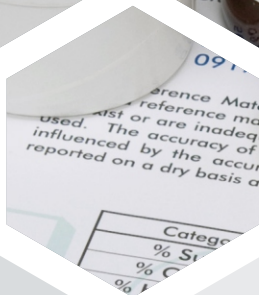
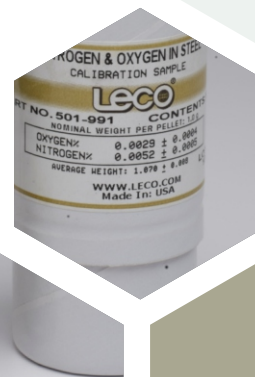


# *Reference Materials and Standards Catalog*



**LECO**  
EMPOWERING RESULTS



## Reference Materials and Standards

This catalog contains Reference Materials that are In Stock or have Limited Stock on hand. Limited Stock means that at the time of release, there are less than 10 units available to order.

Be advised, availability is based on the date the catalog is released. Please contact your local LECO sales office to confirm availability and precise inventory levels as product status can quickly change.

### New/Featured Items

Items listed below are new or may have recently been returned to stock.

Part Number	Description	Lot Number	Exp Date	Sulfur %	Carbon %	Oxygen %	Nitrogen %	ISO Ref
503-514	Steel Pin (1g x 100 per bottle)	742		0.0021	0.051	0.0024	0.0599	17034

### Glossary of Terms

Values in brackets {xx} are not certified and are included for information only.

LCRM - LECO Certified Reference Material

LRM - LECO Reference Material

LSUS - LECO Set-Up Standard

NACM - Non-Accredited Calibration Materials

NMI - National Metrology Institute

PCD - Pure Compound

PUR - Unspecified Certified Material

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## Categorized Listing

*Released May 5, 2021*

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## Metallic and Oxide Chips and Powders

Part No	Lot No	Description	Class	% S	% C	% O	H	% N	ISO Ref
502-899	1035	Cast Iron Powder (100 g)	LCRM	0.037	3.27				17034
502-919	1004	Cast Iron Powder (150 g)	LCRM	0.111	3.94				Guide 34
502-920	1003	Cast Iron Powder (150 g)	LCRM	0.019	4.82				Guide 34
502-399	JK47A	DRI Powder (35 g)	NMI		0.37	0.69		0.0062	
502-927	1004	Iron III Oxide Powder (10 g)	LCRM			30.4			Guide 34
502-702	1000	Iron Powder (100 g)	LCRM	0.01	0.342	1.1	{6} ppm	0.0079	Guide 34
502-970	1001	Iron Powder (100 g)	LCRM	0.0038	0.006				17034
502-698	1008	Iron Powder (150 g)	LCRM	0.013	2.16				Guide 34
502-139	1009	Silicon Dioxide Powder (10 g)	NACM			53.2			Guide 34
502-808	1000	Silicon Steel Chip	PUR	0.0088	0.074				
501-718	079-2	Steel Chip (100 g)	PUR	0.192	0.596			0.0074	
502-999	1000	Steel Chip (100 g)	LCRM	0.0012	0.0021			0.0005	17034
502-974	268-1	Steel Chip ECRM 268-1 (100 g)	PUR	0.0154	1.134			2.03	
502-961	379-1	Steel Chip ECRM 379-1 (100 g)	NMI	0.0006	0.0121			0.055	
502-706-HAZ	1000	Titanium Powder (25 g)	LCRM				279 ppm		Guide 34
502-707-HAZ	1000	Titanium Powder (25 g)	LCRM				276 ppm		Guide 34
502-708-HAZ	1000	Titanium Powder (25 g)	LCRM				259 ppm		Guide 34
502-930	1001	Tungsten Carbide Powder (100 g)	LCRM		6.24				17034
502-141	1031	Tungsten Oxide Powder (10 g)	LRM			20.7			Guide 34
501-801	489-1	White Cast Iron (100 g)	NMI	0.155	2.86			0.0056	
502-908	1000	Zirconium Dioxide Powder (10 g)	LCRM			25.8			Guide 34

## Nonferrous Pins

Part No	Lot No	Description	Class	% S	% C	% O	H	% N	ISO Ref
502-937	751	Copper Pin (1 g x 100 per bottle)	LCRM	0.00114					Guide 34
502-937	752	Copper Pin (1 g x 100 per bottle)	LCRM	0.00116					Guide 34
502-937	753	Copper Pin (1 g x 100 per bottle)	LCRM	0.00115					Guide 34
502-937	754	Copper Pin (1 g x 100 per bottle)	LCRM	0.00115					Guide 34
501-953	648	Copper Pin (1 g x 100 per bottle)	LRM			0.00032			Guide 34
502-411	699	Nickel Pin (1 g x 100 per bottle)	NACM			0.00024			17025
502-867	0739-3	Titanium Pin (0.12 g x 200 per bottle)	LRM		0.022	0.144	{24.7} ppm	0.0126	Guide 34
502-891	749	Titanium Pin (0.12 g x 200 per bottle)	LCRM		0.011	0.121	103 ppm	0.01	17034
502-947	740	Titanium Pin (0.12 g x 200 per bottle)	LCRM		0.022	0.144	14 ppm	0.013	Guide 34
503-504	796	Titanium Pin (0.12 g x 200 per bottle)	LCRM		0.004	0.07	{24} ppm	0.0024	17034
503-507	797	Titanium Pin (0.12 g x 200 per bottle)	LCRM		0.005	0.162	79 ppm	0.013	17034
502-966	746	Titanium Pin (0.12 g x 100 per bottle)	LCRM			0.355	{3} ppm	0.006	Guide 34
502-969	606	Titanium Pin (0.25 g x 100 per bottle)	LCRM		0.012				Guide 34
502-890	747	Zirconium Pin (0.12 g x 200 per bottle)	LCRM		0.0145	0.141	9.1 ppm	0.002	Guide 34

## Steel Pins, Rings, and Pellets

Part No	Lot No	Description	Class	% S	% C	% O	H	% N	ISO Ref
502-060	737	Steel Pin (5 g x 25 per bottle)	LCRM				6.17 ppm		Guide 34
502-198	673	Steel Pin (1 g x 100 per bottle)	LRM			0.0038			Guide 34
502-257	659	Steel Pin (1 g x 100 per bottle)	LRM			0.0032		0.066	Guide 34
502-257	717	Steel Pin (1 g x 100 per bottle)	LRM			0.0035		0.0785	Guide 34
502-712	1042	Steel Pin (1 g x 100 per bottle)	LCRM	0.0007	0.0009	0.0014	{1.6} ppm	0.0023	17034
502-855	0718-1	Steel Pin (1 g x 100 per bottle)	LRM	0.0123	0.0454	0.0109	{5.7} ppm	0.0661	Guide 34
502-863	1002	Steel Pellet (1 g x 100 per bottle)	LCRM	0.0067	0.0383	{0.0013}	{0.5} ppm	0.0042	17034
502-893	772	Steel Pin (1 g x 100 per bottle)	LCRM	0.0044	0.796	0.0013	{1.0} ppm	0.0048	17034
502-894	618	Steel Pin (1 g x 100 per bottle)	LCRM	0.0134	0.684				Guide 34
502-894	619	Steel Pin (1 g x 100 per bottle)	LCRM	0.0127	0.681				17034
502-894	620	Steel Pin (1 g x 100 per bottle)	LCRM	0.0128	0.683				17034
502-903	0720-1	Steel Pin (1 g x 100 per bottle)	LCRM			0.0065	3.6 ppm	0.0565	Guide 34
502-904	566	Steel Pin (0.5 g x 100 per bottle)	LCRM	0.0179	0.056	0.0039	{1.5} ppm	0.0923	Guide 34
502-913	720	Steel Pin (1 g x 100 per bottle)	LCRM	0.0049	0.066	0.0066	3.5 ppm	0.0557	Guide 34
502-916	773	Steel Pin (1 g x 100 per bottle)	LCRM	0.0247	0.473	{0.0017}	{2.3} ppm	0.0068	Guide 34
502-918	1427-5-R	Steel Ring (1 g x 200 per bottle)	LCRM	0.0269	0.012				Guide 34
502-928	633	Steel Pin (1 g x 100 per bottle)	LCRM	0.0193	0.0203	0.0037	2.6 ppm	0.0736	Guide 34
502-928	634	Steel Pin (1 g x 100 per bottle)	LCRM	0.0193	0.0194	0.0036	2.3 ppm	0.0738	Guide 34
502-928	635	Steel Pin (1 g x 100 per bottle)	LCRM	0.0192	0.0192	0.0034	2.2 ppm	0.0737	Guide 34
502-929	1421	Steel Ring (1 g x 200 per bottle)	LCRM	0.0004	0.067				Guide 34
502-935	719	Steel Pin (1 g x 100 per bottle)	LCRM	0.0011	0.062	0.0028	2.2 ppm	0.0712	Guide 34
502-936	763	Steel Pin (0.5 g x 100 per bottle)	LCRM					1	Guide 34
502-946	1021	Steel Pellet (1 g x 100 per bottle)	LCRM	0.0004	0.0116				Guide 34
502-963	738	Steel Pin (1 g x 100 per bottle)	LCRM	0.009	0.0257	0.0071	6.9 ppm	0.0485	Guide 34
502-978	793	Steel Pin (0.5 g x 100 per bottle)	LCRM	0.0026	0.0323	{0.0086}	{7.8} ppm	0.349	17034
502-986	775	Steel Pin (1 g x 100 per bottle)	LCRM	0.292	0.398				17034
502-989	780	Steel Ring (1 g x 200 per bottle)	LCRM	0.0049	0.774				17034
502-990	792	Steel Pin (1 g x 100 per bottle)	LCRM	0.0249	0.172	0.0048	{1.6} ppm	0.0083	17034
502-990	0792-11	Steel Pin (1 g x 100 per bottle)	LCRM	0.025	0.172	0.0053	{2.4} ppm	0.0083	17034
502-991	732	Steel Pin (1 g x 100 per bottle)	LCRM	0.0031	0.072			0.0737	17034
503-514	742	Steel Pin (1 g x 100 per bottle)	LCRM	0.0021	0.051	0.0024		0.0599	17034

## Synthetic Carbon and Sulfur Standards

Part No	Lot No	Description	Class	% S	% C	ISO Ref
502-696	1003	Synthetic Carbon ~1% (50 g)	LCRM		1.03	17034
502-905	1002	Synthetic Carbon ~5% (50 g)	LCRM		5	17034
502-934	1000	Synthetic Carbon ~0.5% (50 g)	LCRM		0.54	Guide 34
502-950	1001	Synthetic Carbon ~0.1% (50 g)	LCRM		0.12	17034
502-914	1002	Synthetic Carbon & Sulfur ~1% (50 g)	LCRM	0.98	0.99	17034
502-914	1003	Synthetic Carbon & Sulfur ~1% (50 g)	LCRM	0.97	0.99	17034
502-964	1000	Synthetic Carbon & Sulfur ~0.1% (50 g)	LCRM	0.1	0.11	17034

## Moisture Standards and TGA/TGM Check Samples

Part No	Lot No	Description	Class	Temp	Weight Loss	Comp Loss	ISO Ref	% Weight Loss at 150oC	% Weight Loss at 200oC	% Weight Loss at 450oC	% Weight Loss at 850oC
502-926	1003	Calcium Oxalate (50 g)	LCRM	200 C	12.2	H2O	17034	—	12.3	—	—
502-926	1003	Calcium Oxalate (50 g)	LCRM	450 C	19.4	CO	17034	—	—	19.5	—
502-926	1003	Calcium Oxalate (50 g)	LCRM	850 C	29.7	CO2	17034	—	—	—	29.6
502-968	1000	Sodium Tartrate Dihydrate (50 g)	LCRM	150 C	15.6	H2O	17034	15.6	—	—	—

## Benzoic Acid Standards

Part No	Lot No	Description	Class	% C	% O	H	Btu/lb	ISO Ref
621-606-245	1032	Benzoic Acid Tablets (0.6 g x 50 per bottle)	NACM				11371	
502-892	1001	Benzoic Acid Tablets (1 g x 70 per bottle)	LCRM				11371	Guide 34
502-184	1004	Benzoic Acid Powder (10 g)	PCD	68.85	26.2	4.95%		

## Pure Chemical Standards

Part No	Lot No	Description	Class	% S	% C	H	% N	ISO Ref
502-695	1000	Acetanilide (10 g)	LCRM		71.07	6.75%	10.36	Guide 34
502-601	6585225	Ammonium Std Solution (5 x 10 mL)	PUR				0.01	
502-897	1002	BBOT (25 g)	LCRM	7.49	72.55	6.13%	6.52	Guide 34
502-897	1003	BBOT (25 g)	LCRM	7.46	72.56	6.14%	6.5	17034
502-690	1000	Caffeine (25 g)	PCD		49.48	5.19%	28.85	
502-205	1020	Caffeine (5 g)	PCD		49.48	5.19%	28.85	
502-902	1002	Calcium Carbonate (50 g)	LCRM		12.01			17034
502-691	1000	Cystine (25 g)	LCRM	26.62	29.97	5.04%	11.62	Guide 34
502-896-250	1002	EDTA (250 g)	LCRM		41	5.52%	9.57	17034
502-896	1002	EDTA (50 g)	LCRM		41	5.52%	9.57	Guide 34
502-911	1001	Glycine (50 g)	LCRM		31.95	6.71%	18.67	Guide 34
502-688	1002	Nicotinic Acid (25 g)	LCRM		58.57	4.11%	11.38	Guide 34
502-642	1018	Phenylalanine (50 g)	LCRM		65.46	6.77%	8.47	17034
501-441	1033	Sucrose (50 g)	PCD		42.1	6.48%		
502-657	1001	Sulfamethazine (25 g)	LCRM	11.6	51.65	5.10%	20.11	17034
502-634	1000	UHP Graphite Powder (50 g)	NACM		100			
502-699	1001	Zinc Sulfide (50 g)	LCRM	32.7				Guide 34

## Ore and Soil Standards

Part No	Lot No	Description	Class	% S	% C	% N	ISO Ref
502-635	1000	High Sulfur Ore Concentrate (25 g)	NACM	45	0.55		
502-693	1001-2	Ore (25 g)	LCRM	2.23	2.05		Guide 34
502-909	1001	Ore (25 g)	LCRM	0.68	0.18		Guide 34
502-909	1002	Ore (25 g)	LCRM	0.67	0.18		17034
502-933	1000	Ore (25 g)	LCRM	0.74	2.16		Guide 34
503-502	1000	Ore (25 g)	LCRM	4.2	3.45		17034
503-503	1000	Ore (25 g)	LCRM	0.86	0.11		17034
503-506	1000	Ore (25 g)	LCRM	0.42	2.07		17034
503-509	1000	Ore (25 g)	LCRM	0.07	6.83		17034
502-814	1002	Soil (25 g)	NACM	0.323	22.6	1.93	
502-694	1002	Soil (65 g)	LCRM	0.201	13.5	1.13	17034
502-697	1001	Soil (65 g)	LCRM	0.045	3.79	0.328	Guide 34
502-962	1000	Soil (65 g)	LCRM	0.019	0.717	0.101	Guide 34



## Natural Matrix Standards

Part No	Lot No	Description	Class	% S	% C	H	% N	ISO Ref
502-983	1000	Alfalfa (50 g)	LCRM	0.38	44.1		3.09	17034
502-906	1001	Barley Flour (50 g)	LCRM				1.98	17034
502-713	1000	Corn Flour (50 g)	LCRM				1.14	Guide 34
502-932	1000	Corn Gluten (50 g)	LCRM	0.98	52.12	7.06%	11.05	Guide 34
502-912	1000	Corn Starch (150 g)	LCRM				0.0755	Guide 34
502-931	1000	Orchard Leaves (20 g)	LCRM	0.442	49.54	6.24%	2.31	Guide 34
502-907	1001	Rice Flour (50 g)	LCRM	0.11	44.53		1.35	17034
502-692	1002	Wheat Flour (50 g)	LCRM	0.194	45.24	6.51%	2.88	17034

## Coal, Coke, and Fly Ash Reference Materials

Part No	Lot No	Description	Class	% S	% C	H	% N	% Ash	% Fixed C	% Vol Matter	ppm Hg	Btu/lb	ISO Ref
502-987	1000	Fly Ash (20 g)	LCRM	1.3	1.25								17034
502-843	1000	Fly Ash (20 g)	NACM	0.29	42.4						0.827		
502-675	15195	LECO ~0.25% S Coal (50 g)	LCRM	0.21				5.02					Guide 34
502-670	19171	LECO ~0.5% S Coal (50 g)	LCRM	0.53				8.27					17034
502-673	17041	LECO ~3% S Coal (50 g)	LCRM	3.23				8.04					Guide 34
502-673	20041	LECO ~3% S Coal (50 g)	LCRM	3.25				8.05					17034
502-674	18191	LECO ~4% S Coal (50 g)	LCRM	4.89				8.8					Guide 34
502-680	20300	LECO PROX PLUS LOW COAL (50 g)	LCRM	0.418	82.1	4.26%	1.14	8.31	{72.6}	19.1		{14219}	17034
502-681	19066	LECO PROX PLUS MED. COAL (50 g)	LCRM	1.32	77.5	4.99%	1.45	9.18	{57.6}	33.2		{13780}	Guide 34
502-683	19269	LECO PROX PLUS METALLURGICAL COKE (50 g)	LCRM	0.711	88.1	{0.21} %	0.95	9.69	{88.7}	1.6		{12366}	17034
502-649	2781	NIST 2781 MERCURY IN DRY SLUDGE (40 g)	NMI				4.78				3.68		

## QAR Certified Coal Reference Materials

Part No	Lot No	Description	% S	% C	H	% N	% Ash	% Vol Matter	% H <sub>2</sub> O	ppm Hg	Btu/lb	ISO Ref
502-831	16335	QAR CRM Coal 1 (50 g)	1.45	{73.40}	{4.68} %	1.7	6.77	{34.31}		0.118	{12769}	Guide 34
502-832	11154	QAR CRM Coal 2 (50 g)	0.288	{77.05}	4.12%	1.12	12.29	{23.00}		0.039	{13239}	
502-833	14255	QAR CRM Coal 3 (50 g)	0.383	{82.03}	{4.19} %	1.16	8.96	{18.20}		0.06	{14175}	Guide 34
502-834	19353	QAR CRM Coal 4 (50 g)	0.299	{67.05}	{4.13} %	0.97	12.5	{34.97}		0.034	{11349}	Guide 34
502-835	10060	QAR CRM Coal 5 (50 g)	0.469	{70.05}	4.85%	1.75	11.08	{38.20}		0.015	{12254}	
502-836	20167	QAR CRM Coal 6 (50 g)	3.97	{68.09}	{4.75} %	1.26	12.37	{39.78}	{3.57}	0.09	{12214}	17034
502-838	12185	QAR CRM Coal 8 (50 g)	0.963	{80.26}	5.17%	1.6	6.5	{33.78}		0.067	{14337}	
502-839	11060	QAR CRM Coal 9 (50 g)	2.03	{76.19}	5.10%	1.46	7.72	{37.57}		0.132	{13586}	
502-845	13158	QAR CRM Coal 10 (50 g)	0.665	{87.33}	1.76%	0.878	8.02	{3.83}		0.169	{13573}	
502-846	13156	QAR CRM Coal 11 (50 g)	0.703	{81.94}	2.39%	1.05	12.19	{5.81}		0.112	{13197}	

## Oil and Fuel Calibration Material

Part No	Lot No	Description	Class	% S	% C	H	% N	Btu/lb	ISO Ref
502-901	1001	Paraffin Oil (118 mL)	LCRM		86.4	14.00%		19831	Guide 34
502-848	1001	Residual Fuel Oil Sulfur ~0.25% (100 mL)	LSUS	0.246					
502-849	1002	Residual Fuel Oil Sulfur ~1% (100 mL)	LRM	0.99					17034
502-850	1003	Residual Fuel Oil Sulfur ~3.0% (100 mL)	LSUS	3.1	83.86	13.11%	0.07	19220	
502-851	1001	White Mineral Oil Sulfur ~ 0.01% (100 mL)	LSUS	0.011					
502-917	1001	White Mineral Oil Sulfur ~0.1% (100 mL)	LSUS	0.105					
502-922	1001	White Mineral Oil Sulfur ~1% (100 mL)	LSUS	1.008					

## Ash Fusion Metal Wire Standards

Part No	Lot No	Description	Class	Melt Point	ISO Ref
502-496	1029	Gold Wire (2 pcs)	LRM	1062 C	17034
501-951	1002	Nickel Wire (2 pcs)	PCD	1455 C	



## Reference Materials and Standards

### Ordering Information/General Terms

Ordering, Customer Assistance, and all Other Inquiries



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- Visit **www.lecodirect.com** to register for an account



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### Terms and Conditions

- Terms: Net 30 days with approved credit.
- Prices shown are US dollars, F.O.B. St. Joseph, Michigan. Freight charges are prepaid and added to the invoice.
- Sales taxes will be added where applicable.
- Returns must be approved in advance; re-stocking fee may be applied. Return Material Authorization (RMA) is required for all returns. Contact LECO for RMA information.
- Disclaimer: LECO products are intended for use by professional laboratory personnel who are familiar with the handling of these materials. Our products are not for use in household, drug, medical, or cosmetic applications. The buyer and/or user assumes full responsibility for the safe handling, storage, application, and proper disposal of all products ordered from this catalog.
- Complete terms and conditions are included with quotations and invoices.
- **Prices, part numbers, and availability are subject to change without notice.**



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