

Quality Specifications for Component Streams to the CRW Pool

Quality	Units	Min	Max	Referee Test Method and Test Frequency	Comments
Density (15 C)	kg/m ³	600	799	ASTM 4052 Frequency: AR ²	<p>Industry Equalization and Enbridge Tariff specification.</p> <p>For test results greater than or equal to 600 kg/ m³, but less than 650 kg/ m³ perform RVP and Aromatics test to confirm it meets those specifications. If exceed max charge appropriate toll (i.e. Light Petroleum, etc.).</p> <p>Industry Equalization max has been reduced to 799 kg/m³ from 815 kg/m³.</p> <p>Upon violation warning sent to violating shipper. If violation continues in 2nd month stream reclassified and shipper requested to nominate to appropriate stream (i.e. MSW, etc.). Once shipper demonstrates that they are back in spec range they are allowed to nominate to the CRW pool the following month.</p>
Viscosity (7.5 C)	cSt		2.0	ASTM D445 Frequency: QR+ ⁴	<p>Enbridge Tariff specification.</p> <p>If exceed max charge appropriate toll (i.e. Light Petroleum, etc.).</p> <p>Upon violation increase monitoring for 1 month. If it continues off spec for that month then notify. If continue off spec in the 2nd month you will be reclassified to the appropriate stream (i.e. MSW, etc) for the 3rd month. In the case of a violation that is corrected in month 2, more frequent monitoring would continue to confirm compliance.</p>
Sulfur, total	wt%		0.5	ASTM D5453 Frequency: AR ²	<p>Industry Equalization specification.</p> <p>Follow similar procedure to Enbridge Book 5 03-03-21: Maintaining 0.5% Weight Sulphur Standard but modified for CRW. CRW Procedure to be developed.</p>
Olefins, total ¹	wt%		<1	PONAOX(U) ASTM 6729 (240 cut) Frequency: QR+ ⁴	<p>CAPP Directive specification.</p> <p>Enforcement and Consequence: Apply Olefin Decision Tree (all shippers to be advised of location of document once posted)</p>
Reid Vapour Pressure	kPa		103	ASTM D323M Frequency: MR ³	<p>Rules and Regs. filed with NEB/FERC specification.</p> <p>Enforcement and Consequence: Immediate shut-in⁵</p>
BS&W	vol%		0.5	ASTM D95 Frequency: AR ²	<p>Rules and Regs. filed with NEB/FERC specification.</p> <p>Enforcement and Consequence: Immediate shut-in⁵</p>
Organic Chlorides ¹	wppm		<1	ASTM D4929 Frequency: QR+ ⁴	<p>Rules and Regs. filed with NEB/FERC specification.</p> <p>Enforcement and Consequence: Immediate shut-in upon identifying violation. Request 3rd party Certificate of Analysis prior to subsequent receipt for period of 1 month.</p>
Aromatics, total (BTEX)	vol%	2.0		PONAOX(U) ASTM 6729 Frequency: QR+ ⁴	<p>Below min possible with passing Wiehe crude compatibility test.</p> <p>Enforcement and Consequence: Reclassify⁶</p>

Mercaptans, volatile (cumulative C1, C2,C3)	ppmw S		175	ASTM D5623 Frequency: QR+ ⁴	Enforcement and Consequence: Reclassify ⁶
H ₂ S (in liquid phase)	wppm		20	ASTM D5623 Frequency: QR+ ⁴	Enforcement and Consequence: Reclassify ⁶
Benzene ⁸	vol%		1.6	PONAOX(U) ASTM 6729 Frequency: QR+ ⁴	Enforcement and Consequence: Delayed shut-in ⁷
Mercury ¹	wppb		10	UOP 938 (CVAA) Frequency: QR+ ⁴	Enforcement and Consequence: Delayed shut-in ⁷
Oxygenates	wppm		100	PONAOX(U) ASTM 6729 Frequency: QR+ ⁴	Enforcement and Consequence: Delayed shut-in ⁷
Total Suspended Solids	mg/l		200	ASTM D4807 Frequency: QR+ ⁴	Enforcement and Consequence: Reclassify ⁶
Phosphorous, volatile	ppm	Per CAPP guidelines		ICP AES D86 (250 cut) Frequency: QR+ ⁴	CAPP Guidance. Refer to ERCB Directive 058. Violating test results communicated to the ERCB.
Selenium	wppb	Application Only		ICP MS	For new stream applications this information to be provided to Enbridge
Pour Point	C	Application Only		ASTM D97	For new stream applications this information to be provided to Enbridge
Salt Content	ptb	Application Only		ASTM 3230	For new stream applications this information to be provided to Enbridge
Simdist		Application Only		ASTM D2887	For new stream applications this information to be provided to Enbridge

Existing Specification

New Specification

New – Application Only

Existing – Application Only

Notes

- For these properties intent is that blending not occur up to specification limit
- AR: All Receipts of CRW component streams tested using a weekly composite
- MR: Monthly Random testing of CRW component streams
- QR+: Quarterly Random testing plus up to 4 additional tests per CRW component stream. Upon violation perform probational testing at Enbridge discretion
- Immediate shut-in upon identifying violation. Request 3rd party Certificate of Analysis prior to subsequent receipt for period of 1 month.
- Upon violation increase monitoring for 1 month. If continues off spec for that month then notify. If continue off spec in the 2nd month reclassified to the appropriate stream (ie. MSW, etc) for the 3rd month. In the case of a violation that is corrected in month 2, more frequent monitoring would continue to confirm compliance.
- Upon violation increase monitoring for 1 month. If violation continues for 2 consecutive months shut-in stream at end of 2nd month. Certificate of Analysis required to get back into pool.
- Benzene level of the CRW pool to be monitored and if a test result of 1.25 vol % is received the Enbridge CRW Committee will reconvene to discuss appropriateness of benzene spec on CRW component streams.