

# ETV Canada Verified



## EcoLibra Resource Recovery System-Municipal Sewage (R2S-MS)<sup>1</sup>

Commercial name EcoLibra Municipal Wastewater Treatment & Recovery System

### Technology Fact Sheet for EcoLibra Systems Inc.

## Performance Claim

When installed and operated in accordance with the manufacturer’s standard operating conditions and specifications, the EcoLibra Resource Recovery System-Municipal Sewage (R2S-MS), treated wastewater with characteristics no higher than those listed in A: Influent Parameters below to produce treated water, sludge and leachate with characteristics less than those listed in B: Effluent Parameters, C: Sludge Parameters and D: Heavy Metals Leachate Results (excluding temperature and pH) with 95% confidence. The EcoLibra R2S-MS achieved the treated water and sludge qualities specified at high level, mid level, and low temperature conditions (0.4 – 26.2°C). The EcoLibra R2S-MS treatment processes do not employ chlorine or chlorine compounds in its operation.

#### A: Influent Parameters

Influent Parameter	Influent Average
Temperature (°C)	0.4-26.2
pH	7-9
BOD <sub>5</sub> (Biochemical Oxygen Demand), mg/L	153 ± 48
TSS (Total Suspended Solids), mg/L	195 ± 128
TN (Total Nitrogen), mg/L	44 ± 7
TP (Total Phosphorous), mg/L	7 ± 2
Total Coliform, MPN/100ml	63x10 <sup>6</sup> ± 40x10 <sup>6</sup>
CBOD <sub>5</sub> (Carbonaceous BOD), mg/L	124 ± 50
TDS (Total Dissolved Solids), mg/L	1,815 ± 725
Ammonia as Nitrogen, mg/L	33 ± 7
Total Kjeldahl Nitrogen, mg/L	44 ± 7
Nitrite + Nitrate Nitrogen, mg/L	0.4 ± 0.6
SP (Soluble Phosphorous), mg/L	4 ± 1
EC (E. Coli), MPN/100ml	3.8x10 <sup>6</sup> ± 1.8x10 <sup>6</sup>
FC (Fecal Coliform), ct/100ml	1.9x10 <sup>6</sup> ± 1.0x10 <sup>6</sup>
COD (Chemical Oxygen Demand), mg/L	641 ± 230

#### C: Sludge Results

BioSolids Output Parameter	
Total Kjeldahl Nitrogen, µg/g	<4750
Carbon, %	<13.7
Mercury, µg/g	<0.19
Arsenic, µg/g	<0.96
Cadmium, µg/g	<0.5
Calcium, µg/g	<268,000
Chromium, µg/g	<7.15
Cobalt, µg/g	<0.87
Copper, µg/g	<49.5
Lead, µg/g	<1.82
Molybdenum, µg/g	<1.05
Nickel, µg/g	<7.1
Phosphorus, µg/g	<4650
Selenium, µg/g	<0.69
Sodium, µg/g	<6500
Zinc, µg/g	<105

#### B: Effluent Parameters

Effluent Parameter	
Temperature (°C)	5.8-22 °C
pH	7-9
BOD <sub>5</sub> mg/L	<3.5
TSS mg/L	<7.7
TN mg/L	<8.9
TP mg/L	<1
Total Coliform, MPN/100ml	<292
CBOD <sub>5</sub> mg/L	<3.3
TDS mg/L	<1,200
Ammonia as Nitrogen, mg/L	<5.6
Total Kjeldahl Nitrogen, mg/L	<8.5
Nitrite + Nitrate Nitrogen, mg/L	<0.48
SP mg/L	<1.05
EC MPN/100ml	<1.7
FC ct/100ml	<1.7
COD mg/L	<11.5

#### D: Heavy Metals Leachate Results

Leachate Output Parameter	
Mercury, µg/L	<0.072
Aluminum, mg/L	<0.005
Barium, mg/L	<0.15
Beryllium, mg/L	<0.001
Boron, mg/L	<0.125
Cadmium, mg/L	<0.001
Chromium, mg/L	<0.0045
Cobalt, mg/L	<0.0031
Copper, mg/L	<0.235
Iron, mg/L	<0.001
Lead, mg/L	<0.002
Manganese, mg/L	<0.001
Molybdenum, mg/L	<0.007
Nickel, mg/L	<0.022
Silicon (soluble), mg/L	<0.11
Silver, mg/L	<0.001
Strontium, mg/L	<0.82
Titanium, mg/L	<0.001
Vanadium, mg/L	<0.002
Zinc, mg/L	<0.005
Zirconium, mg/L	<0.002

1 Commercial name EcoLibra Municipal Wastewater Treatment & Recovery System

# Environmental Technology Verification

## Technology Application

EcoLibra Systems Inc. (EcoLibra) delivers advanced technologies that treat multiple types of wastewaters. The technology verified was the EcoLibra R2S-MS version (commercial name is EcoLibra Municipal Wastewater Treatment & Recovery System) that treats municipal wastewater and recovers nutrients and water. The technology is a packaged wastewater treatment and recovery system with flexible design capability (it can fit within a small building, mobile cargo trailer, sea-can, etc). The R2S-MS systematically applies a series of concepts and methodologies that are commonly used in the wastewater treatment industries.

## Performance Conditions

The EcoLibra Systems Inc. R2S-MS was subjected to verification testing of its multi-parameter technology performance claim. The testing was conducted at a lagoon adjacent to a pump house near Aberdeen, SK by a third party testing agency (TA), Tamarack Systems Inc. The samples were analyzed by the third party Saskatchewan Research Council's SRC Analytical Laboratories.

For the verification testing, no sludge or leachate testing for acrylamide was conducted. ETV Canada and the Verification Entity (VE), Edmonton Wastewater Management Center of Excellence (EWMCE), recognize the difficulty of finding an accredited laboratory to carry out acrylamide testing. However considering the nature of the polymer used in the R2S-MS, acrylamide would possibly be a breakdown product (most likely in the settled sludge) that may gain regulatory interest in the future.

## Technology Description

The R2S-MS is an automated, semi-continuous batch, chemical/physical municipal wastewater treatment system. The system incorporates both chemical treatment through direct addition of chemicals and physical processes to treat municipal strength wastewater. The process involves a series of consecutive steps to progressively treat wastewater constituents. The technology is also known as the EcoLibra Municipal Wastewater Treatment and Recovery System.

## Verification

The verification was conducted by Edmonton Waste Management Centre of Excellence (EWMCE), as the Verification Entity using ETV Canada's General Verification Protocol (February, 2007). The verification was based on information supplied by EcoLibra Systems Inc., and the performance tests conducted by the TA on the EcoLibra R2S-MS in late 2008 early 2009. The test protocol employed during performance testing was prepared for EcoLibra Systems Inc. by the EWMCE.

## What is the ETV Program?

The Environmental Technology Verification (ETV) Program is delivered by ETV Canada under a license agreement from Environment Canada. The ETV Program is designed to support Canada's environment industry by providing credible and independent verification of technology performance claims.

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