



## 2023 CRUDE CHARACTERISTICS

The 2023 Crude Characteristics Booklet is a summary of selected chemical and physical properties of crude oils and condensates moved in the Enbridge Pipelines Inc. (Enbridge)/Enbridge Energy Partners, L.P. system. Samples were collected over a limited period of time and may or may not be representative of shipments over the entire year.

Density at 15C, Vapour Pressure, Sulphur by Weight, Pour Point and Viscosity results at 10, 20, 30, 40 and 45C were tabulated.

### The pieces of data were accumulated as follows:

- 1- Incoming streams were sampled upon first point of receipt into Enbridge custody, or injection onto Enbridge Mainline, or first comingle point.
- 2- Samples are tested at Edmonton and Superior Enbridge labs, as well as external laboratories.
- 3- All available test results for Density, Vapour Pressure, Sulphur, Pour Point and Viscosity are compiled, analyzed, and averaged to obtain Crude Characteristics results.
  - Heavy Viscosity data is compiled from samples tested during the lowest reference temperature time period.
- 4- Spot commodities are excluded from crude characteristics testing.
- 5- Vapour Pressure (1) All crude oils are reported as the VPCR4 @ 37.8oC, results are an annual average,  
(2) All condensates are reported as DVPE

## 2023 Crude Characteristics

Product Identifier	Crude Type (Long Name)	Total Sulphur (% by wt.)	Pour Point (C)	Vapour Pressure (kPa)	Density (kg/m3)	Viscosity (cSt) at Specified Temperature (degree Celsius)				
						10.00	20.00	30.00	40.00	45.00
AHS	ALBIAN HEAVY SYNTHETIC	2.67	<-30	67.5	930.2	246	125	70.0	41.2	33.0
AWB	ACCESS WESTERN BLEND	4.05	<-30	72.1	918.9	287	150	84.7	53.3	42.8
BHB	BOREALIS HEAVY BLEND	3.74	<-30	56.5	925.5	230	121	70.1	46.5	37.6
BR	BOW RIVER	3.89	<-30	72.2****	927.0	218	118	69.4	43.8	35.6
CAL	CENTRAL ALBERTA PIPELINE	1.12	-25	85.1	852.4	11.3	8.23	6.20	4.80	4.30
CAM	AMOCO CONDENSATE	0.07	<-30*	77.1	710.6	0.700	0.630	0.576	0.516	0.500
CDB	CHRISTINA LAKE DIL-BIT BLEND	3.90	<-30	71.6	921.7	276	145	83.3	51.6	41.6
CFT	FORT SASKATCHEWAN CONDENSATE	0.03	<-30	93.7	682.9	0.562	0.517	0.465	0.430	0.400
CGB	GIBSON CONDENSATE	0.21*	<-30**	82.1	734.9*	1.23**	1.07**	0.935**	0.820**	0.770**
CGL	CONDENSATE GIBSONS LIGHT	0.05	<-30	86.1	680.2	0.602	0.546	0.500	0.458	0.439
CHV	CONVENTIONAL HEAVY	3.30	<-30	63.4	926.4	250	133	76.7	47.8	38.6
CL	COLD LAKE	3.73	<-30	68.5	924.2	290	152	86.8	53.4	42.9
CNS	CNRL LIGHT SWEET SYNTHETIC BLEND	0.15	<-30	31.3****	865.2	9.93	7.12	5.33	4.14	3.70
CNX	CANADIAN NATURAL HIGH TAN	3.84	<-30	73.3	919.7	298	156	88.9	54.7	43.9
CPC	PETROCANADA CONDENSATE	0.01**	<-30**	74.1	692.6**	0.570**	0.530**	0.490**	0.450**	0.430**
CPM	PEMBINA CONDENSATE	0.07	<-30	61.5	755.1	1.24	1.08	0.957	0.836	0.790
CPR	PEACE PIPE CONDENSATE	0.09	<-30	70.7	758.8	1.51	1.30	1.13	1.00	0.865
CRL	RANGELAND CONDENSATE	0.10	<-30	79.7	715.9	0.700	0.640	0.580	0.530	0.510
CRW	CONDENSATE BLEND	0.08	<-30	60.2	738.9	1.19	1.05	0.930	0.825	0.783
CSW	CENTRAL ALBERTA SWEET	0.38	-18	88	827.3	6.15	4.72	3.70	2.96	2.69
F	FOSTERTON	3.61	<-30	60.9****	919.1	204	110	64.2	40.1	32.6
FD	FEDERATED	0.38	<-30	75.7	821.6	5.23	3.98	3.08	2.52	2.29
FRB	FORT HILLS DILBIT	4.07	<-30	60.1	927.8	265	139	80.3	49.8	40.1
HSB	HUSKY SYNTHETIC BLEND	0.28	<-30	65.1****	858.3	13.8	9.52	6.91	5.22	4.61
HSC	HARDISTY SYNTHETIC CRUDE	0.23	<-30	62.3	859.8	11.3	8.01	5.94	4.57	4.08
ISB	IMPERIAL SOUR BLEND	0.74	<-30	66.7	849.5	9.09	6.72	5.05	3.69	3.49
ISH	ISH	0.43*	<-30*	49.1	811.8*	4.05*	3.24*	2.62*	2.13*	1.96*
KDB	KEARL LAKE DILBIT	3.94	<-30	66	924.2	263	139	80.1	48.1	38.8
KSW	KINDER MORGAN SWEET	0.35	<-30*	77.1	827.2	6.66*	4.96*	3.77*	3.00*	2.72*
LLB	LLOYDMINSTER BLEND	3.44*	<-30*	64.3	924.2*	283*	148*	85.3*	53.8*	42.5*
LLK	LLOYDMINSTER KERROBERT	3.36	<-30	64.6	921.7	214	116	67.8	42.8	34.7
LSB	LIGHT SOUR BLEND	1.44	-23	87.1	847.1	7.07	5.32	4.08	3.25	2.93
M	MIDALE BLEND	1.95	-14	86.4	861.6	14.0	8.81	6.16	4.70	4.22

\* Results from 2022 Crude Characteristics.

\*\* Results from 2021 Crude Characteristics.

\*\*\*\* Vapor Pressure tested on an open container.

n/a = Test was not done.

## 2023 Crude Characteristics

Product Identifier	Crude Type (Long Name)	Total Sulphur (% by wt.)	Pour Point (C)	Vapour Pressure (kPa)	Density (kg/m <sup>3</sup> )	Viscosity (cSt) at Specified Temperature (degree Celsius)				
						10.00	20.00	30.00	40.00	45.00
MBL	HARDISTY LIGHT	1.94*	<-30*	75.9	846.9*	11.9*	8.67*	6.57*	5.13*	4.57*
MCG	ICG LIGHT SOUR	1.13	<-30	85.2	836.5	6.10	4.74	3.66	2.91	2.64
MGL	GIBSON LIGHT	0.48	<-30	84.8	812.4	3.76	3.06	2.49	2.08	1.92
MGS	GIBSON SOUR	1.65	<-30	83.6	853.1	15.1	10.7	7.84	5.96	5.27
MJT	MOOSE JAW TOPS	1.82	<-30	97.2	840.6	4.96	3.74	3.06	2.51	2.29
MLS	TUNDRA LIGHT SOUR	1.12	<-30	86.2	836.6	5.92	4.61	3.62	2.90	2.64
MM	MANITOBA MEDIUM	2.04	-17	85.5	861.2	11.7	8.11	5.86	4.53	4.06
MML	MANITOBA LIGHT	1.12	<-30*	87.3	836.2	5.95	4.62	3.63	2.92	2.65
MPR	PEACE PIPE LIGHT	0.41	<-30	88.2	808.7	4.00	3.23	2.62	2.16	1.98
MSB	MEDIUM SOUR BLEND	1.44	-19	78.1	853.6	12.2	8.75	6.46	4.95	4.41
MSE	SECURE ENERGY LIGHT SWEET	0.29*	-10*	85.6	838.7*	10.1*	6.76*	5.04*	3.99*	3.60*
MSM	WESTSPUR MIDALE	2.06	-15	83.5	860.6	12.3	8.44	6.03	4.63	4.07
MST	MANITOBA SWEET - TUNDRA	0.45	<-30	86	810.9	3.35	2.73	2.25	1.90	1.75
MSY	LIGHT SMILEY	0.31*	-5*	85.3	839.1*	10.2*	6.71*	4.96*	3.97*	3.56*
NSA	PREMIUM NEWGRADE SYNTHETIC	0.10	<-30	55.6	850.8	5.18	3.99	3.17	2.60	2.37
NW	NORMAN WELLS	0.31*	<-30*	80.3	825.2*	5.09*	3.92*	3.17*	2.60*	2.38*
OCC	SUNCOR-CRACKED C	3.75	<-30	13.4****	928.0	29.4	18.1	12.0	8.50	7.27
OSA	SUNCOR - A	0.19	-24	30.2****	862.7	8.67	6.27	4.75	3.72	3.34
OSH	SUNCOR-OSH	3.17	<-30	22.5	936.3	142	71.5	40.3	25.8	20.7
OSN	SUNCOR - N	0.01	<-30	55.2	729.3	0.873	0.776	0.693	0.627	0.598
P	PEMBINA	0.37	-25	86.2	821.1	6.33	4.80	3.67	2.88	2.58
PAS	PREMIUM ALBIAN SYNTHETIC	0.11	<-30	15****	867.3	12.2	9.16	6.67	5.07	4.47
PBS	PINE BEND SPECIAL	3.63	<-30	36****	932.7	180	96.8	56.9	36.0	29.2
PCH	PREMIUM CONVENTIONAL HEAVY	3.40	<-30	67.1	924.1	270	141	80.3	49.5	39.8
PDH	LONG LAKE HEAVY DILBIT BLEND	4.24	<-30	68.9	924.4	298	154	87.8	53.9	43.3
PSY	PREMIUM SYNTHETIC	0.21	<-30	32.8	863.4	9.98	7.08	5.27	4.10	3.63
PXB	PETROCHINA BLEND	2.59	<-30	29.7****	931.9	209	110	63.6	39.6	32.1
RA	RAINBOW LIGHT	0.34	-17	79.3	825.8	5.83	4.42	3.49	2.85	2.60
RSW	RANGELAND SWEET	0.35	<-30	84.7	814.9	4.46	3.58	2.89	2.37	2.17
SC	SMILEY COLEVILLE HEAVY	2.87	<-30	47.1	928.2	267	141	81.2	50.4	40.6
SES	SOUTH EAST SASK	1.18	<-30*	86.8	840.1	6.51	4.92	3.77	3.02	2.76
SH	SEAL HEAVY	5.27	<-30	62.7	927.5	257	138	81.0	50.1	40.7
SHD	SURMONT HEAVY DILBIT	4.24	<-30	67.6	923.4	252	133	77.0	47.9	38.7

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						10.00	20.00	30.00	40.00	45.00
SLD	SOUTHERN LIGHTS DILUENT	0.01	<-30	97.7	662.1	0.535	0.489	0.437	0.384	0.367
SMA	SURMONT MIX A	3.39**	<-30**	42.5	932.2*	216**	115**	67.3**	42.2**	34.2**
SPR	PEACE PIPE SOUR	1.46	<-30	86.4	827.3	6.64	5.09	3.97	3.20	2.87
SSP	SYNCRUDE SWEET PREMIUM	0.19	<-30	39.3****	858.3	10.4	7.43	5.54	4.30	3.83
SSX	SHELL SYNTHETIC LIGHT	0.20	<-30	48.6****	856.4	14.2	9.83	7.14	5.43	4.79
SW	MIXED BLEND SWEET	0.41	-20	85.4	830.4	8.03	5.66	4.27	3.41	3.08
SYB	SYNBIT BLEND	2.80	<-30	37.4	931.4	252	133	77.0	47.9	38.6
SYN	SYNTHETIC SWEET BLEND	0.23	<-30	42.8	860.1	9.07	6.58	4.97	3.89	3.48
UHC	U.S. HIGH SWEET - CLEARBROOK	0.24	<-30	87.9	814.7	3.54	2.88	2.40	2.02	1.87
UHL	U.S. HIGH SWEET - LEWISTON	0.42	-12*	77.1	805.0	4.28*	3.03*	2.39*	1.95*	1.81*
WCB	WESTERN CANADIAN BLEND	2.98*	<-30*	35.6	923.5*	275*	145*	83.0*	51.4*	41.4*
WCS	WESTERN CANADIAN SELECT	3.73	<-30	74.8	924.3	295	154	88.3	51.8	41.7
WDB	WESTERN CANADA DILBIT	3.56	<-30	72.7	920.8	250	132	76.6	47.8	38.6
WH	WABASCA HVY	4.43	<-30	65****	928.2	245	132	77.2	48.5	39.4

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