



## ANALYTICAL REPORT

Customer: Paul Hayward  
Spectrum Fluid Technologies  
52 Buckler Rd  
North Wangaratta VIC 3676

Your Reference: Three urea Solutions and one raw material for ISO 22241 analysis

SGS Report Number: ENV 22319 (SE 140447)

Date of Receipt of Samples: 16/06/2015

Samples Description: Three 1000ml plastic bottles of Eco-DEF urea solution samples labelled "Batch 20150526, Batch 20150604 and 20150611" and one plastic bag of urea raw material labelled "Raw Urea Batch 2015010516" were received for ISO22241 test

The samples were analysed in accordance with your instructions. The results and associated information are contained in the following pages of the report. If you have any queries regarding this report please contact the undersigned.

Reported by: Pier Victor Garlando/Anna Yu

Report authorised by: Dr Peter Novella

Date: 23/06/2015

Date: 23/06/2015

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**Background:**

SGS was requested by Spectrum Fluid Technologies to conduct chemical and physical analysis for ISO22241 test on three 1000ml plastic bottles of Eco-DEF urea solution labelled “Batch 20150526, Batch 20150604 and 20150611” and one plastic bag of urea raw material labelled “Raw Urea Batch 2015010516”. The samples were logged on as follows:

<b>SGS ID</b>	<b>Sample No.</b>	<b>Sample Label</b>	<b>Sample Date</b>
140447-1	1	Batch# 20150526	26/5/2015
140447-2	2	Batch# 20150604	04/6/2015
140447-3	3	Batch# 20150611	11/6/2015
140447-4	4	Batch# 2015010516 Raw Urea Sample	10/6/2015

The raw material was prepared for a urea solution by SGS analyst. 325 grams of raw material was dissolved in 675 grams of Milli-Q water for prepare a solution at 32.5% w/w, on which it was conducted the ISO test.

**Analytical Results:**

Table 1: Eco DEF Urea samples

Parameters	Unit	Urea Eco-DEF Batch 20150526	Urea Eco-DEF Batch 20150604	Urea Eco-DEF Batch 20150611	Specification as ISO 22241-1:2006	
					Min.	Max.
Urea content*	% (w/w)	32.4	32.5	32.6	31.8	33.2
Density@20 °C	g/cm <sup>3</sup>	1.0917	1.0919	1.0920	1.0870	1.0930
Refracting index@20 °C	-	1.3829	1.3830	1.3831	1.3814	1.3843
Alkalinity as NH <sub>3</sub>	% (w/w)	<0.01	<0.01	<0.01	-	0.2
Biuret	% (w/w)	0.19	0.19	0.21	-	0.3
Aldehyde	mg/kg	<1	<1	<1	-	5
Insolubles	mg/kg	11	8	9	-	20
Phosphate (PO <sub>4</sub> )	mg/kg	<0.5	<0.5	<0.5	-	0.5
Calcium	mg/kg	<0.5	<0.5	<0.5	-	0.5
Iron	mg/kg	<0.2	<0.2	<0.2	-	0.5
Copper	mg/kg	0.16	0.17	0.18	-	0.2
Zinc	mg/kg	<0.1	<0.1	<0.1	-	0.2
Chromium	mg/kg	0.05	0.05	0.07	-	0.2
Nickel	mg/kg	<0.1	<0.1	<0.1	-	0.2
Aluminium	mg/kg	<0.2	<0.2	<0.2	-	0.5
Magnesium	mg/kg	<0.5	<0.5	<0.5	-	0.5
Sodium	mg/kg	<0.5	<0.5	<0.5	-	0.5
Potassium	mg/kg	<0.5	<0.5	<0.5	-	0.5

\* - By Method ISO 22241-2:2006 Annex C Determination urea content by refractive index

**Opinions:** The results for the urea samples labelled “Eco-DEF Batch 20150526, Eco-DEF Batch 20150604 and Eco-DEF Batch 20150611” were found to be within the limits of the ISO2241and DIN 70070 specification.

Table 2: Urea solution from Raw Urea sample

Parameters	Unit	Urea Solution made by SGS from Raw Urea Batch 2015010516	Specification as ISO 22241-1:2006	
			Min.	Max.
Urea content*	% (w/w)	32.5	31.8	33.2
Density@20°C	g/cm <sup>3</sup>	1.0916	1.0870	1.0930
Refracting index@20°C	-	1.3829	1.3814	1.3843
Alkalinity as NH <sub>3</sub>	% (w/w)	<0.01	-	0.2
Biuret	% (w/w)	0.2	-	0.3
Aldehyde	mg/kg	<0.1	-	5
Insolubles	mg/kg	10	-	20
Phosphate (PO <sub>4</sub> )	mg/kg	<0.5	-	0.5
Calcium	mg/kg	<0.5	-	0.5
Iron	mg/kg	<0.2	-	0.5
Copper	mg/kg	<0.05	-	0.2
Zinc	mg/kg	<0.1	-	0.2
Chromium	mg/kg	<0.05	-	0.2
Nickel	mg/kg	<0.1	-	0.2
Aluminium	mg/kg	<0.2	-	0.5
Magnesium	mg/kg	<0.5	-	0.5
Sodium	mg/kg	<0.5	-	0.5
Potassium	mg/kg	<0.5	-	0.5

\* - By Method ISO 22241-2:2006 Annex C Determination urea content by refractive index

**Opinions:** The results for the urea solution prepared by SGS from the urea raw sample labelled "Raw Urea 2015010516" were found to be within the limits of the ISO2241 and DIN 70070 specification.