

Light Sour Blend (LSB) Pool Quality Specifications

Quality Specifications for Component Streams to the Light Sour Blend (LSB) Pool							
Quality	Units	Min	Max	Pool Typical Ex- Superior**	Referee Test Method	Test Frequency	Enbridge Response to Crude Not Meeting Quality Specs
Existing Specifications							
Density (15C)	kg/m ³	>799	<876	835	ASTM D4052	Frequency: AR ²	Delayed shut-in ⁶
Viscosity	cSt	2	<20		ASTM D7042	Frequency: QR ⁴	Delayed shut-in ⁶
Olefins, total ¹	wt%		<1		H NMR	Frequency: R ⁷	Immediate shut-in ⁵
Vapour Pressure (VPCR _{4.1} @ 37.8 C)	kPa		95,103 ⁸		ASTM D6377	Frequency: MR ³	Immediate shut-in ⁵
S&W	vol%		0.5		ASTM D4007	Frequency: AR ²	Immediate shut-in ⁵
Organic Chlorides ¹	wppm		<1		ASTM D4929	Frequency: QR ⁴	Immediate shut-in ⁵
New Specifications							
MCR	wt%		4	3	ASTM D4530	Frequency: MR ³	Reclassification Process ⁶
TAN	mgKOH/g		0.25	0.2	ASTM D664 & ASTM D664 CCQTA modified	Frequency: MR ³	Reclassification Process ⁶
Nickel	mg/L		11	6	ASTM D5708-05	Frequency: MR ³	Reclassification Process ⁶
Vanadium	mg/L		20	13	ASTM D5708-05	Frequency: MR ³	Reclassification Process ⁶
Naphtha (IBP-350F)	mass% recovere			29	ASTM D7169		
Distillate (350-650F)	mass% recovere			31	ASTM D7169		
Gas Oil (650-980F)	mass% recovere			26	ASTM D7169		
Resid (+980F)	mass% recovere			14	ASTM D7169		

**The estimated crude quality of a pool is based on a limited number of random composite samples of batches ex-Superior, timeframe July 2014 – March 2015.

Notes

- For these properties, blending should not occur.
- AR: All Receipts of LSB component streams tested using weekly composite.
- MR: Monthly Random testing of LSB component streams.
- QR: Quarterly Random testing of LSB component streams. Upon violation perform probational testing at Enbridge discretion.
- Immediate shut-in upon identifying violation. Request third party Certificate of Analysis prior to subsequent receipt.
- Upon violation, notification to applicable party, increase monitoring. Consequence based on outcome of increased monitoring.
- R: Random testing. 2015 – Twice per year; 2016 onwards – Annually.
- Max 95kPa May 1st through Sept 15th
Max 103kPa Sept 16th through Apr 30th