

## UNION PACIFIC LOCOMOTIVE DIESEL FUEL SPECIFICATION

### SPECIFICATION C.S. 26-D DIESEL FUEL OIL (ASTM D-975)

#### General Statement

This specification covers two fuel grades:

- No. 1-D for diesel engines (Min. 40 Cetane) and
- No. 2-D for diesel locomotives (Min. 40 Cetane).

The fuels shall be free from grit, acid, microbial growth and fibrous or other foreign material likely to clog pipes and strainers or damage injectors. In addition, the fuel should pass EMD Filtration Cleanliness Test-M.I. 1750.

The fuels in this specification shall be stable as listed under service requirements in engine operation and storage.

#### Rejection

Any samples of fuel delivered failing to meet these specifications shall be rejected and the shipment returned to the manufacturers, who shall pay the freight both ways.

Physical Requirements	ASTM Test Method	No. 1-D	No. 2-D
Flash °C (°F), Min	D93	38°C (100°F)	52°C(135°F)
Water & Sediment, Vol.% Max.	D2709	0.05	0.05
Carbon Residue 10% Bot. Max.	D524	0.15	0.35
Ash, Wt.% Max.	D482	0.01	0.01
Distillation Temperature °F	D86		
90 Percent Volume Recovered			282°C (540°F)
Min. °C (°F)		288°C (550°F)	338°C (640°F)
Max. °C (°F)			
Kinematic Viscosity, mm <sup>2</sup> /S at 40°C (104°F)			
Min.	D445	1.3	1.9
Max.		2.4	4.1
Sulfur Wt. PPM Max.	D5453	15	15
Copper Strip Corrosion, Max. 3 hours at 50°C (122°F)	D130	No. 3	No. 3
Cetane Number, Min.	D613	40	40
API Gravity	D4052	35-45	30-40
Cloud Point °F Max		See Table 1	
Pour Point °F Max.	D4539	See Table 1	
Lubricity at 60°C (140°F), Micron Max	D6079	520	520
Electrical Conductivity Min. pS/m	D2624	25	25
Stability	D6468	Report	Report

## UNION PACIFIC LOCOMOTIVE DIESEL FUEL SPECIFICATION

### SPECIFICATION C.S. 26-D DIESEL FUEL OIL (ASTM D-975)

**Table 1:** Cloud & Pour Point Requirements:

In accordance with ASTM D975, Tenth Percentile Minimum Ambient Temperatures (°F) for the United States, or winter/summer specifications as determined by pipelines on which UP bulk ships products.

Region	Location	Oct	Nov	Dec	Jan	Feb	Mar
Northeast	Colorado East	28.4	10.4	6.8	-2.2	5	10.4
Northeast	IA	28.4	8.6	-9.4	-14.8	-7.6	3.2
Northeast	Il North	30.2	15.8	-2.2	-5.8	-0.4	12.2
Northeast	Il South	33.8	19.4	3.2	1.4	5	17.6
Northeast	KS	28.4	12.2	5	-2.2	6.8	8.6
Northeast	MN	24.8	-0.4	-22	-29.2	-23.8	-11.2
Northeast	MO	33.8	19.4	6.8	3.2	8.6	17.6
Northeast	NE	26.6	8.6	-0.4	-7.6	-2.2	8.6
Northeast	WI	26.6	6.8	-11.2	-18.4	-11.2	-0.4
Northwest	Colorado West	17.6	-0.4	-13	-22	-11.2	3.2
Northwest	WY	24.8	5	-0.4	-14.8	-2.2	3.2
Northwest	CA North	37.4	32	28.4	28.4	30.2	30.2
Northwest	ID	24.8	8.6	-0.4	-5.8	-0.4	8.6
Northwest	NV North	19.4	6.8	-0.4	-7.6	-0.4	8.6
Northwest	NV South	46.4	32	26.6	24.8	28.4	33.8
Northwest	OR West	32	24.8	23	19.4	24.8	26.6
Northwest	OR East	21.2	12.2	6.8	-2.2	6.8	15.8
Northwest	UT	28.4	12.2	6.8	-0.4	6.8	17.6
Southeast	AR	35.6	24.8	19.4	12.2	19.4	26.6
Southeast	LA	41	30.2	26.6	24.8	28.4	33.8
Southeast	TX North	37.4	21.2	15.8	8.6	15.8	19.4
Southwest	TX South	48.2	35.6	28.4	26.6	30.2	35.6
Southwest	AZ	44.6	32	28.4	24.8	26.6	30.2
Southwest	CA South	42.8	35.6	32	30.2	32	35.6
Southwest	NM	39.2	24.8	17.6	12.2	19.4	26.6

\*Pour Point Depressant is added by railroad at North Platte to -30°F.

### **Service Requirements**

Fuels may contain stabilizing and metal deactivating additives approved by the general research & development engineer, in order to meet requirements.

Use of any additive that contributes to pollution of the air and is in violation of state or Federal regulations in the railroad operating area is prohibited.

## **UNION PACIFIC LOCOMOTIVE DIESEL FUEL SPECIFICATION**

### **SPECIFICATION C.S. 26-D DIESEL FUEL OIL (ASTM D-975)**

All fuels shall be stable and shall be compatible with other conventional grades of diesel engine fuel oil.

#### **Pipeline Deliveries**

In addition to fulfilling other requirements, fuel oil delivered by pipeline shall be treated with sufficient corrosion inhibitor to produce a NACE rating of B++.

#### **BIODIESEL**

Up to 5% bio content is permitted in diesel if material is sold as B5 diesel. **Non-biodiesel** material must be bio-free. B100 used in blending must comply with ASTM-6751 and the producer must be BQ-9000 certified. B100 monoglyceride content as measured by ASTM D6584 must be less than 0.4% during cold weather months (October 15<sup>th</sup> thru April 15<sup>th</sup>).

#### **RENEWABLE DIESEL**

Up to 20% renewable content is permitted in diesel if material is sold as R20 diesel. Non-renewable diesel must be renewable & bio free. R100 used in blending must comply with ASTM-D975.

#### **RED DYE ADDITIVE**

Red dye must be injected into the fuel across the rack pursuant to IRS regulations.