



ANALYTICAL REFERENCE MATERIALS INTERNATIONAL

700 Corporate Circle, Suite A
Golden, CO 80401

Phone - (303) 216-2621 FAX - (303) 216-2649

E-mail - armi@armi.com Web - www.armi.com


ILAP – 2011

Re-Issue of the CLA Series
Calibration Set

Carbon, Low-Alloy Cal. Set

- Re-Issue Present CLA Set
- Modify Chemistry (If Needed)
- Produce at Special Metals (Rick Corn)
- Modify Number of Standards in Set

Goals and Objectives

- Make the Set Friendlier to AS-AES (OE)
 - Change Chems. To Reflect Current Needs
 - Add Additional Elements Ca, Pb, Zn, etc.
 - Minimize Number of Standards Used
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Current CLA Status

- CLA 2, 4, 6, 8, 10, & 12 Out of Stock
- CLA 3, 5, 7, 9, & 11 are Less Than 24”
- Tungsten level – Undesirable??
- Inadequate Elemental Coverage

ARMI CLA 1-12 Series

	Al	As	B	C	Ca	Co	Cr	Cu	Mn	Mo	N	Nb
CLA-01	0.72	(0.002)	(0.0001)	0.004	0.0002	0.006	0.032	0.88	1.57	0.01	0.0003	0.006
CLA-02	0.80	(0.003)	(0.001)	0.003	(0.0002)	0.006	0.036	1.40	1.65	0.01	0.0004	0.007
CLA-03	0.55	(0.004)	(0.0002)	0.003	(0.0003)	0.004	0.014	0.64	1.29	1.08	0.0002	0.006
CLA-04	0.64	(0.004)	(0.0002)	0.003	(0.0002)	0.003	0.016	0.95	1.36	1.25	0.0005	0.006
CLA-05	0.19	(0.003)	0.0004	0.003	(0.0002)	0.003	0.004	0.01	0.12	0.69	0.0002	0.003
CLA-06	0.30	(0.009)	(0.001)	0.310	(0.0003)	0.005	2.190	0.31	0.21	0.95	0.0004	0.005
CLA-07	0.03	(0.005)	(0.0002)	0.560	(0.0001)	0.004	2.550	0.01	0.02	1.57	0.0003	0.004
CLA-08	0.08	(<0.01)	(0.0006)	0.640	(0.0001)	0.005	2.880	0.49	0.02	1.91	0.0003	0.005
CLA-09	0.39	(0.005)	0.0003	0.780	(0.0001)	0.006	3.520	0.40	0.01	0.01	0.0004	0.004
CLA-10	0.48	(<0.01)	0.0004	0.850	0.0002	0.010	4.390	0.72	0.01	0.02	0.0006	0.006
CLA-11	0.76	(0.004)	0.0004	0.007	(0.0001)	0.004	0.037	0.89	0.41	0.01	0.0096	(0.005)
CLA-12	0.87	(0.013)	(0.0002)	0.007	(0.0002)	(0.004)	0.044	1.45	1.76	0.01	0.0185	(0.007)
	0.03-0.9		3-4ppm				0.001-4.4		0.01-1.76		2-200	
				0.003-0.9		3-100		0.01-1.45		0.01-1.91		30-70

ARMI CLA 1-12 Series (Cont'd)

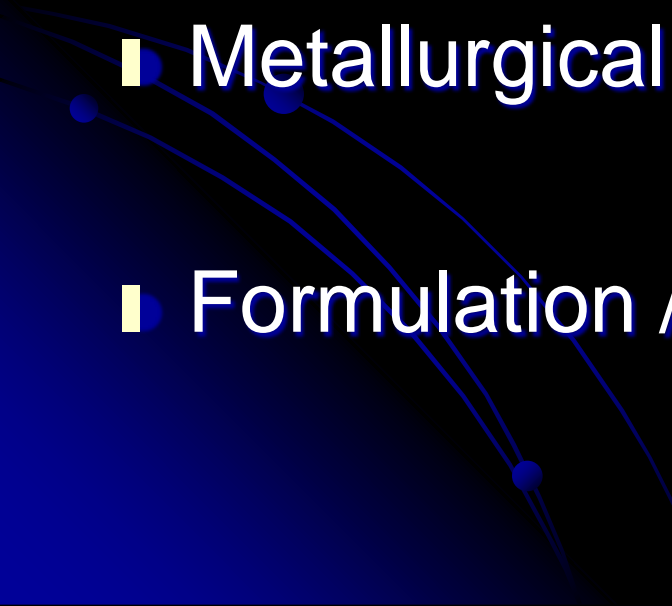
	Ni	O	P	Pb	S	Si	Sn	Ti	V	W	Zr
CLA-01	1.29	0.0005	0.004	(0.004)	0.070	0.02	0.002	0.002	0.78	1.44	(<0.005)
CLA-02	1.43	0.0004	0.005	(<0.01)	0.086	0.02	0.002	0.002	1.13	1.57	(<0.005)
CLA-03	0.77	0.0006	0.005	(<0.01)	0.073	0.91	(0.003)	0.002	0.40	1.02	(<0.01)
CLA-04	1.00	0.0007	0.019	(0.002)	0.087	1.08	0.003	0.003	0.59	1.19	(0.003)
CLA-05	2.32	0.0008	0.030	(<0.01)	0.064	0.46	0.003	0.004	0.004	0.52	(0.003)
CLA-06	2.50	0.0006	0.033	(0.002)	0.065	0.79	0.003	0.005	0.01	0.65	(<0.005)
CLA-07	1.51	0.0003	0.039	(<0.01)	0.025	0.01	0.002	0.006	0.01	(0.018)	(0.003)
CLA-08	1.95	(0.0004)	0.043	(<0.01)	0.059	0.25	0.002	0.005	0.01	0.13	(0.003)
CLA-09	0.03	0.0006	0.007	(<0.01)	0.004	1.29	0.003	0.003	0.00	0.04	(<0.005)
CLA-10	0.02	0.0007	0.015	(<0.01)	0.004	1.70	0.003	0.004	0.28	0.04	(<0.002)
CLA-11	1.29	0.0006	0.004	(0.002)	0.046	0.02	0.002	0.002	0.76	1.48	(0.003)
CLA-12	1.40	0.0006	0.004	(0.002)	0.095	0.03	0.002	0.003	1.12	1.65	(<0.01)
	0.02-2.5		40-400		40-950		20-30		0.004-1.1		
		3-10				0.01-1.7		20-50		0.04-1.65	

NIST 1760 Series

	Al	Ag	As	B	C	Ce	Co	Cr	Cu	Mn	Mo	N	Nb	Ni
1761	0.055	---	0.011	0.0023	1.05	---	0.027	0.222	0.298	0.679	0.103	0.0042	0.021	1.981
1762	0.069	---	0.018	0.0049	0.337	---	0.062	0.92	0.120	2.00	0.35	0.0022	0.070	1.15
1763	0.0435	---	0.055	0.0054	0.202	---	0.093	0.498	0.042	1.584	0.490	0.0045	0.100	0.513
1764	0.0098	---	0.0100	0.0010	0.592	---	0.012	1.468	0.5178	1.193	0.2007	0.0023	0.0416	0.2006
1765	(0.006)	0.0002	0.0010	0.0009	0.006	---	0.0012	0.051	0.0013	0.144	0.005	0.0010	0.0004	0.154
1766	0.012	0.0005	0.0035	0.00012	0.015	(0.002)	0.0020	0.024	0.015	0.067	0.0035	0.0033	0.005	0.021
1767	0.004	0.0008	0.0005	0.0010	0.052	---	0.0050	0.0015	0.0014	0.022	0.020	0.0008	0.010	0.002
	40-690		5-550		0.006-1		10-930		0.001-0.5		0.004-0.5		4-1000	
		2-8		1-54				0.001-1.5		0.02-2		8-45		0.002-2

	P	Pb	S	Sb	Se	Si	Sn	Ta	Te	Ti	V	W	Zr	Fe
1761	0.042	---	0.037	0.0052	---	0.182	0.050	0.050	---	0.173	0.054	---	0.012	95.0
1762	0.033	---	0.030	---	---	0.35	0.046	0.021	---	0.095	0.200	---	0.029	94.2
1763	0.0123	---	0.022	0.011	---	0.633	0.011	0.012	---	0.308	0.307	0.002	0.044	95.3
1764	0.0210	---	0.0118	---	---	0.0595	0.024	0.0297	---	0.029	0.1063	0.0016	0.0012	95.1
1765	0.0052	0.0003	0.0038	0.0010	(0.0035)	(0.004)	0.002	(0.004)	(0.003)	0.006	0.0040	---	(0.0002)	99.6
1766	0.002	0.003	0.0024	0.0005	(0.0035)	0.010	0.0010	(0.006)	(0.003)	5E-04	0.009	(0.001)	(0.0004)	99.8
1767	0.0031	---	0.0090	0.0020	---	0.026	0.006	(0.002)	(0.0003)	0.011	0.033	---	(0.004)	99.8
	20-420		24-370		35		10-500		3-30		0.004-0.3		2-440	
		3-30		5-110		0.01-0.6		20-500		5-1700		10-20		

Steps Required

- 1 Task Group Formation
 - 2 Selection of Desired Chemistries
 - 3 Metallurgical Evaluation of Feasibility
 - 4 Formulation / Order for Cost
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Chemistries of First 2 Customs

Heat #	Al	As	B	C	Ca	Co	Cr	Cu	Fe	Ge	Mg	Mn
HV1484	0.409	---	0.001	0.285	0.002	<0.001	0.02	0.014	98.02	---	<0.001	0.74
HV1485	0.235	0.002	0.001	0.423	0.004	0.003	0.011	0.003	97.62	0.002	<0.001	0.83

Heat #	Mo	Nb	Ni	P	S	Si	Ta	Ti	V	W	Zr
HV1484	0.006	0.005	0.048	0.004	0.0044	0.183	<0.001	0.245	0.001	0.006	0.002
HV1485	<0.001	0.003	0.197	0.008	0.0053	0.424	0.008	0.194	0.001	0.012	0.004

Recommendation

- 1. Compile Task Group Findings
 - 2. Summarize the results
 - 3. Consultation Trip to Special Metals
 - 4. Give the Go Ahead
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