## CERTIFICATE OF ANALYSIS

# **BASELINE®** Ammonia Solution

	PRODU	JCT NU	MBER:	S02070	)1	LOT	IUMBEI	R: 7216	070	AS	SAY (NI	13, w/w	): <b>21</b> %	<b>,</b>		
2A 4 Be < 0.05	average evaporate Nitric Acid	of three alied to dryne	quots subs ss. The res ogen Perox	ampled fron ulting residu ide. Operati	n three sam e is reconst ons are con	nples repres ituted in a s iducted und	sentative of mall volume er Class 100	the lot. The of SEASTA or better cl	e samples a AR™ BASEL ean-room c	are slowly INE® 2% onditions.	3A	4A	5A	6A	7A	
< 2										2B	< 10					
<b>20</b> Ca < 10	<b>21</b> Sc < 0.01	<b>22</b> Ti < 0.5	23 V < 1	<b>24</b> Cr < 0.2					<b>29 C</b> u < 0.5	<b>30 Zn</b> < 2	<b>31 Ga</b> < 0.01	<b>32 Ge</b> < 0.01	33 As < 0.5	34 Se < 1		
<b>38</b> Sr < 0.05	<b>39 Y</b> < 0.01	<b>40 Z</b> r < 0.01	<b>41 N</b> b < 0.01	<b>42 Mo</b> < 0.05		<b>44 Ru</b> < 0.01	<b>45</b> Rh < 0.01	<b>46 Pd</b> < 0.1	<b>47 Ag</b> < 0.01	<b>48 Cd</b> < 0.02	<b>49</b> In < 0.01	<b>50</b> Sn < 0.1	<b>51 Sb</b> < 0.05	<b>52 Te</b> < 0.05		*
<b>56</b> Ba < 0.1	57 La < 0.01		73 Ta					78 Pt		_		<b>82 Pb</b> < 0.02				
	4 Be < 0.05  12 Mg < 2  20 Ca < 10  38 Sr < 0.05	2A Most eler average evaporate Nitric Acid For volati below 3 ti 3B  20 Ca 21 Sc < 10 < 0.01  38 Sr 39 Y < 0.05  56 Ba 57 La	2A  4 Be average of three ali evaporated to dryne Nitric Acid / 2% Hydr For volatile elements below 3 times the state 3B 4B  4 20 Ca 21 Sc 22 Ti < 10 < 0.01 < 0.5  38 Sr 39 Y 40 Zr < 0.05  5 6 Ba 57 La 72 Hf	A Be < 0.05  Most elements are determined average of three aliquots subsevaporated to dryness. The resulting indicated below 3 times the standard deviation of the standard de	A Be average of three aliquots subsampled from evaporated to dryness. The resulting residu Nitric Acid / 2% Hydrogen Peroxide. Operating For volatile elements (indicated by *), the acid below 3 times the standard deviation of the base of the standard deviation	4 Be average of three aliquots subsampled from three same evaporated to dryness. The resulting residue is reconst Nitric Acid / 2% Hydrogen Peroxide. Operations are constructed by 12 Mg For volatile elements (indicated by *), the acid samples below 3 times the standard deviation of the blank are shown as the standard deviation of	A Be average of three aliquots subsampled from three samples represented to dryness. The resulting residue is reconstituted in a sometime of the provided by the provided of t	Most elements are determined by high resolution ICP-MS using sample pred average of three aliquots subsampled from three samples representative of evaporated to dryness. The resulting residue is reconstituted in a small volume Nitric Acid / 2% Hydrogen Peroxide. Operations are conducted under Class 100 For volatile elements (indicated by *), the acid samples are diluted then directly below 3 times the standard deviation of the blank are shown with '<', no blank valued as a second conducted under Class 100 For volatile elements (indicated by *), the acid samples are diluted then directly below 3 times the standard deviation of the blank are shown with '<', no blank valued as a second conducted under Class 100 For volatile elements (indicated by *), the acid samples are diluted then directly below 3 times the standard deviation of the blank are shown with '<', no blank valued as a second conducted under Class 100 For volatile elements (indicated by *), the acid samples are diluted then directly below 3 times the standard deviation of the blank are shown with '<', no blank valued as a second conducted under Class 100 For volatile elements (indicated by *), the acid samples are diluted then directly below 3 times the standard deviation of the blank are shown with '<', no blank valued as a second conducted under Class 100 For volatile elements (indicated by *), the acid samples are diluted then directly below 3 times the standard deviation of the blank are shown with '<', no blank valued as a second conducted under Class 100 For volatile elements (indicated by *), the acid samples are conducted under Class 100 For volatile elements (indicated by *), the acid samples are conducted under Class 100 For volatile elements (indicated by *), the acid samples are conducted under Class 100 For volatile elements (indicated by *), the acid samples are conducted under Class 100 For volatile elements (indicated by *), the acid samples are conducted under Class 100 For volatile elements (indicated by *), the acid samples are cond	Most elements are determined by high resolution ICP-MS using sample preconcentration average of three aliquots subsampled from three samples representative of the lot. 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Values below 3 times the standard deviation of the blank are shown with '<', no blank value is subtracted.  3B 4B 5B 6B 7B 8 1B 2B  420 Ca 21 Sc 22 Ti 23 V 24 Cr 25 Min 26 Fe 27 Co 28 Ni 29 Cu 30 Zn < 10 < 0.01 < 0.5 < 1 < 0.2 < 0.05 < 0.02 < 2 < 0.05 < 2 < 0.05 < 2 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.001 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.001 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.	A Be average of three aliquots subsampled from three samples representative of the lot. The samples are slowly evaporated to dryness. The resulting residue is reconstituted in a small volume of SEASTAR™ BASELINE® 2% Nitric Acid / 2% Hydrogen Peroxide. Operations are conducted under Class 100 or better clean-room conditions. For volatile elements (indicated by *), the acid samples are diluted then directly injected into the ICP-MS. Values below 3 times the standard deviation of the blank are shown with '<', no blank value is subtracted.  3B 4B 5B 6B 7B 8 1B 2B  4 20 Ca 21 Sc 22 Ti 23 V 24 Cr 25 Mn 26 Fe 27 Co 28 Ni 29 Cu 30 Zn 31 Ga < 10 < 0.01 < 0.5 < 1 < 0.2 < 0.05 < 0.5 < 0.02 < 2 < 0.5 < 2 < 0.01  5 38 Sr 39 Y 40 Zr 41 Nb 42 Mo 44 Ru 45 Rh 46 Pd 47 Ag 48 Cd 49 In < 0.05 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01  5 6 Ba 57 La 72 Hf 73 Ta 74 W 75 Re 78 Pt 79 Au 80 Hg 81 TI	2A  Most elements are determined by high resolution ICP-MS using sample preconcentration. 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#### ALL VALUES ARE REPORTED IN PARTS PER TRILLION (PPT)

NE I	.(1)	All
(1) (2)	(2)	Ele
(3)	(3)	Co
(4)		

KEY (1) Atomic Number

(2) Elemental Symbol(3) Concentration (mean

in ppt)

(4) 1 Standard Deviation (N=3)

58 Ce	59 Pr	60 Nd	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu
< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
- 1												
90 Th		92 U										
< 0.01		< 0.01										

BASELINE

NH<sub>3</sub> (20 - 22%): Properties

Molar Mass: 17.03g/mol

Density: 0.92 g/ml

Molarity: 11 moles/litre

Normality: 11 moles/litre

Release Date: August 19, 2016 Expiry Date: August 19, 2019

Greg Henson QA & RA Manager



## **Product Integrity:**

Based on extensive testing results, SEASTAR CHEMICALS INC have found our products, unopened and sealed, maintain the certified integrity, or product quality, for a minimum of three years under the following conditions:

- Stored at room temperature, maximum range 15°C (59°F) to 25°C (77°F).
- Minimum exposure to light.
- For limited time, storage/transport temperature range 5°C (41°F) to 35°C (95°F)

Upon opening the product, the product's integrity will depend on proper handling and exposure to contaminants. The product has been bottled under CLASS 100 clean room conditions, to maintain the certified quality it should be used under these conditions. Furthermore to reduce trace metal contamination, the inner pack of plastic bags and bottle should be opened under CLASS 100 particle conditions to maintain the integrity of the product. The use of plastic gloves, hair net and a clean room suit is also advised.

### Safety:

PRIOR to opening or storing this product be sure to consult the Material Safety Data Sheet (MSDS) Section 7 Handling and Storage to ensure safe storage and handling with regards to this hazardous material. This information must be understood prior to its use or storage.

SAFETY HANDLING NOTES: Consult your MSDS, PRIOR to handling these materials. Use proper safety apparel according to the recommendations of the MSDS. Exposure controls and personal protection should include: a properly functioning fume hood, protection for eyes (safety glasses), hands (chemically compatible gloves), feet (chemically compatible boots) and exposed skin (splash protection and a chemically compatible apron). All of these items must conform to local/regional/national regulatory requirements.

Greg Henson

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QA & RA Manager

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