CERTIFICATE OF ANALYSIS

BASELINE® Hydrofluoric Acid

1	PRODU	CT NUI	MBER: \$	S020502	2 L	OT NU	MBER:	521303	4		ASSAY ((HF, w/v	v): 50%	, 0		
2A 4 Be < 0.1	average evaporate Nitric Acid	of three ali ed to dryne d / 2% Hydr	quots subs ss. The resu ogen Perox	ampled fron ulting residu ide. Operati	n three sam e is reconst ons are con	nples repres tituted in a s iducted und	sentative of mall volume er Class 10	the lot. The of SEASTA or better cl	e samples a AR™ BASEL ean-room c	are slowly INE® 2% conditions.	3A 5 B < 10	4A	5A	6A	7A	
12 Mg < 0.5										1S. Values 2B	13 AI < 5					
20 Ca < 5	21 Sc < 0.1					26 Fe < 5		28 Ni < 1	29 Cu < 5	30 Zn < 1	31 Ga < 0.1	32 Ge < 0.1	33 As * < 20	34 Se < 50		
38 Sr < 1	39 Y < 0.1	40 Z r < 0.5	41 Nb < 0.1	42 M o < 0.1		44 Ru < 0.1	45 Rh < 0.1	46 Pd < 0.1	47 A g < 0.1	48 Cd < 0.1	49 In < 0.1	50 Sn < 0.1	51 Sb < 0.1	52 Te < 0.1		
56 Ba	57 La	72 Hf	73 Ta					78 Pt	79 Au							
	2A 4 Be < 0.1 12 Mg < 0.5 20 Ca < 5 38 Sr < 1	2A Most eler average evaporate Nitric Acid For volati below 3 ti 3B 20 Ca 21 Sc < 5 < 0.1 38 Sr 39 Y < 1 < 0.1	2A 4 Be average of three ali evaporated to dryne Nitric Acid / 2% Hydr 12 Mg For volatile elements below 3 times the state 3B 4B 20 Ca 21 Sc 22 Ti < 5 < 0.1 < 10 38 Sr 39 Y 40 Zr < 1 < 0.5	2A 4 Be	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	A Be average of three aliquots subsampled from three san evaporated to dryness. The resulting residue is reconst Nitric Acid / 2% Hydrogen Peroxide. Operations are constructed by The acid samples below 3 times the standard deviation of the blank are shown as a second standard deviation of the blank are shown as a sec	A Be average of three aliquots subsampled from three samples represented to dryness. The resulting residue is reconstituted in a substantial provided by the samples are conducted und for volatile elements (indicated by *), the acid samples are diluted below 3 times the standard deviation of the blank are shown with '<', 3B 4B 5B 6B 7B 20 Ca 21 Sc 22 Ti 23 V 24 Cr 25 Mn 26 Fe < 5 < 0.1 < 10 < 0.1 < 0.5 < 0.1 < 5 38 Sr 39 Y 40 Zr 41 Nb 42 Mo < 44 Ru < 0.1	A Be 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 at the standard deviation of the blank are shown with '<', no blank valued at the standard deviation of the blank are shown with '<', no blank valued at the standard deviation of the blank are shown with '<', no blank valued at the standard deviation of the blank are shown with '<', no blank valued at the standard deviation of the blank are shown with '<', no blank valued at the standard deviation of the blank are shown with '<', no blank valued at the standard deviation of the blank are shown with '<', no blank valued at the standard deviation of the blank are shown with '<', no blank valued at the standard deviation of the blank are shown with '<', no blank valued at the standard deviation of the blank are shown with '<', no blank valued at the standard deviation of the blank are shown with '<', no blank valued at the standard deviation of the blank are shown with '<', no blank valued at the standard deviation of the blank are shown with '<', no blank valued at the standard deviation of the blank are shown with '<', no blank valued at the standard deviation of the blank are shown with '<', no blank valued at the standard deviation of the blank are shown with '<', no blank valued at the standard deviation of the blank are shown with '<', no blank valued at the standard deviation of the blank are shown with '<', no blank valued at the standard deviation of the blank are shown with '<', no blank valued at the standard deviation of the blank are shown with '<', no blank valued at the standard deviation of the blank are shown with '<', no blank valued at the standard deviation of the blank are shown with '<', no blan	Most elements are determined by high resolution ICP-MS using sample preconcentration average of three aliquots subsampled from three samples representative of the lot. The evaporated to dryness. The resulting residue is reconstituted in a small volume of SEASTA Nitric Acid / 2% Hydrogen Peroxide. Operations are conducted under Class 100 or better 100 or better 100	A Be average of three aliquots subsampled from three samples representative of the lot. The samples evaporated to dryness. The resulting residue is reconstituted in a small volume of SEASTAR™ BASEIN Nitric Acid / 2% Hydrogen Peroxide. 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ALL VALUES ARE REPORTED IN PARTS PER TRILLION (PPT)

(1) (2) (3)

(4)

(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
< 0.1	< 0.1	< 0.1	L TE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
90 Th		92 U											
< 0.1	L.	< 0.1											
	1												



HF (47 - 51%): Properties

Molar Mass: 20.01g/mol
Density: 1.18 g/ml
Molarity: 29 moles/litre
Normality: 29 moles/litre

Analyte Maximum Actual
Specification Value (in ppb)

Total Sulphur (S) 100 ppb < 50

Release Date: October 21, 2013 Expiry Date: October 21, 2016

B McKelvey

Dr. B. McKelvey QA/QC 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.

Dr. B. McKelvey QA/QC Manager

B MªZ

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