ALPHA RESOURCES LLC

Value Beyond Measure

For Immediate Release

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Certified Reference Materials Releases for Q2 2023

Stevensville, Michigan, July 11, 2023 – Alpha Resources LLC, the largest manufacturer of aftermarket consumables and reference materials, is pleased to announce the following new product offerings and updates in certified reference materials which have been released in Q2 of 2023 from their lab. Notably, in addition to new lots for numerous CRMs, several brand new CRMs were released: high sulfur steel CRMs (AR867 and AR959) and a new hydrogen in steel CRM (AR546).

New Lots available in Q2 2023 for Organic Reference Materials include:

- BENZOIC ACID CALORIMETRIC CRM |AR208, AR208C, AR208V, AR1790, AR1790C, AR1790V, AR3403 | Lot # 2204
- EDTA CRM | AR2092 | Lot # 1122V
- AR1684 | Lot 684423 (0.103±0.007%S in Coal CRM)
- AR1700 | Lot 700523 (0.34±0.03%S in Coal CRM)
- AR1706 | Lot 706523 (2.03±0.07%S in Coal CRM)
- AR1711 | Lot 711623 (5.16±0.14%S in Coal CRM)
- AR2049 | Lot 049423 (3.17±0.11%S in Crude CRM)
- AR2771 | Lot 771223 (Ultimate Coke CRM)
- AR2836 | Lot 836323 (2.07±0.05%S in Lube CRM)
- AR2892 | Lot 892423 (0.20±0.01%S in Residual Oil CRM)

AR 4012 | CARBON AND SULFUR IN LIMESTONE CRM | LOT #622Q

% CARBON	% SULFUR
MEAN = 12.02	MEAN = 0.033
Expanded Uncertainty = ± 0.32	Expanded Uncertainty = ± 0.009
(k=2, @ 95% confidence) (n=37)	(k=2, @ 95% confidence) (n=38)

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AR 4018 | CARBON AND SULFUR IN LIMESTONE CRM | LOT #323H

% CARBON	% SULFUR
MEAN = 1.11	MEAN = 1.04
Expanded Uncertainty = ± 0.10	Expanded Uncertainty = ± 0.11
(k=2, @ 95% confidence) (n=41)	(k=2, @ 95% confidence) (n=40)

In Q2 2023, Alpha Resources released **three new Inorganic Certified Reference Materials** to the industrial marketplace:

AR 546 | HYDROGEN IN STEEL CRM | LOT #922K

*TOTAL HYDROGEN (melted/fused)
*MEAN Value = ± 0.7 (ug/g) (0.00007 wt. %
Standard Deviation= ±0.1 (ug/g) (± 0.00001 wt. %)
Expanded Uncertainty = ±0.3 (ug/g) (± 0.00003 wt. %)
(k=2, @ 95% confidence) (n=42)

AR 867 | HIGH SULFUR LOW CARBON STEEL RING CRM | LOT # 2223G

% CARBON	% SULFUR
MEAN = 0.150	MEAN = 0.107
Standard Deviation = ± 0.003	Standard Deviation = ± 0.002
Expanded Uncertainty = ± 0.006	Expanded Uncertainty = ± 0.004
(k=2, @ 95% confidence) (n=34)	(k=2, @ 95% confidence) (n=33)

AR 959 | HIGH SULFUR CARBON STEEL CHIP CRM | LOT # 922N

%CARBON	% NITROGEN	% SULFUR
MEAN = 0.475	MEAN = 0.0083	MEAN = 0.367
Standard Deviation = ± 0.007	Standard Deviation = ± 0.0005	Standard Deviation = ± 0.008
Expanded Uncertainty = ± 0.015	Expanded Uncertainty = ± 0.0010	Expanded Uncertainty = ± 0.017
(k=2, @ 95% confidence) (n=33)	(k=2, @ 95% confidence) (n=85)	(k=2, @ 95% confidence) (n=34)

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New lots released of available Inorganic Certified Reference Materials in Q2 2023 include:

AR 146 | OXYGEN &SULFUR IN COPPER PIN CRM | LOT # 322F

% OXYGEN	% SULFUR*
MEAN = 0.0251	MEAN = 0.0006
Standard Deviation = ± 0.0003	Standard Deviation = ± 0.0001
Expanded Uncertainty = ± 0.0007	Expanded Uncertainty = ± 0.0002
(k=2, @ 95% confidence) (n=36)	(k=2, @ 95% confidence) (n=36)

**Indicates below test method scope limit*

AR 318 | CAST IRON CRM | LOT # 722E

% CARBON	% SULFUR
MEAN = 2.97	MEAN = 0.041
Standard Deviation = ± 0.03	Standard Deviation = ± 0.002
Expanded Uncertainty = ± 0.06	Expanded Uncertainty = ± 0.003
(k=2, @ 95% confidence) (n=49)	(k=2, @ 95% confidence) (n=47)

AR 631 | TITANIUM O/N/H CRM | LOT # 123C

% OXYGEN	% NITROGEN*	% HYDROGEN*
MEAN = 0.389	MEAN = 0.0076	MEAN = 0.0016
Standard Deviation = ± 0.009	Standard Deviation = ± 0.0011	Standard Deviation = ± 0.0002
Expanded Uncertainty = ± 0.020	Expanded Uncertainty = ± 0.0023	Expanded Uncertainty = ± 0.0006
(k=2, @ 95% confidence) (n=52)	(k=2, @ 95% confidence) (n=51)	(k=2, @ 95% confidence) (n=34)

** Indicates below test method scope limit*

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AR 673 | WROUGHT IRON CHIP CRM | LOT # 223E

% CARBON	% SULFUR
MEAN = 0.0004*	MEAN = 0.0011*
Standard Deviation = ± 0.0001	Standard Deviation = ± 0.0001
Expanded Uncertainty = ± 0.0003	Expanded Uncertainty = ± 0.0003
(k=2, @ 95% confidence) (n=35)	(k=2, @ 95% confidence) (n=58)

* *Indicates below test method scope limit*

AR 676 | HIGH OXYGEN & NITROGEN STEEL RING CRM | LOT # 123A

% OXYGEN	% NITROGEN
MEAN = 0.028	MEAN = 0.146
Standard Deviation = ± 0.005	Standard Deviation = ± 0.004
Expanded Uncertainty = ± 0.010	Expanded Uncertainty = ± 0.008
(k=2, @ 95% confidence) (n=47)	(k=2, @ 95% confidence) (n=43)

**NOTE: The addition of graphite powder was used for analysis. The black/brown color of the pin is normal.*

AR 871 | LOW CARBON STEEL RING CRM | LOT # 323J

% CARBON	% SULFUR
MEAN = 0.037	MEAN = 0.015
Standard Deviation = ± 0.001	Standard Deviation = ± 0.001
Expanded Uncertainty = ± 0.003	Expanded Uncertainty = ± 0.002
(k=2, @ 95% confidence) (n=36)	(k=2, @ 95% confidence) (n=37)

AR 3085 | ZINC SULFIDE CRM | LOT #223F

% SULFUR (by purity)	% SULFUR (by analysis)
32.9%	MEAN = 32.9%
Purity – 99.99%	Expanded Uncertainty = ± 1.2
	(k=2, @ 95% confidence) (n=39)

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AR 6101 | HIGH NITROGEN COMPOSITE BLEND CRM | LOT #722A

*TOTAL NITROGEN
*MEAN Value = ± 0.96%
Standard Deviation= ±0.05%
Expanded Uncertainty = ±0.11%
(k=2, @ 95% confidence) (n=51)

AR 6102 | HIGH NITROGEN COMPOSITE BLEND CRM | LOT #722B

*TOTAL NITROGEN
*MEAN Value = ± 2.05%
Standard Deviation= ±0.14%
Expanded Uncertainty = ±0.30%
(k=2, @ 95% confidence) (n=42)

AR 6103 | HIGH NITROGEN COMPOSITE BLEND CRM | LOT #722C

*TOTAL NITROGEN
*MEAN Value = ± 3.19%
Standard Deviation= ±0.17%
Expanded Uncertainty = ±0.39%
(k=2, @ 95% confidence) (n=38)

Available new lots of Inorganic Reference Materials released in Q2 2023 include:

- AR01011 | L-Aspartic Acid | Lot #423L
- AR2209 | Sulfamethazine Reference Material | Lot #1222W

A complete list of Alpha Resources certified reference materials maybe found online at: https://www.alpharesources.com/current-list-of-standards.php

About Alpha Resources

Founded in 1978, Alpha Resources, LLC is a global leader in the manufacture and distribution of consumables and creation of certified reference materials for use in elemental combustion analysis, and is ISO17034, ISO17025, ISO9001:2015 certified.