from a similar tank or previous shipment, and not from a generic set of data for a "typical" product.
 - 1.3 The product sampled and tested for the C of A must be homogenous, such that the C of A is representative of all batches originating from the tank C of A.
 - 1.4 At a MINIMUM, pre-shipment FAX to include:

CBOB / RBOB	RBOB Gasoline	15MV1 / 15MV2	Jet Fuel (Connecting Carriers)	Liquefied Petroleum Gases
API Gravity @ 60F	API Gravity @ 60F	API Gravity @ 60F	API Gravity @ 60F	Specific Gravity
RVP	RVP	Flash Point	Flash Point	Volatility
Sulfur, wt. %	Sulfur, wt. %	Sulfur Content	Sulfur Content	Propane Content
Benzene, vol %	Distillation	Distillation	Aqua-Glo	Butane Content
Distillation	Octane (R + M) /2	Cetane Index (Diesel)	Filter Membrane	Oil Stain Residue
Octane (R + M) /2	Color and Appearance	Saybolt Color (Kerosene)	Saybolt Color	
DRA, ppm total polymer	DRA, ppm total polymer	DRA, ppm total polymer	Visual Appearance in White Bucket	
Color and Appearance	Oxygen Content, wt. %		Water Separation (MSEP)	
	E200, vol%			
	E300, vol%			
	Benzene, vol%			
	Olefins, vol%			
	VOC Reduction, %			
	Driveability Index			

- 2.0 Acceptance of the C of A by SPL does not relieve the Shipper of liability or responsibility for specification compliance and composition of the product.
- 3.0 SPL reserves the right to reject or terminate shipments when samples are found to deviate from the applicable Certificate of Analysis.
- 4.0 SPL may sample and test products prior to acceptance, and during shipments, into the SPL system, and in the event of a variance against the C of A, SPL results will prevail.
- 5.0 For any parameter reported bordering on the specification maximum/minimum level, a recheck may be required prior to acceptance.
- 6.0 Product exception for an off-specification parameter may be requested in writing to Sunoco Pipeline Quality Assurance. However, such requests will be assessed on a case-by-case basis and their approval is not guaranteed.
- 7.0 Any water suspended in or received with Shipper product will be deducted from shipment volumes. The Shipper will be requested to remove the water or be invoiced for handling and disposal charges at the then prevailing rate as determined by SPL.

8.0 Workmanship - Appearance

- 8.1 The product shall be clear and bright, free of any suspended water, sediment or foreign material. A maximum Haze rating of 2 as determined by ASTM D4176, Procedure 2 of either tank temperature or @ 77 °F (whichever is lowest) is the determining criteria.
- 8.2 The product can contain no constituents that in SPL’s opinion would render it unacceptable for its commonly accepted end use. Such constituents may include but are not limited to unusual color or offensive odor.

9.0 PRODUCT TEMPERATURE - The maximum temperature of incoming product shall not exceed 100°F for Gasoline, JET A, Aviation and #1 Kerosene. The maximum temperature of incoming product shall not exceed 110°F for Diesel Fuel Oil or #2 Heating Oil.

10.0 The only non-hydrocarbon components permitted to be blended in gasoline, moved by SPL, are those listed in the specifications. The use of alcohols for blending purposes is prohibited in all gasoline, segregated or fungible.

11.0 It is the Shipper’s responsibility to ensure the product meets all downstream carrier, federal, state or local requirements not stipulated in the SPL specifications.

12.0 All Test Methods listed are based on the most current ASTM, unless specified otherwise or are regulatory required test methods.

13.0 BIO-FUELS PROHIBITION POLICY: In the interest of protecting our Shippers’ products, all products shipped are not permitted to contain Bio-Fuels, such as ethanol and bio-diesel (FAME, FAEE, or other Esters). Any distillate not produced by the origin ~~refiner~~ **refiner-fuel manufacturing facility** (e.g., import, previously certified diesel), whether blended with ~~refinery~~ **refinery-fuel manufacturing facility** production or delivered directly into the pipeline, shall be tested by ASTM D7371 or EN 14078. FAME result must be below the detection limit of the test method used.

SEGREGATED PRODUCTS FOR WHICH SPECIFICATIONS HAVE NOT BEEN ISSUED

LPG	CRUDE	OTHER PRODUCT	PRODUCT	PRODUCT
PRODUCT	OIL	CODE	NAME	NAME
CODE	CODE	CODE	NAME	NAME
BBUTY	LEF	ALKYLT	Lube Ext’d Feedstocks	Alkylate
ISO	SWEET	BTF	Sweet	Bonded Turbine Fuel
LPGMIX	SYN	COND	Synthetic	Condensate
PENT	SOUR	DISTCOM	Sour	Distillate Component
PROP	HEAVY	GASCOMP	Heavy Sour	Gasoline Component
ISOP		LCO		Light Cycle Oil
PRPL		NAPH		Naphtha
		RAFF		Raffinate
		REFLTM		Reformate
		TLENE		Toluene
		TXMIX		Toluene/Xylene Mix
		TRNSMX		Transmix
		STMIX		Segregated Transmix
		UNFGAS		Unfinished Gasoline
		VGO		Vacuum Gas Oil
		XYLE		Xylene
		93CF78/90/115/135		Conventional Gasoline

TABLE 1: SEASONAL VAPOR PRESSURE, DISTILLATION AND VAPOR LOCK PROTECTION CLASS REQUIREMENTS

The following schedule denotes the volatility properties as required by SPL and may not coincide with dates specified by appropriate government agencies. Some systems within SPL may require earlier dates for summer RVP limits in order to ensure compliance with EPA federal regulations. Shippers will be advised in advance of the date that fungible gasolines must be input into the SPL System via the scheduling calendar. SPL will monitor RVP compliance by ASTM D5191 using the EPA correction equation calculation adjustment in 40 CFR §1090.1355: $RVP (psi) = (0.956 * X_{P_{Total}} - 0.347)$ in 40 CFR §80.46(e).

APPROXIMATE ORIGIN MAXIMUM RVP AND DISTILLATION REQUIREMENTS ⁽¹⁾

Destination		Jan	Feb	Mar 1-14	Mar 15-31	Apr 1-15	Apr 16-30	May	Jun	Jul	Aug	Sep 1-15	Sep 16-30	Oct	Nov	Dec
New York ⁽³⁾	Class	E-5	E-5	D-4	D-4	AA-4	AA-4	AA-3	AA-3	AA-3	AA-3	AA-3	D-4	D-4	E-5	E-5
	psi	15.0	15.0	13.5	13.5	9.0	9.0	9.0	9.0	9.0	9.0	9.0	13.5	13.5	15.0	15.0
Pennsylvania ⁽³⁾	Class	E-5	E-5	D-4	D-4	AA-4	AA-4	AA-3	AA-3	AA-3	AA-3	AA-3	D-4	D-4	E-5	E-5
	psi	15.5	15.5	14.5	14.5	10.0	10.0	10.0	10.0	10.0	10.0	10.0	14.5	14.5	15.5	15.5
Ohio	Class	E-5	E-5	D-4	D-4	A-4	A-4	A-3	A-3	A-3	A-3	A-3	C-3	D-4	E-5	E-5
	psi	15.5	15.5	14.5	14.5	10.0	10.0	10.0	10.0	10.0	10.0	10.0	12.5	14.5	15.5	15.5
Michigan	Class	E-5	E-5	D-4	D-4	A-4	A-4	A-3	A-3	A-3	A-3	A-3	D-4	D-4	E-5	E-5
	psi	15.5	15.5	14.5	14.5	10.0	10.0	10.0	10.0	10.0	10.0	10.0	14.5	14.5	15.5	15.5
Detroit Area	Class	E-5	E-5	D-4	D-4	AA-4	AA-4	AA-3	AA-3	AA-3	AA-3	AA-3	D-4	D-4	E-5	E-5
	psi	15.5	15.5	14.5	14.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0	14.5	14.5	15.5	15.5
Texas - Hebert System ⁽⁴⁾	Class	D-4	D-4	D-4	D-4	AA-3	AA-3	AA-3	AA-3	AA-2	AA-2	AA-2	AA-2	C-3	D-4	D-4
	psi	14.5	14.5	14.5	14.5	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	12.5	14.5	14.5

Vapor Pressure / Distillation Class	Max Vapor Pressure	Distillation Temperatures, °F (°C), at % Volume Evaporated ASTM D86					Residue Vol. % max	Driveability Index max, °F (°C) Derived ⁽²⁾
		10 % max	50 % min	50 % max	90 % max	End Point max		
AA	7.8 / 8.0 / 8.8 / 9.0	158 (70)	150 (66)	250 (121)	374 (190)	430 (221)	2	1250 (597)
A	10.0	158 (70)	150 (66)	250 (121)	374 (190)	430 (221)	2	1250 (597)
B	11.0	149 (65)	150 (66)	245 (118)	374 (190)	430 (221)	2	1240 (591)
C	12.5	140 (60)	150 (66)	240 (116)	365 (185)	430 (221)	2	1230 (586)
D	13.5 / 14.5	131 (55)	150 (66)	235 (113)	365 (185)	430 (221)	2	1220 (580)
E	15.0 / 15.5	122 (50)	150 (66)	230 (110)	365 (185)	430 (221)	2	1200 (569)

Class: Vapor/Liquid Ratio of 20:1 ASTM D5188 °F (°C) Min.	1	2	3	4	5
For products which contain 10 % Ethanol	129 (54)	122 (50)	116 (47)	107 (42)	102 (39)

- (1) All limits are for gasoline-ethanol blends containing no more than 10 % by volume ethanol; refer to individual Product Grade specifications for specific RVP requirements. T50, TV/L and RVP limits for all RBOBs and CBOBs must comply with the applicable requirements of the area in which the fuel is destined for retail.
- (2) The Driveability Index (DI) specification limits are applicable at the refinery fuel manufacturing facility or import facility as defined by 40 CFR §80.21090.80.
- (3) Northumberland and Williamsport, PA delivery locations must meet the winter RVP limit requirements for New York; summer RVP limit for these locations is 10.0 psi maximum.
- (4) Texas SIP-controlled summer 7.8 psi low RVP gasoline applies through October 1.

TABLE 2: ADDITIVE APPROVALS AND PROHIBITIONS

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

GUM INHIBITORS AND METAL DEACTIVATORS

Gasoline shipments may, but are not required to, contain the following:

N,N'di-secondary butyl para-phenylenediamine	N,N'disalicylidene-1, 2 propanediamine
N,N'di (1-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-(1,4-dimethylpentyl)-p-phenylenediamine	2,4,6 - tri-tertiary butylphenol
Ortho-tertiary butylphenol	2,4-dimethyl-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-isopropyl phenol

CORROSION INHIBITORS

All products shipped on SPL, with the exception of all grades of Aviation Kerosene, are required to meet a minimum level of corrosion protection. The concentration of inhibitor dosage will be controlled to meet a minimum rating of B+ (less than 5% of test surface rusted) as determined by NACE Standard TM0172-2015, Test Method – Determining Corrosive Properties of Cargoes in Petroleum Product Pipelines.

Gasoline shipped on Sunoco Pipeline may contain only the following corrosion inhibitors:

Aqua Process	11CH77		Mobil	C-605
Afton Chem.	HiTEC 4875, 6455		Nalco	5403, 5405, 5406, EC5624A, EC5626A
Corexit	5267		SPEC-AID	8Q22, 8Q110ULS, 8Q112ULS, 8Q123ULS
Innospec	DCI-4A, DCI-6A, DCI-11, DCI-30.N		Tolad	245, 249, 351, 3232, 3232D, 3240, 4410, 9711, 9715, 9719
Ethyl Hi Tec	580		Unichem	7500, 7501, 7510
Lubrizol	541, 8014, 8017		UOP	Unicor, Unicor J, Unicor PL
MidContinental	MCC5001		Athlon	611, RPS-661

In addition to the above additives, the following may be used in diesel fuels and fuel oil transported by SPL: DuPont AFA-1, Innospec DMA-4, Nalco 5400-A, Nalco EC 5407-A, Infineum R511, Tolad 3032.

Static Dissipater Additives (Conductivity Improvers)

Product shipments may, but are not required to, contain static dissipater additives (SDA). The only approved SDA for use on Sunoco Pipeline is Innospec Statis 450. SDA is prohibited from all Jet Fuel / Aviation Kerosene grades. The origin maximum concentration of Statis 450 is 0.75 mg/l, and the origin maximum conductivity allowed is 250 pS/m at 21°C (70°F) by ASTM D2624.

Aviation Kerosene Additives

Product shall only contain antioxidants and metal deactivators specified and within the concentration noted in the latest ASTM D1655 with advance approval from Sunoco Pipeline prior to shipment. Use of these additives is expected to be short term at reasonable treat levels and is to be clearly indicated on the Certificate of Analysis. All other additives are prohibited. Sunoco Pipeline reserves the right to deny shipment of product containing these additives.

Cloud and Pour Point Depressant Additives

Product shall only contain ethylene vinyl acetate copolymer-based cloud and pour point depressant additives only upon advance approval from Sunoco Pipeline prior to shipment. Use of these additives is expected to be short term at reasonable treat levels and is to be clearly indicated on the Certificate of Analysis. Sunoco Pipeline reserves the right to deny shipment of product containing cloud and pour point depressant additives.

Renewable Diesel

Renewable diesel is a liquid fuel derived from 100 % hydrotreated biomass-based feedstock's that meets the registration requirements for fuels and fuel additives established by the EPA under section 211 of the Clean Air Act and the requirements of ASTM D975. Renewable diesel shall not contain fatty acid esters; FAME, FAEE, or other esters.

Renewable Diesel as defined above is NOT considered biodiesel. All biodiesel remains prohibited on the pipeline.

Distillate grades 15HO2, and 15MV2, ~~UB Grade and 15NRLM~~ allow up to five (5) % by volume Renewable Diesel.

Sunoco Pipeline assumes no responsibility as a blender and all RINs (Renewable Identification Numbers) shall be separated before entering Sunoco Pipeline's system. At origin locations the volume of Renewable Diesel shall be disclosed on the COA (Certificate of Analysis).

Cetane Improver Additives

Product shall only contain 2-ethyl hexyl nitrate or T-butyl peroxide based cetane improver additives only upon advance approval from Sunoco Pipeline prior to shipment. Use of these additives is expected to be short term at reasonable treat levels and is to be clearly indicated on the Certificate of Analysis. Sunoco Pipeline reserves the right to deny shipment of product containing cetane improver additives.

Prohibited Additives

Sunoco Pipeline only permits certain types and concentrations of additives as referenced, while all other types and concentrations of additives are prohibited. Prohibited additives include, but are not limited to the following:

Lubricity additives	Port Fuel Injector (PFI) additives	Biodiesel
Intake Valve Detergent Additives	Additives containing Phosphorous	Marker Solvent Yellow 124

Additive Documentation Requirements

If present, the type and concentration of approved additives must be clearly indicated on the Certificate of Analysis. Additive treat rates are acceptable for concentration reporting. Carrier may request review of volume reconciliation data to verify actual treat rates.

CB GRADES - FUNGIBLE SPECIFICATION FOR CONVENTIONAL GASOLINE BLENDSTOCK FOR OXYGENATE BLENDING WITH 10 % ETHANOL ⁽¹⁾

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

<u>CB - GRADE RVPs</u>	<u>DESIGNATION</u>	<u>ASTM TEST METHOD</u>	<u>E0</u>	<u>E10</u>
			<u>NEAT CBOB RVP MAXIMUM (PSI)</u>	<u>10 % ETHANOL CG RVP MAXIMUM (PSI)</u>
87CB78 / 93CB78	Summer CBOB ⁽¹⁵⁾	D5191	6.6	7.8 ⁽¹⁶⁾
87CB80 / 93CB80	Summer CBOB ⁽¹⁵⁾	D5191	7.0 ⁽¹⁶⁾	8.0
87CB90 / 93CB90	Summer CBOB ⁽¹⁵⁾	D5191	7.8 ⁽¹⁶⁾	9.0 ^(14,16)
87CB100 / 93CB100	Summer CBOB	D5191	9.0 ⁽¹⁶⁾	10.0
87CB125 / 93CB125	Winter CBOB	D5191	11.5	12.5
87CB135 / 93CB135	Winter CBOB	D5191	12.9	13.5 ⁽⁷⁾
87CB145 / 93CB145	Winter CBOB	D5191	13.5	14.5
87CB150 / 93CB150	Winter CBOB	D5191	14.5	15.0 ⁽⁷⁾
87CB155 / 93CB155	Winter CBOB	D5191	15.0	15.5

<u>87CB GRADE OCTANES</u>	<u>ASTM TEST METHOD</u>	<u>OCTANE MINIMUM</u>	<u>OCTANE MINIMUM</u>
RON	D2699, D2885	–	Report
MON	D2700, D2885	–	82.0
Index, (R+M)/2	Calculated	–	87.0

<u>93CB GRADE OCTANES</u> ⁽¹³⁾	<u>ASTM TEST METHOD</u>	<u>OCTANE MINIMUM</u>	<u>OCTANE MINIMUM</u>
RON	D2699, D2885	Report	Report
MON	D2700, D2885	Report	Report
Index, (R+M)/2	Calculated	90.0	93.0

<u>PRODUCT PROPERTY</u>	<u>ASTM TEST METHOD</u>	<u>ORIGIN SPECIFICATIONS</u> ⁽²⁾		<u>Note</u>
		<u>MINIMUM</u>	<u>MAXIMUM</u>	
Gravity, °API at 60 °F	D287, D1298, D4052	Report		12
RVP (psi)	D5191	See above and Table 1 on page 6		7,8,10
Octane RON	D2699, D2885			
MON	D2700, D2885			
(R+M)/2		See table above		
Oxygen Content, wt. %	D5599		0.1	4,11,12
Benzene, volume %	D3606, D5769		3.8 (Footnote 9)	11
Color			Undyed	
Copper Corrosion 3 hours @ 122 °F	D130		1	2
Silver Corrosion 3 hours @ 122 °F	D7667, D7671		1	2
Doctor test OR	D4952	Negative		
Mercaptan sulfur, wt. %	D3227		0.002	5
Solvent Washed Gum, mg/100ml	D381		4	
Lead Content – g/gal at origin	D3237, D5059		0.01	11
Oxidation stability – minutes	D525	240		12
Phosphorous, g/gal	D3231		0.004	11
Sulfur, ppmw	D2622		80.	8,11
Haze Rating, @ 77 °F	D4176 Procedure 2		2	12
Corrosive Properties	NACE TM0172-2015	B+		12
Odor		Non-offensive		6
Distillation	D86	Refer to Table 1		11, 13
Vapor/Liquid Ratio of 20:1	D5188	Refer to Table 1		3, 13
Driveability Index	D4814	Refer to Table 1		

CB GRADES - FUNGIBLE SPECIFICATION FOR CONVENTIONAL GASOLINE BLENDSTOCK FOR OXYGENATE BLENDING WITH 10 % ETHANOL ⁽¹⁾ Cont'd

Gasoline designed for gasoline-ethanol blends in accordance with 40 CFR §~~80.27(d)(2)~~1090.215.

CBOB for oxygenate blending with denatured fuel ethanol (DFE), blended at 10 percent ethanol by volume.

~~Suitable for the special RVP provisions for ethanol blends that contain at least 9 % and no more than 10 % by volume ethanol.~~

~~The use of this gasoline to manufacture a gasoline-ethanol blend containing anything other than between 9 and 10 % by volume ethanol may cause a summertime RVP violation.~~

- (1) Base Gasoline - Not for sale to the ultimate consumer. **Non-additized detergent gasoline. This product may not be used in any reformulated gasoline covered area during the summer season control period.**
- (2) Refer to Table 2 for Additive Approvals and Prohibitions.
 - a. Corrosion inhibitors, gum inhibitors and metal deactivators.
 - b. No additives or corrosion inhibitors containing phosphorous may be used in this gasoline.
 - c. The use of Port Fuel Injector (PFI) and intake valve detergent additives is prohibited.
 - d. The use of MMT octane enhancing additive is prohibited.
- (3) Computer and Linear methods may be used to determine V/L value. The V/L referee method will be D5188.
- (4) **Before blending with denatured fuel ethanol,** This grade may not contain oxygenates, such as ethers and alcohols. The use of non-hydrocarbon blending components in this grade is prohibited. ~~Maximum MTBE, ETBE, and TAME allowed is 0.30 % by volume.~~ **After blending with denatured fuel ethanol, gasoline must contain 10 volume percent ethanol.**
- (5) Mercaptan sulfur waived if fuel is negative by Doctor Test.
- (6) Any gasoline exhibiting an offensive odor, exhibiting the odor of dienes, and/or any gasoline that poses a personal health hazard will not be accepted for shipment. Any gasoline containing more than 0.50 % by wt. of dicyclopentadiene will not be accepted for shipment. The referee method will be based on a gas chromatograph test.
- (7) Northumberland and Williamsport, PA delivery locations must meet the winter RVP limit requirements for New York; summer RVP limit for these locations is 10.0 psi maximum. For all other **BOB** areas, refer to Table 1 on Page 6.
- (8) Requires dual certification on the certificate of analysis, before and after blending with **denatured fuel ethanol.**
- (9) **Before blending with DFE the benzene maximum is 3.8 % by volume, "OR" after blending with DFE the benzene maximum is 3.4 % by volume.**
- (10) For products blended to meet EPA or state-imposed summer ~~VOC~~**RVP** requirements, tests must be performed in accordance with the procedures described in 40 CFR §~~80.1090.1355~~ and footnote (11) below.
- (11) Refer to test methods requirements published in 40 CFR §~~80.46 and §80.47~~**Part 1090 Subpart N.**
- (12) Specification must be met before blending of denatured fuel ethanol.
- (13) **Premium CB grades** specification limits **before blending with denatured fuel ethanol** will be as follows: R+M/2 minimum = 90.0; T50 minimum = 170 °F; TV/L minimum: Class 3 = 124 °F, Class 4 = 116 °F, Class 5 = 105 °F; these requirements are not applicable for the Hebert System.
- (14) Hebert System: 87CB90 / 93CB90 RVP limit after blending with ethanol = 8.8 psi max; report neat RVP's.
- (15) **SIP-Controlled.**
- (16) **This product does not meet the requirements for summer reformulated gasoline.**

RB GRADES - FUNGIBLE SPECIFICATION FOR REFORMULATED GASOLINE BLENDSTOCK FOR OXYGENATE BLENDING WITH 10 % ETHANOL ⁽¹⁾

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

<u>RB - GRADE RVPs</u>	<u>DESIGNATION</u>	<u>ASTM TEST METHOD</u>	<u>E0</u>	<u>E10</u>
			<u>NEAT RBOB RVP MAXIMUM (PSI)</u>	<u>10 % ETHANOL RFG RVP MAXIMUM (PSI)</u>
87RB74 / 93RB74	Summer RBOB	D5191	Report	7.4
87RB115 / 93RB115	Winter RBOB	D5191	10.5	11.5
87RB125 / 93RB125	Winter RBOB	D5191	11.5	12.5
87RB135 / 93RB135	Winter RBOB	D5191	12.9	13.5
87RB145 / 93RB145	Winter RBOB	D5191	13.5	14.5
87RB150 / 93RB150	Winter RBOB	D5191	14.5	15.0
87RB155 / 93RB155	Winter RBOB	D5191	15.0	15.5

<u>87RB GRADE OCTANES</u>	<u>ASTM TEST METHOD</u>	<u>OCTANE MINIMUM</u>	<u>OCTANE MINIMUM</u>
		RON	D2699, D2885
MON	D2700, D2885	-	82.0
Index, (R+M)/2	Calculated	-	87.0
<u>93RB GRADE OCTANES</u>			
RON	D2699, D2885	-	Report
MON	D2700, D2885	-	Report
Index, (R+M)/2	Calculated	-	93.0

<u>PRODUCT PROPERTY</u>	<u>ASTM TEST METHOD</u>	<u>ORIGIN SPECIFICATIONS ⁽²⁾</u>		<u>Note</u>
		<u>MINIMUM</u>	<u>MAXIMUM</u>	
Gravity, °API at 60 °F	D287, D1298, D4052	Report		12
RVP (psi)	D5191	See above and Table 1 on page 6		7,8,10
Octane RON	D2699, D2885			
MON	D2700, D2885			
Index, (R+M)/2		See table above		
Oxygen Content, wt. %	D5599		0.1	4,11,12
Benzene, volume %	D3606, D5769		(Footnote 9)	11
Color			Undyed	
Copper Corrosion 3 hours @ 122 °F	D130		1	2
Silver Corrosion 3 hours @ 122 °F	D7667, D7671		1	2
Doctor test OR	D4952	Negative		
Mercaptan sulfur, wt. %	D3227		0.002	5
Solvent Washed Gum, mg/100ml	D381		4	
Lead Content – g/gal at origin	D3237, D5059		0.01	11
Oxidation stability – minutes	D525	240		12
Phosphorous, g/gal	D3231		0.004	11
Sulfur, ppmw	D2622		80	8,11
Haze Rating, @ 77 °F	D4176 Procedure 2		2	12
Corrosive Properties	NACE TM0172-2015	B+		12
Odor		Non-offensive		6
Distillation	D86		Refer to Table 1	11
Vapor/Liquid Ratio of 20:1	D5188		Refer to Table 1	3
Driveability Index	D4814		Refer to Table 1	

RB GRADES - FUNGIBLE SPECIFICATION FOR REFORMULATED GASOLINE BLENDSTOCK FOR OXYGENATE BLENDING WITH 10 % ETHANOL ⁽¹⁾ Cont'd

Gasoline designed for gasoline-ethanol blends in accordance with 40 CFR §1090.215.

RBOB for oxygenate blending with denatured fuel ethanol (DFE), blended at 10 percent ethanol by volume.

- (1) Base Gasoline - Not for sale to the ultimate consumer. Non-additized detergent gasoline. **Summer RBOB: This product meets the requirements for summer reformulated or conventional gasoline.**
- (2) *Refer to Table 2 for Additive Approvals and Prohibitions.*
 - a. Corrosion inhibitors, gum inhibitors and metal deactivators.
 - b. No additives or corrosion inhibitors containing phosphorous may be used in this gasoline.
 - c. The use of Port Fuel Injector (PFI) and intake valve detergent additives is prohibited.
 - d. The use of MMT octane enhancing additive is prohibited.
- (3) Computer and Linear methods may be used to determine V/L value. The V/L referee method will be D5188.
- (4) **Before blending with denatured fuel ethanol**, this grade may not contain oxygenates, such as ethers and alcohols. The use of non-hydrocarbon blending components in this grade is prohibited. **After blending with denatured fuel ethanol**, gasoline must contain 10 volume percent ethanol.
- (5) Mercaptan sulfur waived if fuel is negative by Doctor Test.
- (6) Any gasoline exhibiting an offensive odor, exhibiting the odor of dienes, and/or any gasoline that poses a personal health hazard will not be accepted for shipment. Any gasoline containing more than 0.50 % by wt. of dicyclopentadiene will not be accepted for shipment. The referee method will be based on a gas chromatograph test.
- (7) [Reserved]
- (8) Requires dual certification on the certificate of analysis, before and after blending with denatured fuel ethanol.
- (9) Before blending with DFE the benzene maximum is 3.8 % by volume, "OR" after blending with DFE the benzene maximum is 3.4 % by volume.
- (10) For products blended to meet EPA or state-imposed summer RVP requirements, tests must be performed in accordance with the procedures described in 40 CFR §1090.1355 and footnote (11) below.
- (11) Refer to test method requirements published in 40 CFR Part 1090 Subpart N.
- (12) Specification must be met before blending of denatured fuel ethanol.

87CX & 93CX GRADES - SPECIFICATION FOR SEGREGATED EXPORT GASOLINE ⁽¹⁾

*87CX & 93CX SPECIFICATIONS ARE IDENTICAL TO CB GRADES - FUNGIBLE SPECIFICATION FOR CONVENTIONAL GASOLINE BLENDSTOCK **FOR OXYGENATE BLENDING WITH 10 % ETHANOL** (pg. 9), WITH THE EXCEPTION OF NOTE # 1, AS FOLLOWS:*

*Note (1) “This gasoline is for export ~~use only~~ **from the United States only**”.*

15HO2 - SPECIFICATION FOR FUNGIBLE **CERTIFIED NON-TRANSPORTATION 15 PPM DISTILLATE FUEL 15 PPM UNDYED #2 FUEL HEATING OIL** CONTAINING UP TO 5 % RENEWABLE HYDROTREATED DIESEL FUEL ⁽¹⁾

<u>PRODUCT PROPERTY</u>	<u>ASTM TEST METHOD</u>	<u>ORIGIN SPECIFICATIONS</u>		<u>NOTE</u>
		<u>MINIMUM</u>	<u>MAXIMUM</u>	
Renewable Fuel, vol %		0	5.0	9,10
Gravity, °API @ 60 °F	D287, D1298, D4052	30		
Flash Point, °F	D93, D56	130		6
	At Delivery	125		
Distillation, °F	50 % recovered	Report		
	90 % recovered	540	640	
	End Point		700	
OR: Simulated Distillation, °F	D2887			3
	50 % recovered	Report		
	90 % recovered	572	673	
	End Point		790	
Color, ASTM	D1500, D6045		2.5	
Additives		Report		5
Viscosity, cSt @ 40 °C (104 °F)	D445, D7042	1.9	4.1	
Pour Point, °F	D97, D5985, D5949, D5950		See Note	4
Cloud Point, °F	D2500, D5771, D5772, D5773		See Note	4
Corrosion, 3 hrs @ 122 °F	D130		1	
Sulfur, ppm wt.	D2622, D5453, D7039			7
	Origin		11	12
	Connecting carrier		11	12
Cetane Number or Index	D613, D6890, D4737A, D7170	40.		8
Aromatics, volume %	D1319, D5186		35	44 7
	OR			
Aromatics by Cetane Index	D976, D4737	40		44 7
Ash, wt. %	D482		0.01	
Carbon Residue: Ramsbottom, wt. %	D524		0.35	
	On 10% Bottom			
BS&W Water and Sediment , vol. %	D2709		< 0.05	
Thermal stability, 90 minutes				
	150 °C Pad Rating	DuPont	7	
	OR			
Thermal stability, % Reflectance	D6468			
	Y/Green or	73		
	W Unit	65		
	OR			
Oxidation Stability, mg/100 ml	D2274		2.5	
Haze Rating, @ 77 °F	D4176 Procedure 2		2	
Dye Content, ppm (lb per 1000 Bbls PTB)	D6258, D6756, or Petrospec DT100		Report	
Color, visual		Undyed		2
Corrosive Properties	NACE TM0172-2015	B+		

15HO2 - SPECIFICATION FOR FUNGIBLE CERTIFIED NON-TRANSPORTATION 15 PPM DISTILLATE FUEL 15 PPM UNDYED #2 FUEL HEATING OIL CONTAINING UP TO 5 % RENEWABLE HYDROTREATED DIESEL FUEL ⁽¹⁾ Cont'd

- (1) ~~Not for On-Road use and should be designated as such in the EPA's Designate and Track reporting system.~~ **15 ppm sulfur (maximum) certified NTDF - This fuel is designated for non-transportation use; 15 ppm Heating Oil.**
- (2) Product must exhibit no visible evidence of dye.
- (3) Referee method is ASTM D86
- (4) Cloud Point and Pour Point:

	<u>Sept – Mar</u>	<u>Apr – Aug</u>
Cloud	+15 °F / -9 °C	+20 °F / -7 °C
Pour	0 °F / -18 °C	+10 °F / - 12 °C
- (5) Report types and concentrations. *Refer to Table 2 for Additive Approvals and Prohibitions.*
- (6) Referee method is ASTM D93, test method ASTM D56 may be used as an alternative.
- (7) ~~Origin laboratory certifying sulfur content can qualify the test method used per EPA performance based testing criteria (see 40 CFR §80.584). The referee test method will be ASTM D5453.~~ **Refer to test method requirements published in 40 CFR Part 1090 Subpart N.**
- (8) Where Cetane number by test method D613 is not available, ~~D4737A~~ **cetane index test methods** can be used as an approximation.
- (9) May contain up to 5.0 % Renewable Diesel as defined in Table 2.
- (10) ~~Shipments of 15HO2 that “do not” contain Renewable Diesel may only be nominated as a segregated batch for deliveries into the Sunoco Logistics Eagle Point, NJ facility.~~
- (11) ~~Test method must be approved under 40 CFR §80.2 and §80.47.~~
~~Test method must be approved under 40 CFR §80.584.~~

15MV2 - SPECIFICATION FOR FUNGIBLE 15 PPM #2 MOTOR VEHICLE **ULTRA LOW SULFUR** DIESEL FUEL CONTAINING UP TO 5 % RENEWABLE HYDROTREATED DIESEL FUEL ⁽¹⁾

<u>PRODUCT PROPERTY</u>	<u>ASTM TEST METHOD</u>	<u>ORIGIN SPECIFICATIONS</u>		<u>NOTE</u>
		<u>MINIMUM</u>	<u>MAXIMUM</u>	
Renewable Fuel, vol. %		0	5.0	9,10
Gravity, °API @ 60 °F	D287, D1298, D4052	30		
Flash Point, °F	D93	130		6
	At Delivery	125		
Distillation, °F	50 % recovered	Report		
	90 % recovered	540	640	
	End Point		700	
OR: Simulated Distillation, °F	D2887			3
	50 % recovered	Report		
	90 % recovered	572	673	
	End Point		790	
Color, ASTM	D1500, D6045		2.5	
Additives		Report		5
Viscosity, cSt @ 40 °C (104 °F)	D445, D7042	1.9	4.1	
Pour Point, °F	D97, D5985, D5949, D5950		See Note	4
Cloud Point, °F	D2500, D5771, D5772, D5773		See Note	4
Corrosion, 3 hrs. @ 122 °F	D130		1	
Sulfur, ppm wt.	Origin		11	7
		Connecting carrier	11	12
Cetane Number or Index	D613, D6890, D4737A, D7170	40.		8
Aromatics, volume %	D1319, D5186		35	117
	OR			
Aromatics by Cetane Index	D976, D4737	40		7
Ash, wt. %	D482		0.01	11
Carbon Residue: Ramsbottom wt. %	On 10 % Bottom		0.35	
BS&W Water and Sediment , vol. %	D2709		< 0.05	
Thermal stability, 90 minutes	150 °C Pad Rating	DuPont	7	
	OR			
Thermal stability, % Reflectance	Y/Green or	W Unit	73	
			65	
	OR			
Oxidation Stability, mg/100 ml	D2274		2.5	
Haze Rating, @ 77 °F	D4176 Procedure 2		2	
Dye Content, ppm (lb per 1000 Bbls PTB)	D6258, D6756, or Petrospec DT100		Report	
Color, visual		Undyed		2
Corrosive Properties	NACE TM0172-2015	B+		

15MV2 - SPECIFICATION FOR FUNGIBLE 15 PPM #2 MOTOR VEHICLE **ULTRA LOW SULFUR DIESEL FUEL CONTAINING UP TO 5 % RENEWABLE HYDROTREATED DIESEL FUEL ⁽¹⁾ Cont'd**

- (1) ~~For On-Road use and should be designated as such in the EPA's Designate and Track reporting system ULSD, #2D 15 ppm maximum sulfur product is suitable for use as #2 Heating Oil.~~
- (2) Product must exhibit no visible evidence of dye.
- (3) Referee method is ASTM D86
- (4) Cloud Point and Pour Point:
- | | | |
|-------------------------------|-------------------|-------------------|
| | <u>Sept – Mar</u> | <u>Apr – Aug</u> |
| Cloud: | +15°F / -9°C | +20°F / -7°C |
| Pour : | 0°F / -18°C | +10°F / - 12°C |
|
 | | |
| <u>Texas – Hebert System:</u> | <u>Oct – Feb</u> | <u>Mar – Sept</u> |
| Cloud : | +15°F / -9°C | +20°F / -7°C |
| Pour : | 0°F / -18°C | +10°F / - 12°C |
- (5) Report types and concentrations. *Refer to Table 2 for Additive Approvals and Prohibitions.*
- (6) Referee method is ASTM D93, test method ASTM D56 may be used as an alternative.
- (7) ~~Origin laboratory certifying sulfur content can qualify the test method used per EPA performance based testing criteria (see 40 CFR §80.584). The referee test method will be ASTM D5453. Refer to test method requirements published in 40 CFR Part 1090 Subpart N.~~
- (8) Where Cetane number by test method D613 is not available, ~~D4737A~~ **cetane index test methods** can be used as an approximation.
- (9) May contain up to 5.0 % Renewable Diesel as defined in Table 2.
- (10) ~~Shipments of 15MV2 that “do not” contain Renewable Diesel may only be nominated as a segregated batch for deliveries into the Sunoco Partners Marketing & Terminals Eagle Point, NJ facility.~~
- ~~(11) Test method must be approved under 40 CFR §80.2 and §80.47.~~
- ~~(12) Test method must be approved under 40 CFR §80.584.~~
- (13) Hebert System - This product does not comply with Title 30 Texas Administrative Code, §114.312 or §114.318 requirements for low emission diesel. TxLED-B: “This product may not be used as fuel for diesel engines in any Texas county requiring the use of low emission diesel fuel without further processing.”

15MV1 - SPECIFICATION FOR FUNGIBLE 15 PPM #1 MOTOR VEHICLE-UNDYED ULTRA LOW SULFUR DIESEL FUEL ⁽¹⁾

<u>PRODUCT PROPERTY</u>	<u>ASTM TEST METHOD</u>	<u>ORIGIN SPECIFICATIONS</u>		<u>NOTE</u>
		<u>MINIMUM</u>	<u>MAXIMUM</u>	
Appearance: Clear & Bright @ 77 °F	D4176, Procedure 1	Pass		3
Gravity, °API	D287, D1298 or D4052	37	51	
Color, Saybolt At Delivery	D156, D6045	18 +16		
Copper Corrosion, 2 hrs. @ 212 °F	D130		1	
Distillation, °F	D86			
10 % recovered			400	
50 % recovered		Report		
90 % recovered			550	
95 % recovered		Report		
End Point			572	
Residue, volume %			1.5	
Loss, volume %			1.5	
Viscosity, cSt 104 °F (40 °C)	D445, D7042	1.3	1.9	
Flash Point, °F	D56, D93 , D3828	123		8
Freeze point, °F	D2386, D5972, D7153, D7154		-22	
Corrosive Properties	NACE TM0172-2015	B+		
Water & Sediment, percent volume	D2709		<0.05	
Carbon residue, wt % on 10% bottom	D524		0.15	
Ash, wt. %	D482		0.01	
Sulfur, ppm wt., at Origin	D2622, D5453, D7039		11	6
Connecting Carrier			11	6
Doctor Test, OR	D4952		Negative	
Mercaptan Sulfur, wt. %	D3227		0.003	2
Cetane Number or Index	D613, D6890, D4737A	40.		4
Aromatics, percent volume	D1319, D5186		35	7 6
OR				
Aromatics by Cetane Index	D976-80, D4737	40		6
Conductivity, pS/m	D2624	Report		9
Thermal Stability, 90 minutes at 150 °C Pad Rating	DuPont		7	5
Burning Quality	D187	Report		

- (1) ~~For On-Road use and should be designated as such in the EPA's Designate and Track reporting system~~ **ULSD, #1D 15 ppm maximum sulfur product is suitable for use as #1 Kerosene.**
- (2) The Mercaptan sulfur determination may be waived if the fuel is considered sweet by the doctor test described in ASTM D4952.
- (3) The finished product shall be visibly free of undissolved water, sediment, and suspended matter, and not exhibit any various shades of green, blue or red. Compliance will be determined with the product temperature adjusted to 77°F.
- (4) Where Cetane number by test method D613 is not available, ~~D4737A~~ **cetane index test methods** can be used as an approximation.
- (5) To rate the filter pad use Octel F-21 procedure.
- (6) ~~Origin laboratory certifying sulfur content can qualify the test method used per EPA performance based testing criteria(see 40 CFR §80.584).~~ **Refer to test method requirements published in 40 CFR Part 1090 Subpart N.**
- (7) ~~Test method must be approved under 40 CFR §80.47.~~
- (8) ~~Kerosene fuel results obtained by Test Method D93 may be up to 1 °C higher than those obtained by Test Method D56. Results obtained by Test Method D3828 may be up to 2 °C lower than those obtained by Test Method D56, which is the preferred method. In case of dispute, Test Method D56 shall apply.~~
- (9) *Refer to Table 2 for Additive Approvals and Prohibitions.*

15K1 - SPECIFICATION FOR FUNGIBLE CERTIFIED NON-TRANSPORTATION 15 PPM DISTILLATE FUEL #1 KEROSENE ⁽¹⁾

<u>PRODUCT PROPERTY</u>	<u>ASTM TEST METHOD</u>	<u>ORIGIN SPECIFICATIONS</u>		<u>NOTE</u>
		<u>MINIMUM</u>	<u>MAXIMUM</u>	
Appearance: Clear & Bright @ 77 °F	D4176, Procedure 1	Pass		3
Gravity, °API	D287, D1298 or D4052	37	51	
Color, Saybolt At Delivery	D156, D6045	18		
Copper Corrosion, 2 hrs. @ 212 °F	D130		1	
Distillation, °F	D86			
10 % recovered			400	
50 % recovered		Report		
90 % recovered			550	
95 % recovered		Report		
End Point			572	
Residue, volume %			1.5	
Loss, volume %			1.5	
Viscosity, cSt 104 °F (40 °C)	D445, D7042	1.3	1.9	
Flash Point, °F	D56, D3828	123		
Freeze point, °F	D2386, D5972, D7153, D7154		-22	
Corrosive Properties	NACE TM0172-2015	B+		
Water & Sediment, percent volume	D2709		<0.05	
Carbon residue, wt % on 10% bottom	D524		0.15	
Ash, wt. %	D482		0.01	
Sulfur, ppm wt., at Origin	D2622, D5453, D7039		11	6
Connecting Carrier			11	
Doctor Test, OR	D4952		Negative	
Mercaptan Sulfur, wt. %	D3227		0.003	2
Cetane Number or Index	D613, D6890, D4737A	40.		4
Aromatics, percent volume	D1319, D5186		35	6
OR				
Cetane Index	D976, D4737	40		6
Conductivity, pS/m	D2624	Report		7
Thermal Stability,				
90 minutes at 150 °C Pad Rating	DuPont		7	5
Burning Quality	D187	Report		

- (1) **15 ppm sulfur (maximum) certified NTDF - This fuel is designated for non-transportation use; 15 ppm Kerosene.**
- (2) The Mercaptan sulfur determination may be waived if the fuel is considered sweet by the doctor test described in ASTM D4952.
- (3) The finished product shall be visibly free of undissolved water, sediment, and suspended matter, and not exhibit any various shades of green, blue or red. Compliance will be determined with the product temperature adjusted to 77 °F.
- (4) Where Cetane number by test method D613 is not available, cetane index test methods can be used as an approximation.
- (5) To rate the filter pad use Octel F-21 procedure.
- (6) Refer to test method requirements published in 40 CFR Part 1090 Subpart N.
- (7) Refer to Table 2 for Additive Approvals and Prohibitions.

JET A - SPECIFICATION FOR FUNGIBLE HIGH SULFUR AVIATION KEROSENE

<u>PRODUCT PROPERTY</u>	<u>ASTM TEST METHOD</u>	<u>ORIGIN SPECIFICATIONS</u>		<u>NOTE</u>
		<u>MINIMUM</u>	<u>MAXIMUM</u>	
Acidity, total mg KOH/g	D3242		0.10	
Additives		Report		3
Appearance	White Bucket	Clear & Bright		2
1. Aromatics, vol %, OR	D1319		25	
2. Aromatics, vol %	D6379		26.5	
Color, Saybolt	D156, D6045	18		
Conductivity, pS/m	D2624	Report		3
Copper Corrosion, 2 hrs. @ 212°F	D130		1	
Physical Distillation, °F	D86			
10 % recovered			400	
50 % recovered		Report		
90 % recovered		Report		
End Point			572	
Residue, vol. %			1.5	
Loss, vol. %			1.5	
Or: Simulated Distillation, °F	D 2887			5
10 % recovered			365	
50 % recovered		Report		
90 % recovered		Report		
End Point			644	
Gravity, °API	D187, D1298 or D4052	37	51	
Flash Point, °F	D56, D93, D3828	108		7,8
MSEP (at Origin)	D3948	85		4
Net Heat of Combustion – BTU/lb.	D3338, D4529, D4809	18,400		
Particulate Contaminant, mg/l	D5452	Report		
Filtration time		Report		
Doctor Test, OR	D4952		Negative	
Mercaptan sulfur, wt. %	D3227		0.003	1
Sulfur, ppm wt.	D1266, D2622, D4294, D5453		3000	
Existent Gum, mg/100ml	D381, IP540		7	
Freeze point, °F (°C)	D2386, D5972, D7153, D7154		-40 (-40) / Jet A -52.6 (-47) / Jet A-1	6
Thermal Stability	D3241			
(2.5 hrs. at control temperature 275°C)				
Filter Pressure Drop in mm/Hg			25	
Tube rating: One of the following requirements shall be met:				
(1) Annex A1 VTR, VTR Color Code			Less than 3	
			(No Peacock or Abnormal Color Deposits)	
(2) Annex A2 ITR or Annex A3 ETR, nm average over area of 2.5 mm ² (refer to D1655 for referee method)			85	
Combustion Properties, one of the following properties must be met:				
1) Smoke Point, mm OR	D1322	25.0		
2) Smoke point, mm	D1322	18.0		
and Naphthalenes, vol. %	D1840		3.0	
Viscosity, cSt -4 °F (-20 °C)	D445, D7945		8.0	

JET A- SPECIFICATION FOR FUNGIBLE HIGH SULFUR AVIATION KEROSENE

Cont'd

This fuel is for aviation use only.

- (1) The Mercaptan sulfur determination may be waived if the fuel is considered sweet by the doctor test described in ASTM D4952.
- (2) The finished product shall be visibly free of undissolved water, sediment, and suspended matter, and not exhibit any various shades of green, blue or red. Compliance will be determined with the product temperature adjusted to 77 °F.
- (3) Only those additives specified and within the concentration noted in the latest ASTM D1655 will be considered for acceptance. The use of any other additives is prohibited. Use of all additives must be approved prior to shipment and reported on the C of A. If any Metal Deactivator Additive (MDA) has been added, Sunoco Pipeline must be notified 48 hours in advance and reserves the right to refuse the shipment. If the batch has been treated with MDA, the following information is to be provided: (1) the purpose of adding MDA, (2) a breakdown of total metals present in the jet fuel before treating with MDA, (3) JFTOT test results both prior to and after adding MDA, (4) MDA treat rate, and (5) MDA product used. *Refer to Table 2.*
- (4) Per ASTM D1655 Water Separation Characteristics at Points Downstream - Results of downstream Test Method D3948 testing are not to be used as the sole reason for rejection of fuel, but they can indicate a mandatory need for further diligent investigation or remedial action, or both, such as passing the fuel through a clay adsorption unit to remove surfactants. However, the fuel may be rejected in the absence of satisfactory Test Method D3948 testing results if no documented evidence is presented that a detailed investigation was carried out demonstrating that the fuel was free of excess water and dirt and could be delivered into aircraft in a clean condition.
- (5) Referee method is ASTM D86
- (6) For product to comply with JET A-1 parameters, the -52.6 °F (-47 °C) maximum specification must be met.
- (7) Aviation turbine fuel results obtained by Test Method D93 may be up to 1 °C higher than those obtained by Test Method D56. Results obtained by Test Method D3828 may be up to 2 °C lower than those obtained by Test Method D56, which is the preferred method. In case of dispute, Test Method D56 shall apply.
- (8) Minimum origin Flash Point of 105 °F is acceptable for Jet fuel batches being re-certified at Shipper delivery locations.

**15EXP2 - SPECIFICATION FOR SEGREGATED 15 PPM #2 MOTOR VEHICLE
~~UNDYED~~ **ULTRA LOW SULFUR** DIESEL FUEL FOR EXPORT ⁽¹⁾**

15EXP2 SPECIFICATIONS ARE IDENTICAL TO 15MV2 - SPECIFICATION FOR FUNGIBLE 15 PPM #2 MOTOR VEHICLE **ULTRA LOW SULFUR DIESEL FUEL (pg. 16), WITH THE EXCEPTION OF NOTE # 1, AS FOLLOWS:**

Note (1) “This diesel fuel is for export ~~use only~~ **from the United States only”.**

JET A-FTZ - SPECIFICATION FOR SEGREGATED HIGH SULFUR AVIATION KEROSENE

***JET A-FTZ SPECIFICATIONS ARE IDENTICAL TO JET A FUNGIBLE SPECIFICATION (pg. 20),
WITH THE EXCEPTION OF NOTE # 1, AS FOLLOWS:***

Note (1) “This Jet fuel is for export from the United States only”.

MIXED BUTANE - SPECIFICATION FOR FUNGIBLE MIXED BUTANE

<u>PRODUCT PROPERTY</u>	<u>ASTM TEST METHOD</u>	<u>ORIGIN SPECIFICATIONS</u>		<u>NOTE</u>
		<u>MINIMUM</u>	<u>MAXIMUM</u>	
Vapor Pressure, psia @ 100 °F	D2598, D6897		Report	
Relative Density @ 60/60 °F	D1657, D2598	Report		
Corrosion, Copper Strip	D1838		1	
Sulfur, ppmw	D6667		30	
Composition, Liq. Volume %:	D2163			
Propane			4.00	
Iso-butane			40.00	
N-butane		55.00		
Pentanes			20.0	
Hexane and heavier			1	2
Olefins			5	
Hydrogen Sulfide	D2420		Pass	
Fluorides, ppmw	D7359		1	
Free water content			None	
Additives	See note 1			

Note: The specification defines only a basic purity for this product. This product is to be free of any contaminants that might render the product unacceptable. Specific contaminants which may render product unacceptable, include but are not limited to dirt, rust, scale and all other types of solids contaminants, caustics, chlorides, oxygenates, heavy metals, glycol, inorganic gases and any compound added to the product to enhance the ability to meet these specifications.

- (1) Additive Restrictions – *Refer to Table 2.*
- (2) Inkster deliveries: 2 % maximum for hexane and heavier.