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Enalytic ID	E1906088-002
Batch Number	306242019
Train Number	UTLX647675
Sample ID	DEF 40.3%
Date Sampled	6/24/2019
Date Received	6/25/2019
Report Date	6/28/2019

## Certificate of Analysis

Marine Diesel Exhaust Fluid Analytical ISO-18611

Client ID: 40.3% DEF Batch# 306242019 Train# UTLX647675

Test Parameter/Method	Units	Test Method (ISO) <sup>1</sup>	Acceptable Limit <sup>2,3</sup>	Results	Chemist	Analysis Date	Pass/Fail
Urea Content	wt%	18611-2 Annex C	(38.0-42.0)	41.7	SPT	6/27/2019	Pass
Refractive Index @ 20degC	N <sub>D</sub> <sup>20</sup>	18611-2 Annex C	1.3947-1.3982	1.3969	CND	6/27/2019	Pass
Alkalinity as NH <sub>3</sub>	%	18611-2 Annex D	<0.5	0.08	CND	6/27/2019	Pass
Biuret	%	18611-2 Annex E	<0.8	0.19	BDK	6/26/2019	Pass
Aldehyde	mg/kg	18611-2 Annex F	<100	<1.0	BDK	6/27/2019	Pass
Insolubles	mg/kg	18611-2 Annex G	<50	<2.0	BDK	6/27/2019	Pass
Phosphate	mg/kg	18611-2 Annex H	<1.0	<0.25	BDK	6/27/2019	Pass
Calcium by ICP-OES	mg/kg	18611-2 Annex I	<1.0	<0.05	CLB	6/25/2019	Pass
Iron by ICP-OES	mg/kg	18611-2 Annex I	<1.0	<0.05	CLB	6/25/2019	Pass
Copper by ICP-OES	mg/kg	18611-2 Annex I	<1.0	<0.02	CLB	6/25/2019	Pass
Zinc by ICP-OES	mg/kg	18611-2 Annex I	<1.0	<0.02	CLB	6/25/2019	Pass
Chromium by ICP-OES	mg/kg	18611-2 Annex I	<1.0	0.03	CLB	6/25/2019	Pass
Nickel by ICP-OES	mg/kg	18611-2 Annex I	<1.0	<0.02	CLB	6/25/2019	Pass
Aluminum by ICP-OES	mg/kg	18611-2 Annex I	<1.0	<0.05	CLB	6/25/2019	Pass
Magnesium by ICP-OES	mg/kg	18611-2 Annex I	<1.0	<0.05	CLB	6/25/2019	Pass
Sodium by ICP-OES	mg/kg	18611-2 Annex I	<1.0	<0.05	CLB	6/25/2019	Pass
Potassium by ICP-OES	mg/kg	18611-2 Annex I	<1.0	<0.05	CLB	6/25/2019	Pass

### Miscellaneous Secondary Unregulated Quality Standards


Identify by FTIR (attached)	Spectra	18611-2 Annex J	Control Match	Match	BDK	6/25/2019	Pass
Density @ 20degC	g/cm <sup>3</sup>	3675	1.1050-1.1770	1.1140	BDK	6/26/2019	Pass

Note 1: All ISO standards are up to date with the latest revisions.

Note 2: The acceptable limit values listed above are based on the ISO 18611 criteria for Marine DEF

Note 3: The API's expanded tolerance Low/High limits for Urea Content are shown in parentheses

**"The undersigned certifies that the value(s) reported have met the highest analytical quality control standards."**

Certification Approval   
Laboratory Director: Anthony J Scala

Date: 6/28/2019

Search results for: E1906088-002  
Date: Tue Jun 25 14:59:53 2019 (GMT-04:00)  
Search algorithm: Search Expert  
Regions searched: 2600.00-450.00

