

## Medium Sour Blend (MSB) Pool Quality Specifications

Quality Specifications for Component Streams to the Medium Sour Blend (MSB) Pool							
Quality	Units	Min	Max	Pool Typical Ex- Superior**	Referee Test Method	Test Frequency	Enbridge Response to Crude Not Meeting Quality Specs
<b>Existing Specifications</b>							
Density (15C)	kg/m <sup>3</sup>	>799	<876	846	ASTM D4052	Frequency: AR <sup>2</sup>	Delayed shut-in <sup>6</sup>
Viscosity	cSt	2	<100		ASTM D7042	Frequency: QR <sup>4</sup>	Delayed shut-in <sup>6</sup>
Olefins, total <sup>1</sup>	wt%		<1		H NMR	Frequency: R <sup>7</sup>	Immediate shut-in <sup>5</sup>
Vapour Pressure (VPCR <sub>4.1</sub> @ 37.8 C)	kPa		95,103 <sup>8</sup>		ASTM D6377	Frequency: MR <sup>3</sup>	Immediate shut-in <sup>5</sup>
S&W	vol%		0.5		ASTM D4007	Frequency: AR <sup>2</sup>	Immediate shut-in <sup>5</sup>
Organic Chlorides <sup>1</sup>	wppm		<1		ASTM D4929	Frequency: QR <sup>4</sup>	Immediate shut-in <sup>5</sup>
<b>New Specifications</b>							
MCR	wt%		6	4	ASTM D4530	Frequency: MR <sup>3</sup>	Reclassification Process <sup>6</sup>
TAN	mgKOH/g		0.5		ASTM D664 & ASTM D664 CCQTA modified	Frequency: MR <sup>3</sup>	Reclassification Process <sup>6</sup>
Nickel	mg/L		33	17	ASTM D5708-05	Frequency: MR <sup>3</sup>	Reclassification Process <sup>6</sup>
Vanadium	mg/L		75	37	ASTM D5708-05	Frequency: MR <sup>3</sup>	Reclassification Process <sup>6</sup>
Naphtha (IBP-350F)	mass% recovere			26	ASTM D7169		
Distillate (350-650F)	mass% recovere			27	ASTM D7169		
Gas Oil (650-980F)	mass% recovere			24	ASTM D7169		
Resid (+980F)	mass% recovere			23	ASTM D7169		

\*\*The estimated crude quality of a pool, understanding the fact that this volume-weighted average estimation is based on historical pool component quality and volume. This estimate is provided for informational purposes only.

### Notes

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