

PLAINS MIDSTREAM CANADA ULC

These Crude Quality Specifications apply to the use of Plains Midstream Canada ULC's
Petroleum and Condensate Pipeline Systems.

CRUDE QUALITY SPECIFICATIONS FOR PETROLEUM

	Density (kg/m ³ @ 15°C)	Total Sulphur (mass %)	Kinematic Viscosity (mm ² /s)	Receipt Temperature (°C)		Vapour Pressure (kPa @ 37.8°C)	Salt (g/m ³)
Test Procedure ¹	ASTM D5002	ASTM D4294	ASTM D445	API 7.3		ASTM D6377	ASTM D3230
				Minimum	Maximum		
Condensate ²	600 – 775	≤0.5% ¹¹	<2	0	40	<103	<285
Light Sweet ³	800 – 876	≤0.5%	<20	0	40	<85 / <95 ¹²	<285
Light Sour ⁴	800 – 871	≤1.2%	<20	0	40	<95	<285
Light Sour Blend ⁵	800 – 871	n/a	<20	0	40	<90	<285
Heavy Crude ⁶	900 - 955	n/a	n/a	5	60/80 ⁹	<70 / <76 ¹³	<285
Heavy Raw Crude ⁷	940 – 1000	n/a	n/a	10	60/80 ⁹	<35	<285
Heavy Blend Crude ⁸	<940	n/a	>100 - <350	5	60	<70 / <76 ¹³	<285

	Organic Halides/ Organic chlorides (ppmW, naphtha fraction)	Phosphorous (ppm)	Olefins (mass %)	Total Contaminant Content ¹⁰ Maximum (vol %)	Moisture Content (vol %)	pH of contained Water	Pour Point
Test Procedure ¹	ASTM D4929	Bureau Veritas CCQTA ICP OES	HNMR	Centrifuge API 10.4 Karl Fisher API 10.9 ASTM D4928	API 10.4	Litmus Test	ASTM D5853
Condensate ²	<1	<1.5	<0.3	0.5	<0.3	>5.0	<-7°C
Light Sweet ³	<1	<1.5	<0.3	0.5	<0.3	>5.0	<-7°C
Light Sour ⁴	<1	<1.5	<0.3	0.5	<0.3	>5.0	<-7°C
Light Sour Blend ⁵	<1	<1.5	<0.3	0.5	<0.3	>5.0	<-7°C
Heavy Crude ⁶	<1	<1.5	<0.3	0.5	<0.3	>5.0	<-7°C
Heavy Raw Crude ⁷	<1	n/a	<0.3	0.5	<0.3	>5.0	<-7°C
Heavy Blend Crude ⁸	<1	n/a	<0.3	0.5	<0.3	>5.0	<-7°C

Notes to Quality Specifications

1. Test procedures shall be determined based on the most recent API or ASTM standards or at the Carrier's sole discretion.
2. Applicable Streams: Rangeland/Aurora Condensate, Rainbow Condensate, Manito Condensate.
3. Applicable Streams: Rainbow Sweet, Rangeland/Aurora Sweet.
4. Applicable Streams: Rangeland/Aurora Sour.
5. Applicable Streams: SSPL Moose Jaw Tops.
6. Applicable Streams: SSPL Fosterton.
7. Applicable Streams: Rainbow Seal Heavy, Rainbow Wabasca Heavy, Manito and Cactus Lake LLK.
8. Applicable Streams: Rainbow Seal Heavy and Rainbow Wabasca Heavy.
9. The maximum receipt temperature for Heavy Crude is 60°C for LACTs, and 80°C for trucked volumes.
10. Contaminant content means all non-hydrocarbon materials, such as Basic Sediment and Water (BS&W) and other impurities.
11. H₂S in liquid phase cannot exceed 20 ppm weight based upon ASTM D5623 test method, Volatile Mercaptans (cumulative C₁, C₂, C₃ mercaptans) cannot exceed 175 ppm weight sulphur based upon ASTM D5623 test method.
12. Vapor Pressure specification of <85 kPa is applicable from May 1st through October 31st; <95 kPa is applicable from November 1st through April 30th.
13. Vapor Pressure specification of <70 kPa is applicable from May 1st through November 30th; <76 kPa is applicable from December 1st through April 30th.