

SPECIFICATIONS FOR B-5
(EPA ULTRA LOW SULFUR 5% BIODIESEL BLEND)

Product Code D5 (1) (2) (3) (4) (5) (6)

(Shipped on Oregon Line ONLY)

Specification Points	ASTM Method	Shipments	
		<u>Min.</u>	<u>Max.</u>
Gravity, deg. API	D-287	30.0	
Flash, Pensky-Martens, deg. F.	D-93	130	
FAME, vol %	D-7371		5 (2)
Sulfur, ppm max	D-5453, D-7039		11.0 (3)
Aromatic %	D-1319		35.0 (4)
Color	D-1500		4.0
Cetane Number OR Cetane Index	D-613 D-976	40.0 40.0 (4)	
Cloud Point deg. F.	D-2500	ASTM (5)	
Pour point deg. F.	D-97	ASTM (5)	
Distillation 90% Recovered deg. F.	D-86	540	640

- (1) In addition to above KM specifications, product must meet ASTM D-975 latest revision, with exception to conductivity requirement; this product may require treatment with a conductivity improver in order to be fully compliant with the latest revision of ASTM D-975 prior to terminal distribution.
- (2) Biodiesel Direct Supplier or certifying laboratory must be BQ9000/ISO9000 certified.
- (3) At pipeline input; terminal delivery/distribution not to exceed 15.
- (4) EPA Ultra Low Sulfur on-highway diesel requires a Cetane Index of 40 or maximum Aromatics of 35%.
- (5) Due to fungible specifications, the cloud/pour point for diesel products must comply with the ASTM specifications for the region in which the diesel is produced. It should be noted that diesel products distributed into colder climates may require cloud and/or pour point suppressors, i.e., winterization.
- (6) Product may contain up to 5 vol% renewable diesel content. (See renewable definition in section 6.1)

SPECIFICATIONS FOR MILITARY JP-5

Product Code 04 (1)(2)

Specification Points	ASTM Method	Shipments	
		<u>Min.</u>	<u>Max.</u>
Gravity, deg. API	D-1298 D-4052	36.0	48.0
Distillation, deg. F.	D-86, (D-2887)		400 (367)
10% rec.			Report
20% rec.			Report
50% rec.			Report
90% rec.			572 (626)
End Point, max			1.5 (n/a)
Residue %		1.5 (n/a)	
Loss %			
Flash Point, deg. F., min	D-93	145 (2)	
MSEP Rating	D-3948	Report	
Corrosion @ 212 F.	D-130		1
Workmanship		Clear and Bright	
Particulate Contam. mg/L.	D-5452		1.0
Freeze Point deg. C (F.)	D-2386, D-5972		-46 (-51)
Gum, Existent mg/100 ml	D-381		7
Water Reaction, interface rating (max)	D-1094		1b
Thermal Oxidation Stability @275°C	D3241(4)	Tube Rating (VTR)	<3
		Press Drop	25
		ETR, ITR (nm)	<85

- (1) In addition to above KM specifications, product must meet MIL-DTL-5624W or latest revision.
- (2) At pipeline input. Minimum 140° F applicable at terminals.

SPECIFICATIONS FOR TURBINE FUEL

Product Code 15 (1) (2) (3) (4)

Specification Points	ASTM Method	Shipments	
		<u>Min.</u>	<u>Max.</u>
Gravity, deg. API	D-1298, D-4052	37.0	51.0
Workmanship		Clear and Bright	
Distillation, deg. F. 10% Recovered End Point	D-86, (D-2887)		401 (205) 572 (300)
Flash Point, deg. F.	D-56 or D-93	108 (2)	
Freezing Point, deg C or F	D-2386, D-5972, D-7153, D-7154		-40
Copper Strip, 2 h at 100 C (212 F)	D-130		No. 1
Existent Gum, mg/100mL	D-381		7
MSEP Rating	D-3948 (Refinery Origin) D-7224 (Midstream Origin)	85 85	
Thermal Oxidation Stability @275°C	D3241(4) Tube Rating (VTR) Press Drop ETR, ITR (nm)		<3 (4) 25 <85

- (1) In addition to above KM specifications, product must meet ASTM D-1655 latest revision.
- (2) At pipeline input. ASTM minimum 100° F applicable at terminals.
- (3) Any included additives approved for use in ASTM D-1655 must be declared by type and volume.
- (4) Meets 275°C at input. Terminal delivery is 260°C.

SPECIFICATIONS FOR MILITARY F-76

Product Code 28 (1)(2)

Specification Points	ASTM Method	Shipments	
		<u>Min.</u>	<u>Max.</u>
Gravity, deg. API	D-287, D1298 D-4052	30	45
Flash, P.M., deg. F.	D-93	145	
Sulfur, wt %	D-1552, D-2622, D-4294		0.1
Color	D-1500		3.0
Cetane Number	D-613	42.0	
Cetane Index	D-976	43.0	
Workmanship	D-4176	Clear and Bright	
Cloud Point deg. F.	D-2500		30
Pour point deg. F.	D-97		21
Distillation	D-86		
	90% Recovered deg. F.		675
	End point		725

- (1) In addition to above KM specifications, product must meet MIL-F-16884N or latest revision, with exception to lubricity of fuel below 500 ppm sulfur.
- (2) Effective cycle 37 of 2017 contains 30% Renewable Diesel

SPECIFICATIONS FOR BONDED TURBINE FUEL

Product Code 35 (1) (2) (3) (4) (5)

Specification Points	ASTM Method	Shipments	
		<u>Min.</u>	<u>Max.</u>
Gravity, deg. API	D-1298, D-4052	37.0	51.0
Workmanship		Clear and Bright	
Distillation, deg. F. 10% Recovered End Point	D-86, (D-2887)		401 (205) 572 (300)
Flash Point, deg. F.	D-56 or D-93	108 (4)	
Freezing Point, deg C or F	D-2386, D-5972		-40
Copper Strip, 2 h at 100 C (212 F)	D-130		No. 1
Existent Gum, mg/100mL	D-381		7
MSEP Rating	D-3948 (Refinery Origin) D-7224 (Midstream Origin)	85 85	
Sulfur weight %	D-2622		0.3
Thermal Oxidation Stability @275°C	D3241(4)	Tube Rating (VTR) Press Drop ETR, ITR (nm)	<3 25 <85

- (1) In addition to above KM specifications, product must meet ASTM D-1655 latest version.
- (2) Fuel transported on Shipper of Record's Bond.
- (3) Fuel is fungible with product code 15.
- (4) At pipeline input. ASTM minimum 100 deg F applicable at terminals.
- (5) Any included additives approved for use in ASTM D-1655 must be declared by type and volume.

SPECIFICATIONS FOR TRANSHIPPED TRANSMIX

Product Code 53

Specification Points	ASTM Method	Shipments	
		<u>Min.</u>	<u>Max.</u>
Gravity, deg. API	D-287, D-1298, D-4052	35.0	55.0
Sulfur, PPM	D-5453		1500
Color	D-1500		4.0
Copper Strip, 2 h @ 100C (212F)	D-130		No. 1
Distillation End Point (F)	D-86		640
Oxygenate Content, Vol% max			
From Ethers	D-5845		0.6
From Ethanol	D-5845		1.0
Particulate Contam., mg/L	D-5452		10.0
Water and Sediment, vol%	D-2709		0.05

SPECIFICATIONS FOR CARB
ULTRA LOW SULFUR DIESEL FUEL

Product Code 80 (1) (2) (3) (4) (5)

Specification Points	ASTM Method	Shipments	
		<u>Min.</u>	<u>Max.</u>
Gravity, deg. API	D-287, D-1298, D-4052	30.0	
Flash point, deg. F.	D-93	130 (5)	
Sulfur, max ppm	D-5453, D-7039		11.0 (2)
Aromatic vol %, Max	D-5186-03(3)		10 35.0 (3)
Biodiesel (FAME) %	D-7371		0.0
Color D-1500			4.0
Cetane Number OR Cetane Index	D-613 D-976	40.0 40.0	
Haze Rating/Workmanship	D-4176		2.0
Cloud Point deg. F.	D-2500	ASTM	
Distillation 90% Recovered deg. F.	D-86	540	640

- (1) In addition to above KM specifications, product must meet ASTM D-975 latest revision, with exception to lubricity requirements; this product may require treatment with a lubricity and/or conductivity improver in order to be fully compliant with the latest revision of ASTM D-975 prior to terminal distribution.
- (2) At pipeline input; terminal delivery/distribution not to exceed 15 ppm.
- (3) Maximum allowable fungible specification. All Refinery production having greater than 10 Vol% Aromatics must have been produced within the restrictions of a CARB Executive Order.
- (4) Product may contain up to 5 vol% renewable diesel content. (See renewable definition in section 6.1)
- (5) Terminal delivery is 125°F.

SPECIFICATIONS FOR DENATURED FUEL ETHANOL

Product 83 (1) (2) (3) (4) (5)

Specification Points	ASTM Method	Shipments	
		<u>Min.</u>	<u>Max.</u>
Octane	D-2699 D-2700	114	
Sulfur, ppm	D-5453		10
Benzene, vol%	D7576-10		0.06 (5)
Olefins, vol%	D7347-07e1		0.5 (5)
Aromatic Hydrocarbons, vol%	D7576-10		1.7 (5)
Acidity (as acetic acid), mass% (<i>mg/L</i>)	D-1613-96		0.007 (56)
Appearance		Clear and Bright	
Copper content, mg/kg, max	D-1688-95		0.1
Denaturant content, vol%		1.96	3.00
Nonvolatile matter, mg/100 ml	D-1353		5
Ethanol content, vol%	D-5501-94(1998)e1	92.1	
Inorganic Chloride content, mg/kg (<i>mg/L</i>) max	D-7319, D-7328		6.7 (5)
Methanol, vol%	D-5501		0.5
Solvent-washed gum, mg/100ml	D-381-00, air jet apparatus		5.0
pHe	D-6423-99	6.5	9.0
Water content, mass % (vol%)	E-203-96 or E-1064-00		1

- (1) Product 83 is a terminal inventory control code, not a pipeline product code.
- (2) Product may not be denatured, wholly or partially, with MTBE.
- (3) In addition to above KM specifications, product must meet ASTM D-4806 latest revision.
- (4) This specification is for community ethanol tankage intended for terminal rack blending. Neat or blended ethanol is not pumped in KM's Pacific pipeline system.
- (5) California terminals only.

SPECIFICATIONS FOR EPA
ULTRA LOW SULFUR DIESEL FUEL

Product Code 84 (1) (2) (3) (4) (5) (6)

Specification Points	ASTM Method	Shipments	
		<u>Min.</u>	<u>Max.</u>
Gravity, deg. API	D-287, D1298, D-4052	30.0	
Flash, P.M., deg. F.	D-93	130 (6)	
Sulfur, ppm max	D-5453, D-7039		11.0 (2)
Aromatic %	D-1319		35.0 (3)
Biodiesel (FAME) %	D-7371		0.0
Color D-1500			4.0
Cetane Number OR Cetane Index	D-613 D-976	40.0 40.0 (3)	
Haze Rating/Workmanship	D-4176		2.0
Cloud Point deg. F.	D-2500	ASTM(4)	
Distillation 90% Recovered deg. F.	D-86	540	640

- (1) In addition to above KM specifications, product must meet ASTM D-975 latest revision, with exception to lubricity and conductivity requirements; this product may require treatment with a lubricity and/or conductivity improver in order to be fully compliant with the latest revision of ASTM D-975 prior to terminal distribution.
- (2) At pipeline input; terminal delivery/distribution not to exceed 15 ppm.
- (3) EPA Ultra Low Sulfur on-highway diesel requires a Cetane Index of 40 or maximum Aromatics of 35%.
- (4) Due to fungible specifications, the cloud/pour point for diesel products must comply with the ASTM specifications for the region in which the diesel is produced. It should be noted that diesel products distributed into colder climates may require cloud and/or pour point suppressors, i.e., winterization.
- (5) Product may contain up to 5 vol% renewable diesel content. (See renewable definition in section 6.1)
- (6) Terminal delivery is 125°F.

SPECIFICATIONS FOR MEXICAN
ULTRA LOW SULFUR DIESEL FUEL

Product Code 89 (1) (2) (3) (4) (5) (6)

Specification Points	ASTM Method	Shipments	
		<u>Min.</u>	<u>Max.</u>
Gravity, deg. API	D-287, D1298, D-4052	30.0	
Flash, P.M., deg. F.	D-93	130 (6)	
Sulfur, ppm max	D-5453, D-7039		11.0 (2)
Aromatic %	D-1319		35.0
Biodiesel (FAME) %	D-7371		0.0
Color D-1500			4.0
Cetane Number OR Cetane Index	D-613 D-976	45.0 45.0 (3)	
Haze Rating/Workmanship	D-4176		2.0
Cloud Point deg. F.	D-2500	ASTM(4)	
Distillation 90% Recovered deg. F.	D-86		653

- (1) In addition to above KM specifications, product must meet NOM-16 latest revision, with exception to lubricity and conductivity requirements; this product may require treatment with a lubricity and/or conductivity improver in order to be fully compliant with the latest revision of NOM-16 prior to terminal distribution.
- (2) At pipeline input; terminal delivery/distribution not to exceed 15 ppm.
- (3) Ultra Low Sulfur on-highway diesel requires a Cetane Index of 45 or maximum Aromatics of 35%.
- (4) Due to fungible specifications, the cloud/pour point for diesel products must comply with the ASTM specifications for the region in which the diesel is produced. It should be noted that diesel products distributed into colder climates may require cloud and/or pour point suppressors, i.e., winterization.
- (5) Product may contain up to 5 vol% renewable diesel content. (See renewable definition in section 6.1)
- (7) Terminal delivery is 125°F.

SPECIFICATIONS FOR B100 BIODIESEL

Product Code BD (1)(2)(3)(4)

Specification Points	Test Method	Test Results	
		Min.	Max.
Acid Number, mg KOH/g	D-664		0.50
API Gravity @ 60° F Specific Gravity	D-287, D-1298, D-4052	28 .8871	35 .8498
Cetane Number	D-613 or D6890	47	
Cloud Point, °C (°F)	D-2500 AOCS-CK 209		10° C (50°F) Summer 1°C (34°F) Winter (OR, WA) 3°C (37°F) Winter (CA,NV,AZ)
Cold Soak Filterability, Max seconds	D-7501		360 (Summer) 200 (Winter)
Distillation Temperature, °C (°F) Atmospheric equivalent temperature 90% recovered	D-1160		360° C (680°F)
Flash Point (closed cup), °C (°F)	D-93, D6450		93° C (199° F)
Alcohol Control One of the following must be met:			
1. Methanol content, mass %	EN-14110 AOCS-CK 209		0.2
2. Flash Point, °C (°F)	D-93, D6450		130° C (266° F)
Free Glycerin, mass %	D-6584		0.020
Total Glycerin, mass %	D-6584		0.240
Kinematic Viscosity @ 40° C, mm ² /s	D-445	1.9	6.0
Methyl Ester, mass %	EN-14103	97	
Monoglycerides content – year round, %	D-6584, Sec 11.1.2	(winter) (summer)	0.40 0.80
Oxidation Stability, hours @ 110° C (230° F)	EN-14112 EN-15751	4	
Sodium and Potassium combined, ppm (µg/g)	EN- 14538		5
Sulfur, mass % (ppm)	D-5453, D-7039		11.0
Water and sediment combined, volume % Water, volume %	D-2709 D-6304		0.050 0.04
Haze rating @ 25° C (77° F)	D-4176 (Procedure 2)		1

- (1) Product BD is an inventory control code; not a pipeline product code.
(2) Direct supplier or certifying laboratory must be BQ9000/ISO9000 certified or have BQF-1 form on file with KM QC.
(3) Product must meet ASTM D-6751 latest revision, for all Table 1 properties not listed above.
(4) Effective 8/30/30 – Additives prohibited except Oxidation Stabilizer – Supplier shall declare model and treat rate.
Summer = Apr 1 thru Sep 30

SPECIFICATIONS FOR CARB/MARINE DIESEL FUEL

Product Code CM (1) (2) (3) (4) *

Specification Points	ASTM Method	Shipments	
		<u>Min.</u>	<u>Max.</u>
Gravity, deg. API	D-287, D-1298, D-4052	30.0	
Flash point, deg. F.	D-93	140	
Sulfur, max ppm	D-5453, D-7039		15.0
Aromatic vol %, Max	D-5186-03(3)		10 35.0
Biodiesel (FAME) %	D-7371		0.0
Color D-1500			4.0
Cetane Number OR Cetane Index	D-613 D-976	40.0 40.0	
Haze Rating/Workmanship	D-4176		2.0
Cloud Point deg. F.	D-2500	ASTM	
Pour point deg. F.	D-97	ASTM	
Distillation 90% Recovered deg. F.	D-86	540	640

* This Product is NOT transported via KM's main line systems (East Line, West Line, Calnev Line, South Line North Line and Oregon Line).

- (1) In addition to above KM specifications, product must meet ASTM D-975 latest revision, with exception to lubricity requirements; this product may require treatment with a lubricity and/or conductivity improver in order to be fully compliant with the latest revision of ASTM D-975 prior to terminal distribution.
- (2) All Refinery production having greater than 10 Vol% Aromatics must have been produced within the restrictions of a CARB Executive Order.
- (3) Product may contain up to 5 vol% renewable diesel content. (See renewable definition in section 6.1)
- (4) This product is for use in category 2 and 3 marine engine applications only, not intended for use in the maximum 15ppm content diesel fuel market.

SPECIFICATIONS FOR R99/100
RENEWABLE DIESEL FUEL

Product Code RD (1) (2) (3) (4)

Specification Points	ASTM Method	Shipments	
		<u>Min.</u>	<u>Max.</u>
Gravity, deg. API	D-287, D-1298, D-4052	30.0	
Flash point, deg. F.	D-93	130 (2)	
Sulfur, max ppm	D-5453, D-7039		11.0 (3)
Aromatic vol %, Max	D-5186-03		10
Biodiesel (FAME) %	D-7371		0.0
Color	D-1500		3.0 (4)
Cetane Index	D-976	40.0	
Haze Rating/Workmanship	D-4176		2.0
Cloud Point deg. F.	D-2500	ASTM	
Distillation 90% Recovered deg. F.	D-86	540	640

- (1) In addition to above KM specifications, product must meet ASTM D-975 latest revision, with exception to lubricity requirements; this product may require treatment with a lubricity and/or conductivity improver in order to be fully compliant with the latest revision of ASTM D-975 prior to terminal distribution.
- (2) Terminal delivery is minimum 125°F.
- (3) At pipeline input; terminal delivery/distribution not to exceed 15 ppm.
- (4) Should be water white, any color to be investigated.