Refined Products Pipeline Product Codes and Specifications

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(Eastern Area & Beaumont/Hebert Pipeline Systems)

~~**July 17, 2024**~~ **October 1, 2024**

ENERGY TRANSFER

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

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87CB78	Summer CBOB	7.8	10
87CB80	Summer CBOB	8.0	10
87CB90	Summer CBOB	9.0	10
87CB100	Summer CBOB	10.0	10
87CB125	Winter CBOB	12.5	10
87CB135	Winter CBOB	13.5	10
87CB145	Winter CBOB	14.5	10
87CB150	Winter CBOB	15.0	10
87CB155	Winter CBOB	15.5	10

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

93CB78	Summer CBOB	7.8	10
93CB80	Summer CBOB	8.0	10
93CB90	Summer CBOB	9.0	10
93CB100	Summer CBOB	10.0	10
93CB125	Winter CBOB	12.5	10
93CB135	Winter CBOB	13.5	10
93CB145	Winter CBOB	14.5	10
93CB150	Winter CBOB	15.0	10
93CB155	Winter CBOB	15.5	10

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	12
87RB115	Winter RBOB	11.5	12
87RB125	Winter RBOB	12.5	12
87RB135	Winter RBOB	13.5	12
87RB145	Winter RBOB	14.5	12
87RB150	Winter RBOB	15.0	12
87RB155	Winter RBOB	15.5	12

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

93RB74	Summer RBOB	7.4	12
93RB115	Winter RBOB	11.5	12
93RB125	Winter RBOB	12.5	12
93RB135	Winter RBOB	13.5	12
93RB145	Winter RBOB	14.5	12
93RB150	Winter RBOB	15.0	12
93RB155	Winter RBOB	15.5	12

SEGREGATED GASOLINE GRADES

CBOB - 94 Octane after DFE blending at 10 percent ethanol by volume

Product Code [1]	Product Designation	Max RVP (psi)	Page
94CB78	Summer CBOB	7.8	14
94CB80	Summer CBOB	8.0	14
94CB90	Summer CBOB	9.0	14
94CB100	Summer CBOB	10.0	14
94CB125	Winter CBOB	12.5	14
94CB135	Winter CBOB	13.5	14
94CB145	Winter CBOB	14.5	14
94CB150	Winter CBOB	15.0	14
94CB155	Winter CBOB	15.5	14
RBOB - 94 Octane after DFE blending at 10 percent ethanol by volume			
94RB74	Summer RBOB	7.4	15
94RB115	Winter RBOB	11.5	15
94RB125	Winter RBOB	12.5	15
94RB135	Winter RBOB	13.5	15
94RB145	Winter RBOB	14.5	15
94RB150	Winter RBOB	15.0	15
94RB155	Winter RBOB	15.5	15
CBOB - This gasoline is for export from the United States only			
87CX90 / 93CX90	Export Gasoline	9.0	16
87CX100 / 93CX100	Export Gasoline	10.0	16
87CX125 / 93CX125	Export Gasoline	12.5	16
87CX145 / 93CX145	Export Gasoline	14.5	16
87CX155 / 93CX155	Export Gasoline	15.5	16

FUNGIBLE DISTILLATES GRADES

Product Code	Product Designation	Cetane Minimum	Origin Sulfur (ppm) Maximum	Page
15HO2	Certified NTDF, 15 ppm sulfur Heating Oil #2	40	11	17
15NTDF2	Certified NTDF, 15 ppm sulfur NTDF-other #2	40	11	19
15MV2	ULSD, Ultra Low Sulfur Diesel Fuel #2	40	11	21
15MV1	ULSD, Ultra Low Sulfur Diesel Fuel #1	40	11	23
15K1	Certified NTDF, 15 ppm sulfur Kerosene #1	40	11	24
JETA	High Sulfur Aviation Kerosene	N/A	3000	25

SEGREGATED DISTILLATES-GRADES

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

FUNGIBLE LIQUEFIED PETROLEUM GAS (LPG) GRADES

Product Code	Product Name	Page
MIXBUT	Mixed Butane	29

(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.

Tariff Product Requirements

All products must meet tariff and product specification requirements. Carriers' set tariff requirements to meet the physical constraints of the system.

Fungible Batches

A "fungible batch" is defined as a batch of petroleum product meeting carriers' established specifications, which may be commingled with other quantities of petroleum product meeting the same specifications. Fungible product specifications are established based on industry standards, federal and state requirements, and carriers' ability to handle various products. Fungible products provide shippers with a significant degree of flexibility for scheduling lifting and delivery times.

Segregated Batches

A "segregated batch" is defined as a batch of petroleum product meeting carriers' established specifications, which may not be commingled with other quantities. A batch may be segregated because it has properties that differ from the fungible specifications.

SHIPMENT ACCEPTANCE TERMS

The following are general terms and conditions regarding product quality for all applicable products shipped on the Carriers' pipeline system, both fungible and segregated:

The requirements set forth in this Pipeline Product Code and Specifications publication apply to all deliveries of product for shipments on the pipelines listed on the cover page hereof. For purposes hereof, "Carrier" means the operator of each such pipeline.

1.0 A pre-shipment Certificate of Analysis (C of A), or a full C of A, must be received at Carrier origin points, at least two hours prior to lifting. A full C of A, reflecting all tests listed in the Carrier 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 Carrier 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	15MV1 / 15MV2	Jet Fuel (Connecting Carriers)	Liquefied Petroleum Gases
API Gravity @ 60F	API Gravity @ 60F	API Gravity @ 60F	Specific Gravity
RVP	Flash Point	Flash Point	Volatility
Sulfur, wt. %	Sulfur Content	Sulfur Content	Propane Content
Benzene, vol %	Distillation	Aqua-Glo	Butane Content
Distillation	Cetane Index (Diesel)	Filter Membrane	Oil Stain Residue
Octane (R + M) /2	Saybolt Color (Kerosene)	Saybolt Color	
DRA, ppm total polymer	DRA, ppm total polymer	Visual Appearance in White Bucket	
Color and Appearance		Water Separation (MSEP)	

2.0 Acceptance of the C of A by Carrier does not relieve the Shipper of liability or responsibility for specification compliance and composition of the product.

3.0 Carrier reserves the right to reject or terminate shipments when samples are found to deviate from the applicable Certificate of Analysis.

4.0 Carrier may sample and test products prior to acceptance, and during shipments, into the Carrier system, and in the event of a variance against the C of A, Carrier 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 Energy Transfer 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 Carrier.

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 @ 77 °F.

8.2 The product can contain no constituents that in Carriers 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 and #1 Kerosene. The maximum temperature of incoming product shall not exceed 110°F for Diesel Fuel Oil and #2 Heating Oil.

10.0 The only non-hydrocarbon components permitted to be blended in gasoline, moved by Carrier, 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 Carrier 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 fuel manufacturing facility (e.g., import, previously certified diesel), whether blended with 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 PRODUCT CODE	PRODUCT NAME	CRUDE OIL CODE	PRODUCT NAME	OTHER PRODUCT CODE	PRODUCT NAME
BBUTY	BB Stock	LEF	Lube Ext'd Feedstocks	ALKYLT	Alkylate
ISO	IsoButane	SWEET	Sweet	BTF	Bonded Turbine Fuel
LPGMIX	LPG Mix	SYN	Synthetic	COND	Condensate
PENT	Pentane	SOUR	Sour	DISTCOM	Distillate Component
PROP	Propane	HEAVY	Heavy Sour	GASCOMP	Gasoline Component
ISOP	IsoPentane			LCO	Light Cycle Oil
PRPL	Propylene			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

ENERGY TRANSFER

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

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

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-3	AA-3	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	7.4 / 10.0	7.4 / 10.0	7.4 / 10.0	7.4 / 10.0	7.4 / 10.0	7.4 / 10.0	7.4 / 10.0	14.5	14.5	15.5	15.5
Ohio	Class	E-5	D-4	D-4	D-4	A-3	A-3	A-3	A-3	A-3	A-3	A-3	C-3	D-4	E-5	E-5
	psi	15.5	14.5	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	C-3	C-3	C-3	AA-2	AA-2	AA-2	AA-2	AA-2	AA-2	AA-2	AA-2	C-3	D-4	D-4
	psi	14.5	12.5	12.5	12.5	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	7.4 / 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)~~ 145.0 (62.8)	235 (113)	365 (185)	430 (221)	2	1220 (580)
E	15.0 / 15.5	122 (50)	~~150 (66)~~ 145.0 (62.8)	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 fuel manufacturing facility or import facility as defined by 40 CFR §1090.80.

(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

Carrier Pipeline will permit only the types and concentrations of additives detailed below; all other types and concentrations of 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-diemethylpentyl)-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 Carrier Pipelines, except Aviation Kerosene, are required to meet a minimum level of corrosion protection a minimum rating of B+ (less than 5% of test surface rusted) as determined by NACE Standard TM0172-2015 Determining Corrosive Properties of Cargoes in Petroleum Product Pipelines.

Gasoline shipped on Carrier 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-30N		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 Carrier: 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 Carrier Pipeline is Innospec Statis 450 and AvGuard. SDA is prohibited from all Jet Fuel / Aviation Kerosene grades. The origin maximum concentration of Statis 450 and AvGuard 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 Carrier 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. Carrier 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 Carrier 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. Carrier 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, 15NTDF2 and 15MV2 allow up to five (5) % by volume Renewable Diesel.

Carrier Pipeline assumes no responsibility as a blender and all RINs (Renewable Identification Numbers) shall be separated before entering Carrier 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 Carrier 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. Carrier Pipeline reserves the right to deny shipment of product containing cetane improver additives.

Hydrogen Sulfide

Carrier Pipeline does not accept products containing H_2S in the liquid or vapor phase. Any products intended to be treated with H_2S scavengers must be approved by Carrier Pipeline prior to use and the product certification (COA) completed on the treated product indicating the H_2S has been successfully mitigated. The COA must be submitted and reviewed by Carrier Pipeline prior to the product being lifted into the system.

Prohibited Additives

Carrier 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.

CB - GRADE RVPs	DESIGNATION	ASTM TEST METHOD	E0 NEAT CBOB RVP MAXIMUM (PSI)	E10 10 % ETHANOL CG RVP MAXIMUM (PSI)
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

87CB GRADE OCTANES	ASTM TEST METHOD	OCTANE MINIMUM	OCTANE MINIMUM
RON	D2699, D2885	–	Report
MON	D2700, D2885	–	82.0
Index, (R+M)/2	Calculated	–	87.0
93CB GRADE OCTANES [13]			
RON	D2699, D2885	Report	Report
MON	D2700, D2885	Report	Report
Index, (R+M)/2	Calculated	90.0	93.0

PRODUCT PROPERTY	ASTM TEST METHOD	ORIGIN SPECIFICATIONS [2] MINIMUM	MAXIMUM	Note
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		(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 §1090.215.

CBOB for oxygenate blending with denatured fuel ethanol (DFE), transferred to an EPA registered oxygenate blender, blended at 10 percent ethanol by volume.

Must not contain any heavy metals, including but not limited to lead or manganese.

(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. **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 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 methods requirements published in 40 CFR 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.

RB - GRADE RVPs	DESIGNATION	ASTM TEST METHOD	E0 NEAT RBOB RVP MAXIMUM (PSI)	E10 10 % ETHANOL RFG RVP MAXIMUM (PSI)
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

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

PRODUCT PROPERTY	ASTM TEST METHOD	ORIGIN SPECIFICATIONS [2] MINIMUM	MAXIMUM	Note
Gravity, °API at 60 °F	D287, D1298, D4052	Report		12
RVP (psi)	D5191	*See above and Table 1 on page 6*		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), transferred to an EPA registered oxygenate blender, blended at 10 percent ethanol by volume.

Must not contain any heavy metals, including but not limited to lead or manganese.

(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.

94CB GRADES - SPECIFICATION FOR SEGREGATED CONVENTIONAL GASOLINE BLENDSTOCK FOR OXYGENATE BLENDING WITH 10 % ETHANOL (1)

94CB 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) Octane rating after blending with denatured fuel ethanol shall be 94.0 (R+M/2) minimum.**

94RB GRADES - SPECIFICATION FOR SEGREGATED REFORMULATED GASOLINE BLENDSTOCK FOR OXYGENATE BLENDING WITH 10 % ETHANOL (1)

94RB SPECIFICATIONS ARE IDENTICAL TO: RB GRADES - FUNGIBLE SPECIFICATION FOR REFORMULATED GASOLINE BLENDSTOCK FOR OXYGENATE BLENDING WITH 10 % ETHANOL (pg. 9), WITH THE EXCEPTION OF NOTE # 1, AS FOLLOWS:

***Note* (1) Octane rating after blending with denatured fuel ethanol shall be 94.0 (R+M/2) minimum.**

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 from the United States only".**

15HO2 - SPECIFICATION FOR FUNGIBLE CERTIFIED NON-TRANSPORTATION 15 PPM DISTILLATE FUEL HEATING OIL CONTAINING UP TO 5 % RENEWABLE HYDROTREATED DIESEL FUEL [1]

PRODUCT PROPERTY	ASTM TEST METHOD	ORIGIN SPECIFICATIONS MINIMUM	MAXIMUM	NOTE
Renewable Fuel, vol %		0	5.0	9
Gravity, °API @ 60 °F	D287, D1298, D4052	30		
Flash Point, °F	D93	130		6
At Delivery		125		
Distillation, °F 50 % recovered	D86	Report		3
90 % recovered		540	640	
End Point			700	
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	
Connecting carrier			11	
Cetane Number or Index	D613, D6890, D4737A, D7170	40.		8
Aromatics, volume %	D1319, D5186		35	7
OR				
Cetane Index	D976, D4737	40		7
Ash, wt. %	D482		0.01	
Carbon Residue: Ramsbottom, wt. %	D524		0.35	
On 10% Bottom				
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 HEATING OIL CONTAINING UP TO 5 % RENEWABLE HYDROTREATED DIESEL FUEL (1) Cont'd

(1) 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. Test Method D2887 may be used as an alternative if correlated to D86 and reported as "Predicted D86".

(4) Cloud Point and Pour Point:

	Sept – Mar	Apr – Aug
Cloud:	+15 °F / -9 °C	+20 °F / -7 °C
Pour:	0 °F / -18 °C	+10 °F / -12 °C

Texas –System:

	Oct – Feb	Mar – Sept
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) Refer to test method requirements published in 40 CFR Part 1090 Subpart N.

(8) Where Cetane number by test method D613 is not available, 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) Hebert & J.C. Nolan Systems - 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."

15NTDF2 - SPECIFICATION FOR FUNGIBLE CERTIFIED NON-TRANSPORTATION 15 PPM DISTILLATE FUEL OTHER NON-TRANSPORTATION FUEL CONTAINING UP TO 5 % RENEWABLE HYDROTREATED DIESEL FUEL (1)

PRODUCT PROPERTY	ASTM TEST METHOD	ORIGIN SPECIFICATIONS MINIMUM	MAXIMUM	NOTE
Renewable Fuel, vol %		0	5.0	9
Gravity, °API @ 60 °F	D287, D1298, D4052	30		
Flash Point, °F	D93	130		6
At Delivery		125		
Distillation, °F 50 % recovered	D86	Report		3
90 % recovered		540	640	
End Point			700	
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	
Connecting carrier			11	
Cetane Number or Index	D613, D6890, D4737A, D7170	40.		8
Aromatics, volume %	D1319, D5186		35	7
OR				
Cetane Index	D976, D4737	40		7
Ash, wt. %	D482		0.01	
Carbon Residue: Ramsbottom, wt. %	D524		0.35	
On 10% Bottom				
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+		

15NTDF2 - SPECIFICATION FOR FUNGIBLE CERTIFIED NON-TRANSPORTATION 15 PPM DISTILLATE OTHER NON-TRANSPORTATION FUEL CONTAINING UP TO 5 % RENEWABLE HYDROTREATED DIESEL FUEL (1) Cont'd

(1) 15 ppm sulfur (maximum) certified NTDF - This fuel is designated for non-transportation use; 15 ppm NTDF-Other.

(2) Product must exhibit no visible evidence of dye.

(3) Referee method is ASTM D86. Test Method D2887 may be used as an alternative if correlated to D86 and reported as "Predicted D86".

(4) Cloud Point and Pour Point:

	Sept – Mar	Apr – Aug
Cloud:	+15 °F / -9 °C	+20 °F / -7 °C
Pour:	0 °F / -18 °C	+10 °F / -12 °C

Texas –System:

	Oct – Feb	Mar – Sept
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) Refer to test method requirements published in 40 CFR Part 1090 Subpart N.

(8) Where Cetane number by test method D613 is not available, 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) Hebert & J.C. Nolan Systems - 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."

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

PRODUCT PROPERTY	ASTM TEST METHOD	ORIGIN SPECIFICATIONS MINIMUM	MAXIMUM	NOTE
Renewable Fuel, vol. %		0	5.0	9
Gravity, °API @ 60 °F	D287, D1298, D4052	30		
Flash Point, °F	D93	130		6
Distillation, °F At Delivery	D86	125		
Distillation, °F 50 % recovered	D86	Report		3
Distillation, °F 90 % recovered	D86	540	640	
Distillation, °F End Point	D86		700	
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
Sulfur, ppm wt. Origin	D2622, D5453, D7039		11	
Sulfur, ppm wt. Connecting carrier	D2622, D5453, D7039		11	
Cetane Number or Index	D613, D6890, D4737A, D7170	40.		8
Aromatics, volume %	D1319, D5186		35	7
OR				
Cetane Index	D976, D4737	40		7
Ash, wt. %	D482		0.01	
Carbon Residue: Ramsbottom wt. % On 10 % Bottom	D524		0.35	
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	
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) **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. Test Method D2887 may be used as an alternative if correlated to D86 and reported as "Predicted D86".
(4) Cloud Point and Pour Point:

	Sept – Mar	Apr – Aug
Cloud:	+15°F / -9°C	+20°F / -7°C
Pour :	0°F / -18°C	+10°F / - 12°C

Texas –System :	Oct – Feb	Mar – Sept
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) Refer to test method requirements published in 40 CFR Part 1090 Subpart N.
(8) Where Cetane number by test method D613 is not available, 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) Hebert & J.C. Nolan Systems - 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 ULTRA LOW SULFUR DIESEL FUEL (1)

PRODUCT PROPERTY	ASTM TEST METHOD	ORIGIN SPECIFICATIONS MINIMUM	MAXIMUM	NOTE
Appearance: Clear & Bright @ 77 °F	D4176, Procedure 1	Pass		3
Gravity, °API	D287, D1298 or D4052	37	51	
Color, Saybolt	D156, D6045	18		
At Delivery		+16		
Copper Corrosion, 2 hrs. @ 212 °F	D130		1	
Distillation, °F	D86			8
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) 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, 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.*
(8) Referee method is ASTM D86. Test Method D2887 may be used as an alternative if correlated to D86 and reported as “Predicted D86”.

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

PRODUCT PROPERTY	ASTM TEST METHOD	ORIGIN SPECIFICATIONS MINIMUM	MAXIMUM	NOTE
Appearance: Clear & Bright @ 77 °F	D4176, Procedure 1	Pass		3
Gravity, °API	D287, D1298 or D4052	37	51	
Color, Saybolt	D156, D6045	18		
At Delivery		+16		
Copper Corrosion, 2 hrs. @ 212 °F	D130		1	
Distillation, °F	D86			8
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.*
(8) Referee method is ASTM D86. Test Method D2887 may be used as an alternative if correlated to D86 and reported as "Predicted D86".

JET A - SPECIFICATION FOR FUNGIBLE HIGH SULFUR AVIATION KEROSENE

PRODUCT PROPERTY	ASTM TEST METHOD	ORIGIN SPECIFICATIONS MINIMUM	MAXIMUM	NOTE
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			5
10 % recovered			400	
50 % recovered		Report		
90 % recovered		Report		
End Point			572	
Residue, vol. %			1.5	
Loss, vol. %			1.5	
Gravity, °API	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 (ºC)	D2386, D5972, D7153, D7154		-40 (-40) / Jet A -52.6 (-47) / Jet A-1	6
Thermal Stability (2.5 hrs. at control temperature 275°C)	D3241			
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 mm2 (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, Carrier 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. Test Method D2887 may be used as an alternative if correlated to D86 and reported as "Predicted D86".
(6) For product to comply with JET A-1 parameters, the -52.6 ºF (-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 ºF is acceptable for Jet fuel batches being re-certified at Shipper delivery locations.

15EXP2 - SPECIFICATION FOR SEGREGATED 15 PPM #2 MOTOR VEHICLE 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 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

PRODUCT PROPERTY	ASTM TEST METHOD	ORIGIN SPECIFICATIONS MINIMUM	MAXIMUM	NOTE
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.