



## Supplies for Inorganic Analysis

# LECO Corporation

## Delivering the Right Results

In 1936, the Laboratory Equipment Company introduced the first rapid carbon determinator to the American iron and steel industry. Today, more than 70 years later, LECO® is recognized globally as a leader in the development of high-quality analytical instrumentation, mass spectrometers, chromatographs, metallography and optical equipment, and consumables.

Located in St. Joseph, Michigan—just 90 miles from both Chicago and Grand Rapids, Michigan—LECO's headquarters is comprised of several buildings, each contributing to a unique area of the company's success. At our state-of-the-art research and development center, teams of engineers work together to create and test ideas that will be incorporated into the next generation of instruments. Rugged manufacturing facilities allow quality to drive production—from stamped metal parts to complex electronic assemblies, most components are produced in-house, allowing strict control over the entire manufacturing and assembly process in



*Aerial view of LECO's headquarters*

accordance with the quality standards of ISO-9001. Our Global Support Center provides service and support after the sale of your instrument, as well as customer training courses and the only fleet of mobile laboratories in North America featuring a hands-on experience with LECO products and specialists. A global network of sales and support professionals, along with CE testing performed at an on-site compliance testing center, help strengthen a commitment to worldwide excellence.

Whether it is a diverse array of analytical instrumentation, a new way to look at gas and liquid chromatography, rugged metallography products, or dedicated service support after the sale, LECO stands by a commitment to deliver the right results.

## Mobile Laboratories

LECO Corporation's unique mobile laboratories travel throughout North America, bringing the latest innovations in analytical instrumentation to your neighborhood. Take the opportunity to view our products in use as well as discuss everything from methods to maintenance with knowledgeable LECO technicians.

The LECO fleet includes four specially designed mobile laboratories for organic, materials characterization, metallographic, and spectrographic analyses. To find out more about LECO's Mobile Laboratories or to obtain the latest schedule, call 269-983-5531, 800-292-6141 (U.S. only), or log onto



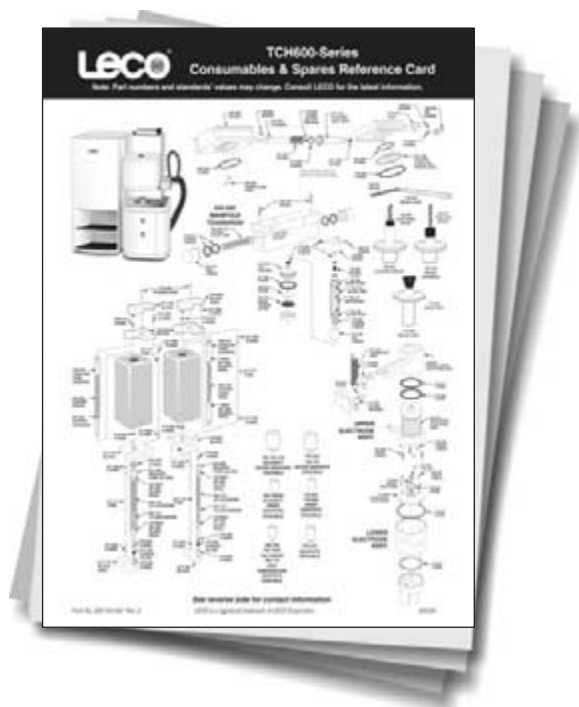
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## **Support Materials**

A variety of support materials are available to LECO customers. Reference Cards offer exploded views of individual instruments, indicating precise locations of spare parts, necessary part numbers, and descriptions of consumable products. Material Safety Data Sheets (MSDS) are also available for a variety of chemical products offered through LECO. These materials may be obtained by contacting your LECO sales representative, or by downloading the latest version from our website, [www.leco.com](http://www.leco.com).



# Ordering Information/General Terms

## Ordering, Customer Assistance, and all Other Inquiries

### Phone

800-292-6141 or  
269-985-5496



### Mail

LECO Corporation  
3000 Lakeview Avenue  
St. Joseph, MI 49085



### Fax

269-982-8977



### Internet

[info@leco.com](mailto:info@leco.com)  
for general inquiries

[sales@leco.com](mailto:sales@leco.com)  
for Purchase Orders or  
pricing information



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**VISA, Mastercard, and American Express Accepted.**



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## Terms and Conditions

- Terms: Net 30 days with approved credit.
- Shipments: 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.
- All specifications, part numbers, and policies are current for the United States at the time this catalog went to print, and are subject to change without notice.
- 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.

# Information for Elemental Analysis

LECO Corporation is the world leader in elemental determinators for various inorganic applications. Carbon, Hydrogen, Nitrogen, Sulfur, Oxygen, and Moisture may be determined in various types of samples including metals, alloys, ores and other inorganic materials. LECO also offers instrumentation for organic matrices, time-of-flight mass spectrometers, optical microscopes, image analysis and metallographic supplies.

LECO's determinators are designed with specific capabilities to match the requirements of our customers and their respective industries. Many of the requirements that have been established include precision/accuracy, sample size, instrument range, and hardware/software robustness. In order to obtain the highest level of performance, we recommend that our customers define the following prior to operating our instruments.

## **Desired Precision and Accuracy for your Application**

This is typically based on standards and a realistic sample size. Appropriate sample size is determined by proven method requirements, level of robustness, and desired sample preparation. Standards are determined by availability and level of certification required for your laboratory. For examples, please refer to such organizations as ASTM and ISO, or refer to one of the LECO Application Notes that can be found on page 24.

## **Desired Sample Preparation**

The level of sample preparation is directly correlated to the type of sample being analyzed. Some inorganic products may be analyzed as-is, directly from the industrial process. However, due to the nature of a majority of inorganic matrices, it may be required to abrade, etch or clean the sample prior to its addition to a crucible or boat. Additionally, different materials may require different reagents, accelerators or fluxes. Please see page 3 of for more information regarding LECO's combustion/fusion supplies.

## **Desired Level of Maintenance Commitment or Level of Robustness**

The amount of preventive maintenance performed on any elemental determinator is relative to the instrument's ability to handle the amount and type of sample that is analyzed. We have designed our instruments to maximize the level of robustness based on the lowest amount of involvement by the operator; however, there are several measures that can be taken to maximize the longevity of the instrument. Mainly, routine maintenance, appropriate sample size, and the use of proper consumables for each application. See page 26 for more information on LECO's Preventive Maintenance Agreements (PMAs).

At LECO Corporation, we have several trained Application Scientists that are available to help guide you through any question you may have. Please feel free to contact our scientists at 800-292-6141.



# General Combustion/Fusion Supplies

## Reagents

Part No.	Description	Contents
501-171-HAZ	Anhydrone - for H <sub>2</sub> O absorption	1 lb. (454 g)
764-098	Cellulose - Traps SO <sub>3</sub>	1 lb. (454 g) pkg
502-190	Copper Oxide Wire - for converting CO to CO <sub>2</sub> and H <sub>2</sub> to H <sub>2</sub> O on TCH600-Series	100 g
502-189	Copper Sticks - for removal of O from inert carrier gas	100 g ampule
502-304	Copper Sticks - for removal of O from inert carrier gas	100 g
502-304-500	Copper Sticks - for removal of O from inert carrier gas	500 g
501-621	Copper Turnings - for removal of O from inert carrier gas	200 g
502-177	Fine Quartz Wool	50 g
502-156	Fluorhib	1 lb. (454 g)
502-493	Fluorhib HP	35 g
501-081	Glass Wool - packing material for reagent tubes	1 lb. (454 g) box
501-073	Graphite Powder	100 g
502-351	Halogen Scrubber	50 g
769-608-HAZ	Halogen Trap Reagent	200 g
769-610	Halogen Trap Reagent	225 g
502-176-HAZ	Lecosorb (8/20 Mesh) - for CO <sub>2</sub> removal	500 g
502-174-HAZ	Lecosorb (20/30 Mesh) - for CO <sub>2</sub> removal	500 g
501-060	Manganese Dioxide - SO <sub>2</sub> scrubber	60 g
501-587	Platinum/Silica - for converting CO to CO <sub>2</sub> in combustion analysis	15 g
501-170	Rare Earth Copper Oxide - for converting CO to CO <sub>2</sub> and H <sub>2</sub> to H <sub>2</sub> O	50 g
761-747-HAZ	Schutze™ Reagent - for converting CO to CO <sub>2</sub>	100 g
502-480-HAZ	Schutze™ Reagent - for converting CO to CO <sub>2</sub>	500 g

## Accelerators/Fluxes

Part No.	Description	Contents
501-264	Copper Accelerator	0.5 lb. (227 g)
501-263	Copper Chip Accelerator (-20 +30 mesh)	3 lb. (1.36 kg)
501-640	Copper Chip Accelerator (-20 +30 mesh)	20 lb. (9 kg)
501-457	Tin Coated Copper Accelerator	3 lb. (1.36 kg)
501-077	Iron Chip - standard grade (-6 +20 mesh)	2 lb. (0.9 kg)
763-467	Iron Chip - standard grade (-6 +20 mesh)	25 lb. (11.35 kg)
502-231	HP Iron Chip - high purity (-6 +20 mesh)	1 lb. (0.45 kg)
763-266	LECOCEL - tungsten, (-20 +40 mesh)	5 lb. (2.27 kg)
763-026	LECOCEL - tungsten, (-20 +40 mesh)	30 lb. (13.6 kg)
501-008	LECOCEL II - tungsten/tin, standard grade	5 lb. (2.27 kg)
502-297	LECOCEL II - tungsten/tin, standard grade	30 lb. (13.6 kg)
502-173	LECOCEL II HP - tungsten/tin, high purity	1.7 lb. (0.75 kg)
763-263	LECOCEL III - tungsten, (-12 +20 mesh)	5 lb. (2.27 kg)
763-027	LECOCEL III - tungsten, (-12 +20 mesh)	30 lb. (13.6 kg)
501-598	Nibbled Nickel Flux	100 g bottle
502-344	Ultra High Purity Nickel Basket	1 g ea. (100/bottle)
502-345	Ultra High Purity Nickel Basket	1.5 g ea. (100/bottle)
502-183	Nickel Capsule - for under 100 mg of refractory materials	100/bottle
501-059	Tin Capsules	100/bottle
501-076	Tin Metal Accelerator (-20 +30 mesh)	2 lb. (0.9 kg)
761-739	Tin Flux - for N/O/H determinations (0.5 g pellets)	1 lb. (454 g)
762-695	Tin Metal Accelerator (-20 +30 mesh)	25 lb. (11.35 kg)
763-029	Nickel Basket	1.5 g ea. (100/bottle)

# Capsules and Crucibles

Refer to page 7-8 for a visual guide to selecting the correct replacement capsule or crucible.

## All LECO Carbon and Sulfur Determinators

Part No.	Description	Contents
528-018	Ceramic Crucible - for typical carbon/sulfur analyses	1000/pkg
528-018HP	Ceramic Crucible - O Sulfur blank	1000/pkg
528-028	Standard Filtering Crucible - can be used with LECO autoloaders	100/box
528-028-500	Standard Filtering Crucible - can be used with LECO autoloaders	500/box
528-030	Filtering Crucible - for graphitic carbon determinations (not designed for automation)	100/box
528-038	Ceramic Crucible - heavy duty for extended burn time (WR-12/WR-112 Series)	1000/pkg
528-040	Crucible Cover - with 4 mm hole, for use with 528-018 and 528-038 Crucibles (not designed for automation)	1000/box
528-042	Porous Crucible Cover - for use with 528-018 and 528-038 Crucibles for S titrators	1000/box
528-050	Ceramic Crucible - for typical carbon/sulfur analyses (like 528-018)	10 bags; 50 each
529-036	Crucible Liner - for use with 528-018 Crucibles (special applications)	10/pkg
619-880	Crucible Cover - with 10 mm hole, for use with 528-018 and 528-038 Crucibles	1000/box
619-880-100	Crucible Cover - with 10 mm hole, for use with 528-018 and 528-038 Crucibles	100/pkg

## TF-1/TF-10

The TF-1 (single tube) and TF-10 (dual tube) furnaces can be used to pre-burn ceramic crucibles. Pre-burning crucibles is recommended prior to analysis in order to minimize blank levels and is required for ASTM compliance.



### Impact of Preheating Crucibles on Carbon/Sulfur Results High Purity Iron Standard; 5 ppm C, 2 ppm S

Analysis #	Baked		Not Baked • Not Touched		Not Baked • Touched	
	C ppm	S ppm	C ppm	S ppm	C ppm	S ppm
1	4.6	2.5	13.5	3.1	40.1	3.9
2	4.6	2.0	12.3	3.8	24.4	3.7
3	4.8	1.8	11.5	3.2	24.6	3.5
4	4.9	1.5	12.5	3.2	22.9	3.8
5	5.8	2.7	12.8	3.8	34.4	3.3
6	4.8	2.5	12.6	3.8	22.8	4.4
7	4.5	2.2	11.6	4.1	41.5	3.8
8	3.6	1.5	18.5	2.3	21.6	3.7
9	6.0	2.0	12.0	3.9	32.5	4.2
10	6.0	1.6	16.0	4.2	31.4	4.3
Average (ppm)	5.0	2.0	13.3	3.5	29.6	3.9
Std Dev	0.75	0.45	2.20	0.59	7.40	0.34

# Capsules and Crucibles

Refer to page 7-8 for a visual guide to selecting the correct replacement capsule or crucible.

## RC-412/RC612

Part No.	Description	Contents
625-505-430	Nickel Boat	50/box
781-335	Quartz Boat	1/pkg
782-059	Nickel Liner	10/pkg

## RH-404/RH-404EN, RH-402

Part No.	Description	Contents
501-059	Small Tin Capsule - for macrosample analysis of high density powdered materials	100/bottle
502-040	Large Tin Capsule - for macrosample analysis of low density powdered materials	100/bottle
502-040-100	Large Tin Capsule - for macrosample analysis of low density powdered materials	1000/bottle
603-710	Quartz Crucible - for performing hot extraction analyses (RH-402)	24/pkg
611-351-183	Lower Electrode Tip - for use with 764-330 Crucibles without automation	1/pkg
764-330	Graphite Crucible (RH-404EN)	1000/pkg
769-520	Short Graphite Crucible (RH-402)	1000/pkg
769-761	Tall Graphite Crucible - for aluminum analyses (RH-402)	100/pkg
782-719	High Temp Graphite Crucible (RH-404)	50/pkg
782-720	High Temp Graphite Crucible (RH-404)	1000/pkg
782-720SHD	High Density Graphite Crucible (RH-404)	1000/pkg
782-721	Lower Electrode Tip - for 782-719 and 782-720 Crucibles (RH-404)	1/pkg

## TC-336/TN-314/RO-316, TC-236

Part No.	Description	Contents
501-059	Small Tin Capsule - for macrosample analysis of high density powdered materials	100/bottle
502-040	Large Tin Capsule - for macrosample analysis of low density powdered materials	100/bottle
502-040-100	Large Tin Capsule - for macrosample analysis of low density powdered materials	1000/bottle
502-183	Nickel Capsule - for under 100 mg of refractory materials	100/bottle
611-351-181	Lower Electrode Tip - for use with 776-247 Crucibles with automation	1/pkg
611-351-182	Lower Electrode Tip - for use with 776-247 Crucibles without automation	1/pkg
775-431	Inner Graphite Crucible - for applications requiring uniform crucible temperature, use with 775-433 Crucibles	1000/pkg
775-433	Outer Graphite Crucible - for applications requiring uniform crucible temperature, use with 775-431 and 775-892 Crucibles	50/pkg
775-892	Inner Graphite Crucible - for applications requiring uniform crucible temperature, use with 775-433 Crucibles	100/pkg
776-247	Graphite Crucible - for typical nitrogen/oxygen analyses	1000/pkg
780-890	Larger ID Crucible - typically used for oxygen analysis and in conjunction with 780-892 Covers	1000/pkg
780-892	Graphite Cover - minimize getting effect	1000/pkg
782-719	High Temp Graphite Crucible - for high temperature alloys and refractories	50/pkg
782-720	High Temp Graphite Crucible - for high temperature alloys and refractories	1000/pkg
782-720SHD	High Density Graphite Crucible	1000/pkg
782-721	Lower Electrode Tip - for 782-719 and 782-720 Crucibles	1/pkg



# Capsules and Crucibles

Refer to page 7-8 for a visual guide to selecting the correct replacement capsule or crucible.

**TCH600/ROH600/RH600/RHEN600/TC600/RO600/TN600, TC500/RO500/  
TN500, TC-436/TC-436DR/TC-436AR/TN-414/RO-416/RO-416DR, TC400/  
RO400/TN400, TC-300/RO-300/TN-300**

Part No.	Description	Contents
501-059	Small Tin Capsule - for macrosample analysis of high density powdered materials	100/bottle
502-040	Large Tin Capsule - for macrosample analysis of low density powdered materials	100/bottle
502-183	Nickel Capsule - for under 100 mg of refractory materials	100/bottle
618-376	Lower Electrode Tip - for 782-719 and 782-720 Crucibles - for use with TC500/600-Series Batch Autoloader <u>only</u>	1/pkg
611-351-180	Lower Electrode Tip - for use with 764-330 Crucibles with automation	1/pkg
611-351-181	Lower Electrode Tip - for use with 776-247 Crucibles with automation	1/pkg
611-351-182	Lower Electrode Tip - for use with 776-247 Crucibles without automation	1/pkg
611-351-183	Lower Electrode Tip - for use with 764-330 Crucibles without automation	1/pkg
619-895	Graphite Crucible; High Temp - for use with EN units (requires 619-896 Tip)	1000/pkg
619-896	Lower Electrode Tip - for use with the 619-895 Crucible	1/pkg
621-510	Pre-Loaded Crucible Cassette (100 776-247 Crucibles per cassette)	5/pkg
621-511	Pre-Loaded Crucible Cassette (100 782-720 Crucibles per cassette)	5/pkg
764-330	Graphite Crucible - for use with EN Units (aluminum applications)	1000/pkg
775-431	Inner Graphite Crucible - for applications requiring uniform crucible temperature use with 775-433 Crucibles	1000/pkg
775-433	Outer Graphite Crucible - for applications requiring uniform crucible temperature use with 775-431 and 775-892 Crucibles	50/pkg
775-892	Inner Graphite Crucible - for applications requiring uniform crucible temperature use with 775-433 Crucibles	100/pkg
776-247	Graphite Crucible - for typical nitrogen/oxygen analyses	1000/pkg
780-890	Larger ID Crucibles - typically used for oxygen analysis and in conjunction with 780-892 Covers	1000/pkg
780-892	Graphite Covers - minimize gettering effect	1000/pkg
782-703	High Purity Outer Crucible - for oxygen in silicon applications, use with 782-795HD Crucibles	1000/pkg
782-703-100	High Purity Outer Crucible - for oxygen in silicon applications, use with 782-795HD Crucibles	100/pkg
782-719	High Temp Graphite Crucible, 0.5" OD - for high temp alloys and refractories	50/pkg
782-720	High Temp Graphite Crucible , 0.5" OD - for high temp alloys and refractories	1000/pkg
782-720S	High Temp Graphite Crucible, 0.625" OD - for high temp alloys and refractories	1000/pkg
782-720SHD	High Density Graphite Crucible, 0.5" OD	1000/pkg
782-721	Lower Electrode Tip - for 782-719 and 782-720 Crucibles without automation	1/pkg
782-795HD	Inner Crucible - for oxygen in silicon applications, use with 782-703 Crucibles	1000/pkg

# Capsules and Crucibles

Most commonly used items represented.



501-059



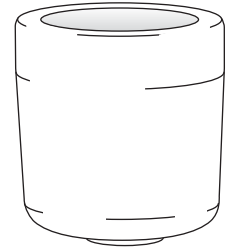
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502-040-100



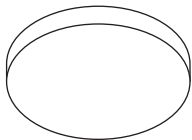
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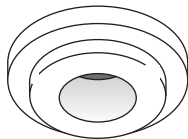
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528-050



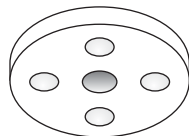
528-030



528-042



619-880  
619-880-100  
(for automation)



528-040  
(not for  
automation)



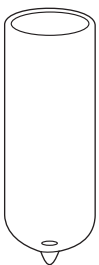
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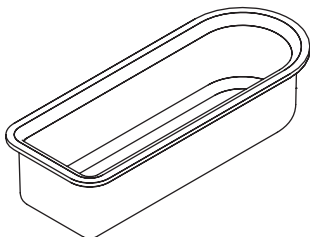
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528-038



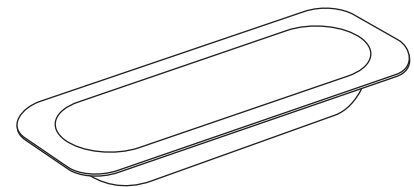
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625-505-430



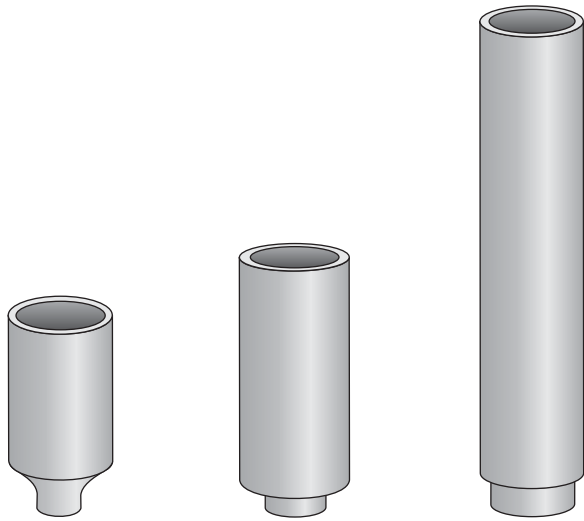
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782-059

# Capsules and Crucibles

Most commonly used items represented.



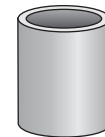
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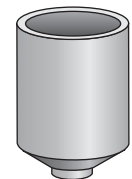
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775-892



775-433



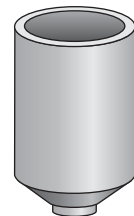
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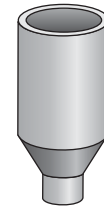
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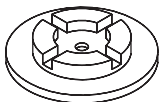
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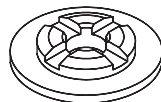
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782-720S  
782-720SHD



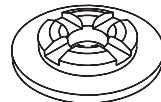
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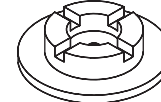
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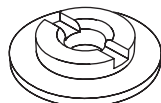
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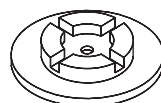
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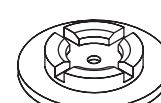
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619-896



782-721



618-376

# Combustion/Reaction Tubes and Glassware

Refer to page 11 for a visual guide to selecting the correct replacement tubes and glassware.

## CF-10 Gas Purifier

601-064	Catalyst Tube (Quartz)
601-065	Reagent Tube (Glass)

## Carbon, Sulfur

### CS-225, CS-125

771-030	Filter Tube/Reagent Tube (Glass)
772-739	Catalyst Heater Tube (Glass)
772-905	Combustion Tube (Quartz)

### CS400/CS300/CS200/CS230/WC200/WC230

601-390	Reagent Tube (Glass)
611-351-223	HD Combustion Tube (Quartz)
771-030	Filter Tube/Reagent Tube (Glass)
771-373	Reagent Tube (Glass)
772-739	Catalyst Heater Tube (Glass)
772-905	Combustion Tube (Quartz)

### CS-344/IR-312/IR-332, CS-244/IR-212/IR-232

611-351-223	HD Combustion Tube (Quartz)
771-030	Filter Tube/Reagent Tube (Glass)
771-373	Reagent Tube (Glass)
772-739	Catalyst Heater Tube (Glass)
772-905	Combustion Tube (Quartz)

### CS-444/CS-444LS/IR-412/IR-432

604-112	Catalyst Tube (Quartz)
611-351-223	HD Combustion Tube (Quartz)
761-047	Reagent Tube (Glass)
771-030	Filter Tube/Reagent Tube (Glass)
771-373	Reagent Tube (Glass)
772-739	Catalyst Heater Tube (Glass)
772-905	Combustion Tube (Quartz)

### CS600/CSHS600/CSLS600/C600/S600/SHS600/SDR600

601-390	Reagent Tube (Glass)
604-112	Catalyst Tube (Quartz)
611-351-223	HD Combustion Tube (Quartz)
618-603	Catalyst Tube (Quartz)
771-030	Filter Tube/Reagent Tube (Glass)
771-373	Reagent Tube (Glass)
772-739	Catalyst Heater Tube (Glass)
772-905	Combustion Tube (Quartz)

## RC-412

771-373	Reagent Tube (Glass)
782-428	Catalyst Tube (Quartz)
783-299	Reaction Tube (Quartz)

## RC612

617-548	Reagent Tube
625-505-125	Catalyst Heater Tube Rear (Quartz)
625-510-402	Reaction Tube (Quartz)
789-412	Catalyst Heater Tube (Quartz)

## WR-112

771-030	Filter Tube/Reagent Tube (Glass)
772-739	Catalyst Heater Tube (Glass)
772-905	Combustion Tube (Quartz)
775-880	Reagent Tube (Glass)

## HF-10

507-207	Catalyst Tube (Glass)
519-004	Combustion Tube, S in Oil (Quartz)
550-120	Combustion Tube, S (Quartz)
550-122	Jet Combustion Tube, C (Quartz)
772-905	Combustion Tube, C or Simultaneous C/S (Quartz)
773-106	Antimony Trap Tube (Glass)

Please Note: Quartz tubes are typically utilized for higher temperature applications (i.e. catalyst tubes). Glass reagent/filter tubes are designed for lower temperature applications. Glass tubes should not be used in place of quartz tubes.

# Combustion/Reaction Tubes and Glassware

Refer to page 11 for a visual guide to selecting the correct replacement tubes and glassware.

## Hydrogen

### DH-103

775-601	Reagent Tube (Glass)
776-279	Catalyst Heater Tube (Quartz)

### DH603

617-548	Reagent Tube (Glass)
625-510-144	Reaction Tube (Quartz)
789-412	Catalyst Heater Tube (Quartz)

### RH-402

604-241	Reaction Tube (Quartz)
775-601	Reagent Tube (Glass)
776-279	Catalyst Heater Tube (Quartz)

### RH-404/RH-404EN

761-047	Reagent Tube (Glass)
775-601	Reagent Tube (Glass)
776-279	Catalyst Heater Tube (Quartz)

### RHEN600/602

617-548	Reagent Tube (Glass)
789-412	Catalyst Tube (Quartz)

## Nitrogen, Oxygen, Hydrogen

### TC-336/RO-336/TN-314, TC-236

761-047	Reagent Tube (Glass)
771-373	Reagent Tube (Glass)
775-355	Catalyst Heater Tube (Glass)
775-601	Reagent Tube (Glass)

### TC-300/RO-300/TN-300

761-047	Reagent Tube (Glass)
771-373	Reagent Tube (Glass)
775-355	Catalyst Heater Tube (Glass)
775-601	Reagent Tube (Glass)

### TC-436/TC-436AR/TC-436DR/TN-414/ RO-416/RO-416DR

761-047	Reagent Tube (Glass)
771-373	Reagent Tube (Glass)
775-355	Catalyst Heater Tube (Glass)
775-601	Reagent Tube (Glass)
776-279	Catalyst Heater Tube (Quartz)

### TCH600/ROH600/RH600/RHEN600/ TC600/RO600/TN600, TC500/RO500/ TN500, TC400/RO400/TN400

617-548	Reagent Tube (Glass)
617-716	Filter Tube (Glass)
618-809	Filter Tube, TC/RO/TN500 (Glass)
776-279	Catalyst Heater Tube (Quartz)
789-412	Catalyst Heater Tube (Quartz)

Please Note: Quartz tubes are typically utilized for higher temperature applications (i.e. catalyst tubes). Glass reagent/filter tubes are designed for lower temperature applications. Glass tubes should not be used in place of quartz tubes.

## Tube Furnaces

### TF-1

503-052	Oxygen Baffle
528-314	Combustion Tube (for standard use)
529-046	Combustion Tube (for use w/Oxygen baffle)
601-010	Spare Parts Kit* includes: 1) 528-314 Combustion Tube 2) 601-012 O-ring (combustion tube) 3) 601-013 Heating Element 6) 601-014 Heating Element Clamp 2) 601-015 Braided Cable (Terminal to Element) 2) 601-016 Braided Element Cable 1) 777-073 Thermocouple 1) 777-242 Furnace Control Card 1) 781-165 Solid State Relay
781-793	Choke 30 Amp 1 MHz

### TF-10

503-052	Oxygen Baffle
528-314	Combustion Tube (for standard use)
529-046	Combustion Tube (for use w/Oxygen baffle)
616-687	Spare Parts Kit* includes: 2) 528-314 Combustion Tube (for replacement) 4) 601-018 Insulation Strip 1) 777-073 Thermocouple 1) 777-295 Furnace Controller Card 1) 781-165 Solid State Relay 6) 783-177 Heating Element
781-793	Choke 30 Amp 1 MHz

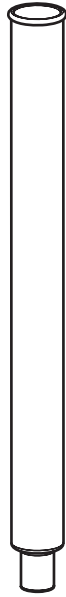
\*These items may be purchased individually

# Combustion/Reaction Tubes and Glassware

Most commonly used items represented.



618-809  
REAGENT  
TUBE  
(Glass)



617-548  
REAGENT  
TUBE  
(Glass)



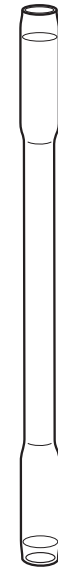
625-505-125  
CATALYST  
TUBE  
(Quartz)



776-279  
CATALYST  
TUBE  
(Quartz)



772-739  
CATALYST  
TUBE  
(Glass)



789-412  
CATALYST  
TUBE  
(Quartz)



775-355  
CATALYST  
TUBE  
(Glass)



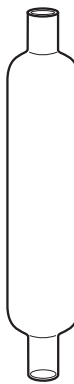
618-603  
CATALYST  
TUBE  
(Quartz)



604-112  
CATALYST  
TUBE  
(Quartz)



604-241  
REACTION  
TUBE  
(Quartz)



771-373  
REACTION  
TUBE  
(Glass)



771-030  
REACTION  
TUBE  
(Glass)



617-716  
REACTION  
TUBE  
(Glass)



775-601  
REACTION  
TUBE  
(Glass)



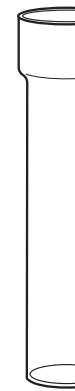
601-390  
REACTION  
TUBE  
(Glass)



775-880  
REACTION  
TUBE  
(Glass)



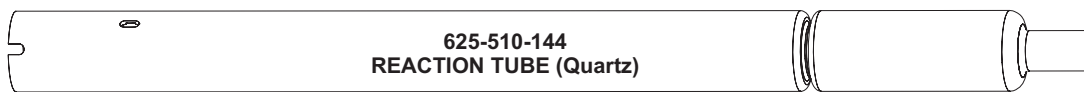
761-047  
REACTION  
TUBE  
(Glass)



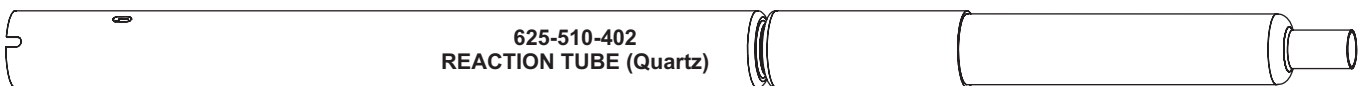
772-905  
COMBUSTION  
TUBE



611-351-223  
HEAVY DUTY  
COMBUSTION  
TUBE  
(Quartz)



625-510-144  
REACTION TUBE (Quartz)



625-510-402  
REACTION TUBE (Quartz)



# Primary Standards and Calibration Samples

Numbers listed represent either an average from multiple lots or an expected range for a particular lot's average. Call 800-292-6141 for exact chemistry and availability.

## Primary Standards

### Carbon, Sulfur

Part No.	Description	% C	% S	Contents
501-714	Low Alloy Steel Chips; Jernkontorets/Sweden; #24	0.1744	0.0010	150 g
501-718	Low Alloy Steel Chips; Jernkontorets/Sweden; #40	0.793	0.192	100 g
502-808	Silicon Steel Chips, MIEC/China; CE31	0.074	0.0088	150 g
502-475	Steel Chips	0.0039	0.0005	100 g
501-801	White Cast Iron Chips; BCS/United Kingdom; #489-1	2.860	0.155	100 g

### Moisture

Part No.	Description	Crystalline H <sub>2</sub> O	Contents
501-919	SARM -4 Norite; SABS	0.33%	100 g

### Oxygen, Nitrogen

Part No.	Description	% O	% N	Contents
502-399	JK 47 (Iron Powder)	1.09	0.0067	35 g

## Calibration Samples

### Hydrogen

Part No.	Description	ppm H	Contents
762-747	1 gram Steel Pins	0.8 - 2.0	100
502-061	5 gram Steel Pins	0.8 - 2.0	25
501-529	1 gram Steel Pins	4.0 - 7.0	100
502-060	5 gram Steel Pins	4.0 - 7.0	25
502-024	0.1 gram Titanium Pins	20.0 - 30.0	100
502-135	0.25 gram Titanium Pellets	7.0 - 20.0	100
762-741	0.25 gram Titanium Pellets	25.0 - 60.0	100

### Carbon, Sulfur, Nitrogen

Part No.	Description	ppm C	ppm S	ppm N	Contents
502-401	UHP Iron Chip	<5.0	<2.0	<5.0	50 g
502-402	Steel Chip	40 - 60	30 - 60	30 - 60	50 g
502-459	1 gram Steel Pins	600 - 700	100 - 200	40 - 60	100
502-809	0.5 gram Steel Pins	100 - 500	100 - 400	600 - 1000	100

### Moisture

Part No.	Description	Moisture	Contents
502-091	Calcium Oxalate	12.21%	50 g

### Oxygen, Nitrogen, Hydrogen

Part No.	Description	ppm O	ppm N	ppm H	Contents
502-416	1 gram Steel Pins	25 - 75	300 - 600	1 - 6	100
501-996	0.12 gram Titanium Pins	1500 - 2500	200 - 500	20 - 50	100

# Primary Standards and Calibration Samples

Information listed below is to be used only as a guide. Values listed represent an average from multiple lots and approximate ranges are provided for comparative purposes only. Please call 800-292-6141 for exact chemistry and availability at the time of order.

## Calibration Samples

### Carbon, Sulfur

Part No.	Description	% C	% S	Contents
502-414	1 gram Steel Pellet	0.005 - 0.030	0.001 - 0.030	100
501-501	1 gram Steel Rings	0.020 - 0.040	0.005 - 0.030	454
501-992	1 gram Steel Rings	0.02 - 0.04	0.0005 - 0.002	454
501-502	1 gram Steel Rings	0.04 - 0.10	0.005 - 0.030	454
501-503	1 gram Steel Rings	0.10 - 0.25	0.005 - 0.030	454
501-510	1 gram Steel Rings	0.14 - 0.20	0.075 - 0.150	454
501-504	1 gram Steel Rings	0.25 - 0.50	0.005 - 0.030	454
501-505	1 gram Steel Rings	0.50 - 0.80	0.005 - 0.030	454
501-506	1 gram Steel Rings	0.80 - 1.00	0.005 - 0.030	454
502-364	1 gram Steel Rings	0.80 - 1.00	—	454
502-280	1 gram Steel Rings	—	0.075 - 0.150	454
502-348	1 gram Steel Pins	0.0005 - 0.0015	0.0005 - 0.0015	100
502-412	1 gram Steel Pins	0.0050 - 0.0100	0.0050 - 0.0100	100
501-674	1 gram Steel Pins	0.015 - 0.035	0.005 - 0.025	454
502-455	1 gram Steel Pins	0.035	0.0024	100
502-449	1 gram Steel Pins	0.04 - 0.065	0.280 - 0.365	454
501-675	1 gram Steel Pins	0.050 - 0.080	0.005 - 0.025	454
501-676	1 gram Steel Pins	0.09 - 0.25	0.003 - 0.025	454
501-677	1 gram Steel Pins	0.30 - 0.40	0.005 - 0.025	454
501-678	1 gram Steel Pins	0.50 - 0.60	0.005 - 0.025	454
501-679	1 gram Steel Pins	0.85 - 1.00	0.005 - 0.025	454
501-673	Steel Chips—Low C/S	0.0003 - 0.0015	0.0005 - 0.0025	454
502-318	Ore (Drill Tailings)	0 - 2	0 - 2	25 g
502-319	Ore (Drill Tailings)	1 - 5	1 - 5	25 g
502-320	Ore (Drill Tailings)	2 - 6	2 - 6	25 g
502-372	Ore (Drill Tailings)	3 - 10	3 - 10	25 g
502-491	Ore (Drill Tailings)	7 - 15	7 - 15	25 g
502-403	Copper Pins	—	0.0005 - 0.0015	100
501-105	Iron Powder	2.0 - 2.4	0.005 - 0.02	250 g
502-451	Iron Powder	3.90 - 4.1	0.08 - 0.10	150 g
501-123	Tungsten Carbide Powder	6.0 - 6.25	—	100 g
501-024	White Iron	3.10 - 3.5	0.02 - 0.08	250 g
501-995	0.5 Titanium Pins	0.025	—	100
502-029	Synthetic Carbon	1.0	—	50 g
502-030	Synthetic Carbon	5.0	—	50 g
502-630	Synthetic Carbon	0.4 - 0.6	—	50 g
502-632	Synthetic Carbon	0.1 - 0.2	—	50 g

# Primary Standards and Calibration Samples

Information listed below is to be used only as a guide. Values listed represent an average from multiple lots and approximate ranges are provided for comparative purposes only. Please call 800-292-6141 for exact chemistry and availability at the time of order.

## Nitrogen, Oxygen

Part No.	Description	ppm O	ppm N	Contents
501-990	1 gram Copper Pellets	175 - 325	—	100
501-147	1 gram Copper Pins	175 - 325	—	100
501-148	1 gram Copper Pins	325 - 475	—	100
501-149	1 gram Copper Pins	475 - 700	—	100
501-550	0.5 gram Steel Pins	15 - 45	15 - 45	100
501-993	0.5 gram Steel Pins	—	25 - 85	100
502-102	0.5 gram Steel Pins	25 - 125	200 - 400	100
501-551	0.5 gram Steel Pins	70 - 225	25 - 85	100
502-494	0.5 gram Steel Pins	—	300 - 600	100
502-016	0.5 gram Steel Pins	—	1500 - 2500	100
502-072	0.5 gram Steel Pins	—	5000 - 5500	100
502-456	1 gram Steel Pins	4 - 6	23	100
502-197	1 gram Steel Pins	10 - 50	—	100
501-991	1 gram Steel Pellets	15 - 45	15 - 45	100
501-643	1 gram Steel Pins	15 - 45	15 - 45	100
501-643-100	1 gram Steel Pins	15 - 45	15 - 45	454
502-257	1 gram Steel Pins	25 - 75	300 - 600	100
501-644	1 gram Steel Pins	40 - 150	50 - 100	100
502-198	1 gram Steel Pins	65 - 150	—	100
501-645	1 gram Steel Pins	150 - 300	250 - 400	100
501-646	1 gram Steel Pins	200 - 500	10 - 50	100
502-193	1 gram Steel Pins	—	10 - 50	100
502-194	1 gram Steel Pins	—	65 - 150	100
502-195	1 gram Steel Pins	—	175 - 300	100
502-328	1 gram Steel Pins	—	300 - 600	100
502-411	1 gram Nickel Pins	2 - 8	—	100

Part No.	Description	% O	% N	Contents
501-653	0.1 gram Titanium Pins	0.040 - 0.050	0.002 - 0.005	100
501-657	0.1 gram Titanium Pins	0.070 - 0.085	0.005 - 0.009	100
501-664	0.1 gram Titanium Pins	0.14 - 0.16	0.012 - 0.020	100
501-320	0.1 gram Titanium Pins	0.16 - 0.25	0.012 - 0.020	100
502-201	0.1 gram Titanium Pins	0.250 - 0.270	0.017 - 0.020	100
502-047	0.1 gram Zirconium Pins	0.125 - 0.135	—	100
502-141	Tungsten Trioxide Powder	18.8 - 20.6	—	10 g
502-140	Zirconium Oxide Powder	25.7 - 26.3	—	10 g
502-138	Iron Oxide III Powder	29.5 - 30.5	—	10 g
502-139	Silicon Dioxide Powder	53.3	—	10 g

# O-Rings

See individual consumable and spares reference cards for precise location of o-rings for most instruments. For exact o-ring sizes, please refer to the drawings on page 17.

## **CS-225, CS-125**

Part No.	O-Ring Location
521-113	Combustion Tube
762-058	Dust Filter Assembly
771-991	Dust Filter Assembly
772-520	Catalyst Heater Tube/Reagent Tube/ Filter Tube
781-424	Lance Tube Assembly

## **CS-400/C-400/S-400, CS-300, CS-200/C-200/ S-200/WC-200**

Part No.	O-Ring Location
601-920	Combustion Tube
605-520-087	O-Ring Package
762-058	Dust Filter Assembly
765-976	Reagent Tube
771-991	Dust Filter Assembly
772-520	Reagent Tube/Filter Tube
772-738	Catalyst Heater Tube/Reagent Tube
781-424	Dust Filter Tube Assembly

## **CS-344/IR-312/IR-332, CS-244/IR-212/IR-232**

Part No.	O-Ring Location
578-672	Lance Assembly
601-920	Combustion Tube
760-224	Lance Assembly
762-058	Dust Filter Assembly
772-269	Lance Assembly
772-520	Reagent Tubes/Filter Tube
772-738	Catalyst Heater Tube/Furnace Assembly

## **CS-444/CS-444LS/IR-412/IR-432**

Part No.	O-Ring Location
601-920	Combustion Tube
604-172	Dust Filter Assembly
762-058	Dust Filter Assembly
771-991	Dust Filter Assembly
772-520	Reagent Tube/Filter Tube
772-738	Catalyst Heater Tube/Furnace Assembly
773-320	Lance Assembly

## **CS600/CSHS600/CSLS600/C600/S600/ SHS600/SDR600**

Part No.	O-Ring Location
601-920	Combustion Tube
765-976	Reagent Tube Seal
772-520	Reagent Tube
772-738	Catalyst Heater Tube/Assembly Furnace

## **DH-103, DH-102**

Part No.	O-Ring Location
771-445	Catalyst Block
772-520	Catalyst Heater Tube/Reagent Tube
772-738	Catalyst Heater Tube/Catalyst Block
773-913	Lance Tube Assembly
778-114	Catalyst Heater Assembly

## **DH603**

Part No.	O-Ring Location
602-802	Combustion Tube
617-083	Catalyst Block
765-976	Reagent Tube
772-520	Reagent Tube/Catalyst Heater Tube
773-913	Piercer

## **RC612**

Part No.	O-Ring Location
601-442	Catalyst Block/Catalyst Heater Tube
602-802	Combustion Tube
617-083	Catalyst Block
765-976	Reagent Tube
772-520	Catalyst Heater Tube/Reagent Tube

# O-Rings

See individual consumable and spares reference cards for precise location of o-rings for most instruments. For exact o-ring sizes, please refer to the drawings on page 17.

## **RH-402**

<b>Part No.</b>	<b>O-Ring Location</b>
762-357	Furnace Assembly
772-520	Reagent Tube
772-738	Catalyst Heater Tube
772-910	Reaction Tube
778-114	Catalyst Heater Assembly

## **TC-436/TC-436AR/TC-436DR/TN-414/ RO-416/RO-416DR, RH-404**

<b>Part No.</b>	<b>O-Ring Location</b>
760-226	Upper Electrode Assembly
771-407	Upper Electrode Assembly
772-520	Reagent Tube
772-738	Catalyst Heater Tube
774-489	Upper Electrode Assembly
775-312	Lower Electrode Assembly
778-114	Catalyst Heater Assembly

## **TC-300/RO-300/TN-300**

<b>Part No.</b>	<b>O-Ring Location</b>
760-226	Upper Electrode Assembly
771-407	Upper Electrode Assembly
772-520	Catalyst Heater Tube
772-738	Catalyst Heater Tube
774-489	Upper Electrode Assembly
775-312	Lower Electrode Assembly

## **TCH600/ROH600/RH600/RHEN600/TC600/ RO600/TN600, TC500/RO500/TN500, TC400/ RO400/TN400**

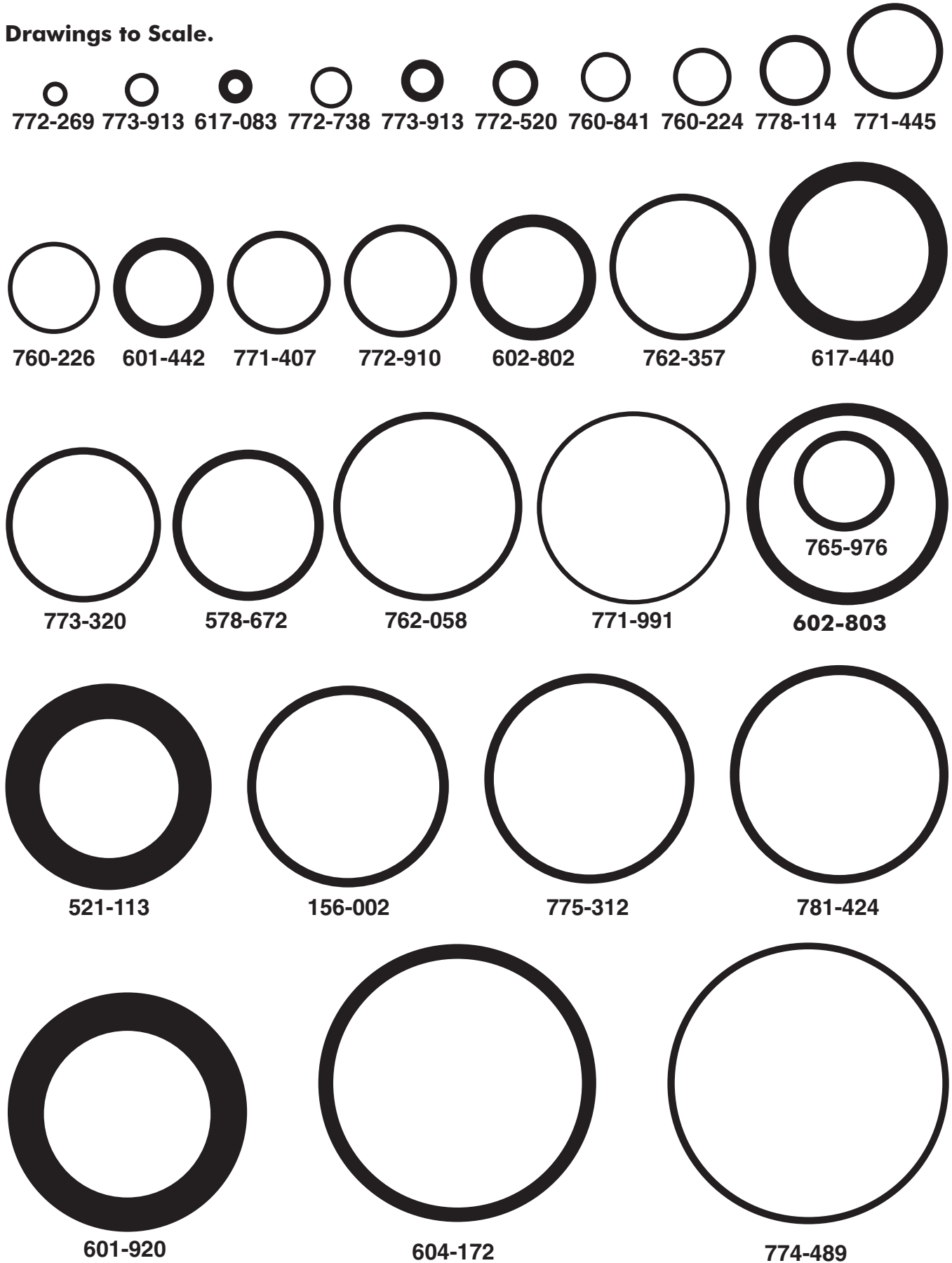
<b>Part No.</b>	<b>O-Ring Location</b>
156-002	Lower Electrode Assembly
602-803	Loading Head Assembly
617-083	Incoming Scrubber/Catalyst Heater
617-440	Loading Head Filter Assembly
765-976	Incoming Scrubber
772-520	Reagent Tubes
773-913	Loading Head/TC Cell
774-425	Loading Head Assembly
778-114	Incoming Scrubber Assembly

## **WR-112**

<b>Part No.</b>	<b>O-Ring Location</b>
521-113	Combustion Tube
762-058	Dust Filter Assembly
771-991	Dust Filter Assembly
772-520	Reagent Tubes/Filter Tube
781-424	Dust Filter Assembly

# O-Rings

Drawings to Scale.

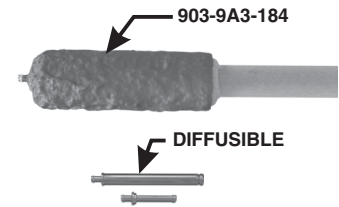




# Evacuated Samplers and Pin Tubes

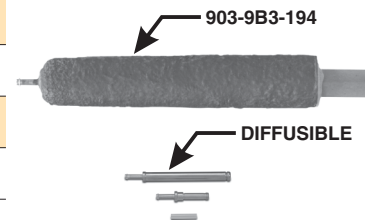
## Evacuated Steel Sampler with Inner Steel Pin

903-9A3-174	3-foot Cardboard, 6-inch Non-Splash Sleeve without Anti-Skull Coat
903-9A3-184	3-foot Cardboard, 6-inch Non-Splash Sleeve with Anti-Skull Coat
903-9A3-124	3-foot Cardboard, 12-inch Non-Splash Sleeve without Anti-Skull Coat
903-9A3-194	3-foot Cardboard, 12-inch Non-Splash Sleeve with Anti-Skull Coat



## Evacuated Steel Sampler with Quartz Lining

903-9B3-174	3-foot Cardboard, 6-inch Non-Splash Sleeve without Anti-Skull Coat
903-9B3-184	3-foot Cardboard, 6-inch Non-Splash Sleeve with Anti-Skull Coat
903-9B3-124	3-foot Cardboard, 12-inch Non-Splash Sleeve without Anti-Skull Coat
903-9B3-194	3-foot Cardboard, 12-inch Non-Splash Sleeve with Anti-Skull Coat

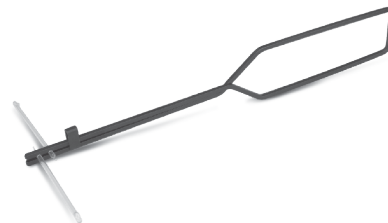


## Evacuated Pin Tubes for Rapid Sampling of Molten Metals Carbon • Sulfur • Oxygen • Nitrogen • Hydrogen

Part No.	Pin Tube Type	Inside Diameter	Length	Qty.
511-036	Standard	4 mm $\pm$ 0.2 mm (0.159" $\pm$ 0.009")	146 mm (5.75")	1000
511-039	Standard	3.5 mm $\pm$ 0.2 mm (0.139" $\pm$ 0.009")	146 mm (5.75")	1000
511-037	Precision	4 mm $\pm$ 0.025 mm (0.159" $\pm$ 0.001")	146 mm (5.75")	1000
511-390	High Vacuum	6 mm (0.236")	125 mm (4.92")	10
511-390-100	High Vacuum	6 mm (0.236")	125 mm (4.92")	100



**Evacuated Pin Tubes**—for rapid sampling of molten metals.



**511-038 Pin Tube Holder**—a convenient tool for safely inserting the pin tube.

# Miscellaneous Operating Accessories

Refer to page 21 for a visual guide of Miscellaneous Operating Accessories.

## Carbon and Sulfur Determinators

### CS230, CS-400, CS-300, CS-200 Series

501-082	Wire Brush
501-110	Silicone Tubing (Pinch Valve/Dust Box)
501-241	Vacuum Grease
503-032	Glass Scoop
601-483	Paper
601-484	Printer Ribbon Cartridge
760-138	Tweezers, Straight
761-929	Crucible Tong
773-579	Stainless Steel Scoop Assembly
775-306	Secondary Filter
775-307	Filter Tool (Thumbscrew)

### WR-112 Series

501-082	Wire Brush
503-032	Glass Scoop
760-138	Tweezers, Straight
761-929	Crucible Tong
773-579	Stainless Steel Scoop Assembly
775-306	Secondary Filter
775-307	Filter Tool (Thumbscrew)

### CS600, CS-444, WC600 Series

501-082	Wire Brush
501-110	Silicone Tubing (Pinch Valve/Dust Box)
501-241	Vacuum Grease
503-032	Glass Accelerator Scoop
601-483	Paper
601-484	Printer Ribbon Cartridge
760-138	Tweezers, Straight
761-929	Crucible Tong
773-579	Stainless Steel Scoop Assembly
775-306	Secondary Filter
775-307	Filter Tool (Thumbscrew)

### WC200/230 Series

612-717	Trap Tube Assembly
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## Nitrogen and Oxygen Determinators

### TC-300 Series

501-241	Vacuum Grease
601-483	Paper
760-138	Tweezers, Straight
765-933	Lubricant Cooling Agent
766-053	Crucible Tweezers, Curved
766-646	Air Filter Coating
767-473	Utility Funnel
768-980	Balston Filter

### TC-300 Series Continued

774-649	Cleaning Brush Assembly (774-652 Brush Only)
775-306	Secondary Filter
775-307	Filter Tool (Thumbscrew)
775-416	Small Cleaning Brush Assembly (188-012 Brush Only)
775-850	Halogen Trap Kit
782-918	Cleaning Brush Assembly (782-877 Brush Only)
782-942	Cleaning Brush Assembly (782-938 Brush Only)

### TC-436 Series

501-241	Vacuum Grease
502-023	Funnel
503-032	Glass Accelerator Scoop
601-484	Printer Ribbon Cartridge
603-350	O-Ring Installation Tool
611-373	Lower Electrode Insert Wrench
760-138	Tweezers, Straight
766-053	Crucible Tweezers, Curved
768-980	Balston Filter
774-649	Cleaning Brush Assembly (774-652 Brush Only)
775-306	Secondary Filter
775-307	Filter Tool (Thumbscrew)
775-416	Small Cleaning Brush Assembly (188-012 Brush Only)
782-918	Cleaning Brush Assembly (782-877 Brush Only)
782-942	Cleaning Brush Assembly (782-938 Brush Only)

### TCH600, TC500, TC400 Series

501-241	Vacuum Grease
502-374	Particle Filter
503-032	Glass Accelerator Scoop
603-350	O-ring Installation Tool
611-373	Lower Electrode Insert Wrench
617-486	Fitting Removal Tool
617-528	Oxygen Scrubber Sealing Cap
617-726	Oxygen Scrubber Removal Tool
617-997	Funnel
619-871	Cleaning Brush Assembly (619-803 Brush Only)
765-933	Cooling Agent
774-649	Cleaning Brush Assembly (774-652 Brush Only)
775-306	Secondary Filter
775-416	Small Cleaning Brush Assembly (188-012 Brush Only)
783-785-110-HAZ	Supelco™ OMI Filter

# Miscellaneous Operating Accessories

Refer to page 21 for a visual guide of Miscellaneous Operating Accessories.

## Carbon and Moisture Determinators

### RC-412

501-614	Spatula
601-483	Paper
601-484	Printer Cartridge Ribbon
761-929	Crucible Tong
775-306	Secondary Filter
780-044	Boat Puller Assembly

### RC612

501-614	Spatula
614-704	Air Filter
625-505-137	Quartz Boat Tweezers
625-505-430	Nickel Boats
768-980	Heated Filter
780-044	Boat Puller
781-335	Quartz Boats
782-059	Nickel Liners

## Hydrogen Determinators

### DH-103

625-510-222	Needle
760-138	Tweezers, Straight
775-306	Secondary Filter
775-307	Filter Tool (Thumbscrew)

### DH603

614-704	Air Filter
625-510-146	Sample Puller
625-510-222	Piercer Needle
778-625	Seals

### RH-402

501-241	Vacuum Grease
601-483	Paper
601-484	Printer Ribbon Cartridge
603-778	Sample Alignment Tool
760-138	Tweezers, Straight
760-139	Crucible Tweezers, Curved
767-473	Funnel
768-980	Balston Filter
775-306	Secondary Filter
775-307	Filter Tool (Thumbscrew)

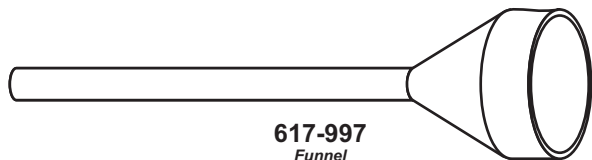
### RH-404/RH-404EN

501-241	Vacuum Grease
503-032	Glass Accelerator Scoop
601-483	Paper
601-484	Printer Ribbon Cartridge
760-138	Tweezers, Straight
766-053	Crucible Tweezers, Curved
768-980	Balston Filter
774-649	Cleaning Brush Assembly (774-652 Brush Only)
775-306	Secondary Filter
775-307	Filter Tool (Thumbscrew)
775-416	Small Cleaning Brush Assembly (188-012 Brush Only)
782-918	Cleaning Brush Assembly (782-877 Brush Only)
782-942	Cleaning Brush Assembly (782-938 Brush Only)
789-238	Cleaning Electrode Brush Assembly

### RHEN600/602

611-351-198	EN Electrode Cleaning Brush Assembly
619-802	EN Electrode Cleaning Brush (only)
761-744	Molecular Sieve Assembly

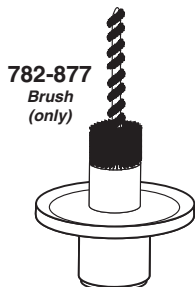
# Miscellaneous Operating Accessories



**617-997**  
Funnel

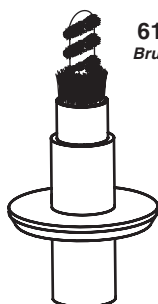


**502-023**  
Funnel



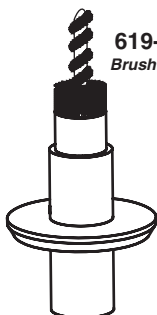
**782-877**  
Brush  
(only)

**782-918**  
Brush Assembly  
(EF-400/500 Step Brush)



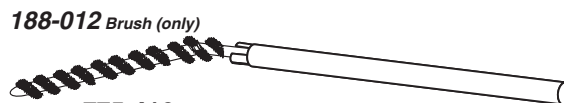
**619-802**  
Brush (only)

**611-351-198**  
Brush Assembly  
(EN-Series Brush)



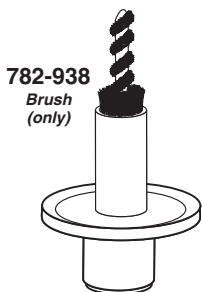
**619-803**  
Brush (only)

**619-871**  
Brush Assembly  
(TC-400/500/600 Brush)



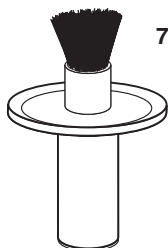
**188-012** Brush (only)

**775-416** Small Cleaning Brush Assembly



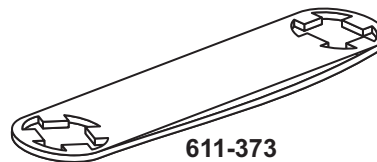
**782-938**  
Brush  
(only)

**782-942**  
Brush Assembly  
(EN-400/500 Brush)

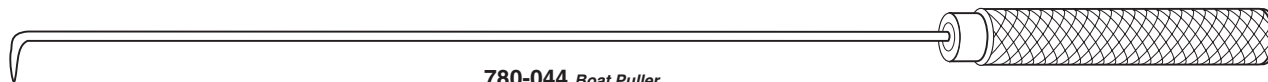


**774-652**  
Brush  
(only)

**774-649**  
Brush Assembly  
(All Series Lower Electrode Brush)



**611-373**  
Lower Electrode Insert Wrench



**780-044** Boat Puller



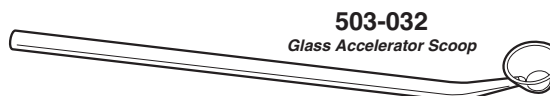
**761-929** Crucible Tongs



**501-614**  
Spatula



**773-579**  
Stainless Steel Scoop



**503-032**  
Glass Accelerator Scoop



**766-053** Crucible Tweezers, Curved



**760-138** Tweezers, Straight

# Upgrades and Options

## Balances

750-000-160	3-Place Balance and Interface Kit (1.0 mg)
751-300-160	4-Place Balance and Interface Kit (0.1 mg)
751-700-120	5-Place Balance and Interface Kit (001 mg)
751-600-120	6-Place Balance and Interface Kit (0.001 mg)

## Printer Kits

601-480-110	Dot Matrix Printer Kit (USB)
612-917	Dot Matrix Printer Kit (Serial)
621-434-110	Deskjet Printer Kit

## Gas Regulators

501-291	O <sub>2</sub> Regulator
764-216	Inert Gas Regulator
766-036	Air Regulator
768-593	CO <sub>2</sub> Regulator

## CS230

CF10	Gas Purification Unit
617-249-HAZ	CS Halogen Trap Kit
619-995	Bar Code Reader (USB)
621-891	Vacuum Cleaner Kit
621-895	PC Software Upgrade
621-896	PC Upgrade Kit (PC, Monitor, Keyboard, Mouse, and PC Software)
621-897	Autocleaner Kit (requires 621-891)
625-513	Shuttle Loader Kit (without autocleaner)
625-514	Shuttle Loader/Autocleaner Kit

## CS600

TF-1	Single Tube Resistance Furnace
TF-10	Dual Tube Resistance Furnace
603-620	ADM-10 Manual Accelerator Dispenser
604-570-110	ADA-200 Automatic Accelerator Dispenser (120 V~, 60 Hz, 15 W)
604-570-120	ADA-200 Automatic Accelerator Dispenser (220 V~, 50/60 Hz, 15 W)
617-249-HAZ	CS Halogen Trap Kit
618-430	Batch Loader Kit
619-995	Bar Code Reader (USB)
625-505-980	Balston Filter Upgrade Kit
625-511	Shuttle Loader Kit (SN 3185 and below)
625-512	Shuttle Loader Kit (SN 3186 and above)

## DH603

619-995	Bar Code Reader (USB)
625-615	Piercer Upgrade Kit

## RC612

619-995	Bar Code Reader (USB)
620-400-210	Autoloader Add-On Kit
625-507	Incoming Gas Purifier

## TC400/500/600, TCH600\*

617-834	Incoming Gas Scrubber Kit**
617-837	Gas Dose Kit (N/O)**
621-422	Vacuum Cleaner
625-501-917	Autocleaner Kit (TC500 SN ≤3180; TC600 SN ≤3276)
625-501-919	Autocleaner Kit (TC500 SN 3181-3329; TC600 SN 3277-3725)
625-501-915	Autocleaner Kit (TC500 SN ≥3330; TC600 SN ≥3726)
625-501-923	Autocleaner/Batch Loader Kit (TC500 SN ≤3180; TC600 ≤3276)
625-501-925	Autocleaner/Batch Loader Kit (TC500 SN 3181-3329; TC600 SN 3277-3725)
625-501-921	Autocleaner/Batch Loader Kit (TC500 SN ≥3330; TC600 SN ≥3726)
625-501-927	Batch Loader Kit (TC500 SN ≥3330; TC600 ≥3726)
620-925-124	Autocleaner/Cassette Loader Kit (TC500 SN ≤3180; TC600 SN ≤3276)
620-925-122	Autocleaner/Cassette Loader Kit (TC500 SN 3181-3329; TC600 SN 3277-3725)
620-925-120	Autocleaner/Cassette Loader Kit (TC500 SN ≥3330; TC600 SN ≥3726)
620-925-126	Cassette Loader Kit (T500 SN ≥3330; TC600 SN ≥3726)

\*Automation is not available for TC400 Series Determinators

\*\*Standard on TC600 Series Determinators

## ROSi600

625-501-938	Autocleaner/Batch Loader Kit (SN 3330-3726 and above)
625-501-940	Autocleaner/Batch Loader Kit (SN 3329-3725 and below)
625-501-942	Batch Loader Kit (SN 3330-3726 and above)

# Conversion Kits

## TC400

621-424 TN400 to TC400

621-425 RO400 to TC400

## TC500

617-991 TN500C to TC500C

617-994 RO500C to TC500C

617-995 RO500 to TC500

## TC600

618-481 TC600 to TCH600

619-890 RO600 to TC600

621-297 RH600 to TCH600

621-298 RO600 to TCH600

621-299 TN600 to TCH600

621-345 TCH to TCHEN600

621-997 TN600 to TC600

## DH603

625-515 DH603 to DH603D

## CS230

621-836 S230 to S230DR

621-837 S230 to CS230

621-838 S230 to CS230CL

621-839 S230 to CS230CH

621-840 S230SH to S230DR

621-841 S230SH to CS230SH

621-842 S230SH to CS230CSH

621-843 C230 to CS230

621-844 C230 to CS230SH

621-845 C230CL to C230CLH

621-846 C230CL to CS230CL

621-847 C230CH to C230CLH

621-848 C230CH to CS230CH

621-849 C230CH to CS230CSH

621-850 CS230 to CS230SH

621-851 CS230CH to CS230CSH

621-852 CS230SH to CS230CSH

## CS600

619-938 SHS600 to SDR600

619-939 S600 to SDR600

621-350 SHS600 to CSHS600

621-368 CS600 to CSHS600

625-351 S600 to CS600

625-352 C600 to CS600

625-501-980 CS600 to CSLS600

- Unit must be returned to the LECO Global Service and Support Center for installation
- Unit must be in working order prior to shipment to LECO
- Customer is responsible for shipping charge both to and from LECO
- Conversion kit cost does not include labor
- Conversion process includes Preventive Maintenance service
- Please call 269-982-5497 or contact your local LECO Sales Engineer for more information



# Application Notes

**LECO offers a wide range of application notes and application tips. You can visit [http://www.leco.com/resources/application\\_note\\_subs/inorganic\\_application\\_notes.htm](http://www.leco.com/resources/application_note_subs/inorganic_application_notes.htm) to download, or call 1-800-292-6141 to request a copy.**

## Carbon & Sulfur

- Carbon & moisture in aggregates using the RC-412 (203-821-010)
- Sulfur in battery paste (PbO/PbSO<sub>4</sub>) using the CS series (203-821-209)
- Sulfur in copper base materials using the CS series (203-821-109)
- Carbon & sulfur in lime using the CS series (203-821-135)
- Carbon and sulfur in metal-bearing ores and related materials using the CS600 series (203-821-309)
- Carbon & sulfur in potassium heptafluorotantalate materials using the CS-444 and CS-400 (203-821-198)
- Carbon in refractory and reactive metals and their alloys using the CS600 series (203-821-308)
- Carbon & sulfur in steel, nickel-base, & cobalt-base alloys using the CS600 series (203-821-261)
- Ultra low carbon & sulfur in steel, nickel-base, & cobalt alloys using the CS-444 (203-821-004)
- Carbon in tungsten carbide using the WC600 (203-821-281)
- Carbon in tungsten carbide powder using the WC-200 (203-821-060)
- Surface Carbon on Steel Sheet and Rod Samples using the RC612 (203-821-322)

## Hydrogen

- Hydrogen in aluminum & aluminum alloys using the RH-402 (203-821-199)
- Hydrogen in aluminum & aluminum alloys using the RHEN602 (203-821-300)
- Hydrogen in copper & copper alloys using the RHEN600/602 (203-821-305)
- Hydrogen in Reactive/Refractory Metals using the RH600/TCH600 (203-821-339)
- Hydrogen in Reactive/Refractory Metals using the RHEN600/602 (203-821-340)
- Hydrogen in steel & iron using the RH600 (203-821-266)
- Hydrogen in steel & iron using the RHEN600 (203-821-271)

## Moisture

- Carbon & moisture in aggregates using the RC-412 (203-821-010)
- Moisture in welding flux using the RC-412 (203-821-021)

## Nitrogen & Oxygen

- Oxygen & nitrogen in calcium fluoride using the TC600 (203-821-202)
- Oxygen & nitrogen in carbon black, graphite, & calcined coke using the TC-436 (203-821-037)
- Ultra low nitrogen & oxygen in iron, steel, nickel-base, & cobalt base alloys using the TC600 (203-821-184)
- Ultra low nitrogen & oxygen in iron, steel, nickel-base, & cobalt base alloys using the TC500 (203-821-187)
- Oxygen & nitrogen in nitride materials using the TC500/600 (203-821-213)
- Oxygen & nitrogen in reactive/refractory metals and their alloys (including Ti, Zr, W, Mo, Ta, Nb, Hf and their alloys) using the TC600 (203-821-185)
- Oxygen & nitrogen in reactive/refractory metals and their alloys (including Ti, Zr, W, Mo, Ta, Nb, Hf and their alloys) using the TC500 (203-821-186)

## Nitrogen, Oxygen, & Hydrogen

- Oxygen, nitrogen, & hydrogen in refractory metals using the TCH600 (203-821-267)
- Oxygen, nitrogen, & hydrogen in steel and iron using the TCH600 (203-821-265)

## Oxygen & Hydrogen

- Oxygen & hydrogen in copper & copper alloys using the TCH600/ROH600 (203-821-276)

## Analytical Papers from the Technical Services Laboratory

- Carbon and Sulfur Determination—LECO Induction Furnace Instruments (209-141-001)
- Oxygen and Nitrogen Determination Inert Gas Fusion Instruments (209-141-003)
- Simultaneous Oxygen, Nitrogen, and Hydrogen Determination of Metals (209-141-004)
- TCH600 Analytical Tips (209-141-002)

## **SmartLine® Internet-Based Remote Diagnostics**

*LECO's new internet-based SmartLine® Remote Diagnostics system provides you with our fastest service solution yet for getting the answers you need—saving you time and money.*

### **Why SmartLine?**

SmartLine provides you with an on-line support connection between your instrument and LECO's Global Support Center, allowing trained service specialists to remotely operate your instrument as if they were right there with you. Four times faster than our modem-based product, LECO is the only company to offer you this high-speed internet-based solution, allowing you to maximize your up-time and reduce on-site service calls. LECO service specialists can quickly perform basic diagnostic tests on your instrument, putting us on the same page as you—creating a better flow of communication for quicker, targeted solutions.

### **How it Works**

1. Simply call LECO's Global Support Center at 269-982-5497 during normal working hours to get your session code\*
2. Log onto <http://rc.leco.com> and enter your session code
3. LECO accepts the connection

Your SmartLine session has begun!

### **SmartLine Advantage**

With LECO's internet-based SmartLine you are set-up and connected in around 5 minutes. The only requirements are access to a high-speed internet connection (DSL or 256 kbps or faster) and a session code. No hardware, modem, or third-party software for you to install—just three simple steps and you are on your way to the quickest service solution available in the industry.

- Quick set-up (can be done on-the-fly in approximately 5 minutes; no hardware or modem to install)
- Secure customer-initiated connection
- Ability to securely connect through firewalls
- Quicker solutions and less time spent per session using high-speed connection
- Compatible with wireless environments

### **Your High-Speed Internet-Based SmartLine Package Includes**

- Five hours of "on-line" support time to get you started towards quicker solutions\*\*
- Renewable five-hour blocks of SmartLine time

**Call our Global Support Center at 269-982-5497 today and get started with your free internet-based SmartLine demonstration!**

\*LECO's normal working hours are Monday through Friday, 8:00 a.m. to 5:00 p.m. EST. Additional sessions outside normal business hours can also be scheduled by appointment.

\*\*Five-hour time blocks are valid for one year from date of purchase.

### **Part Numbers**

- 710-198 SmartLine Startup
- 710-199 SmartLine Renewal

# Preventive Maintenance Agreements

Much like an automobile, routine checks and maintenance need to be performed regularly on your laboratory instrumentation to keep them in peak operating condition. That is why we have designed Preventive Maintenance Agreements (PMA's) for select LECO instrument models.

**Save \$\$\$  
and instrument  
down-time!**

PMA's are a smart, convenient way to help you prevent unexpected downtime and associated costs. With LECO PMA's, trained LECO service specialists perform maintenance checks on your instrument (including cleanings and flow-path rebuilds) on a regularly scheduled basis. One, all-inclusive part number covering routine parts, labor, and travel can be easily purchased and renewed (Note: replacement parts and labor that may be necessary to repair an instrument are **not** included in this package).

Start maximizing your production today with PMA's from LECO. To receive a quote or for more

<b>Instrument</b>	<b>Part No.</b>
C/S/CS-200, 300, 400 Carbon/Sulfur Determinator (1 visit)	104-109-HAZ
CS/CSHS600 Carbon/Sulfur Determinator (1 visit)	104-118-HAZ
C/SDR600 Carbon/Sulfur Determinator (1 visit)	104-119-HAZ
RO500/600 Oxygen Determinator (1 visit)	104-115-HAZ
ROH600/TCH600 Oxygen/Hydrogen Determinator (1 visit)	104-116-HAZ
S/SHS600 Sulfur Determinator (1 visit)	104-117-HAZ
TN500/600 Nitrogen Determinator (1 visit)	104-114-HAZ
TC600-Series Nitrogen/Oxygen Determinator (1 visit)	104-113-HAZ

**For the latest instrument information including app notes, kits & bulletins, reference cards, and consumables go to [www.leco.com](http://www.leco.com).**

**To contact LECO regarding a service-related issue, call 269-982-5497.**

For over 70 years, LECO has pioneered new and innovative instrumentation for your laboratory. Our product line continues to grow each year to include a wider variety of target applications.



## Metals/Inorganics *(for more information, request form no. 209-034)*

- Carbon/Sulfur Determinators
- Carbon/Hydrogen/Moisture Determinators
- Nitrogen/Oxygen/Hydrogen Determinators
- Hydrogen Determinators
- Glow Discharge Spectrometers



## Metallographic/Optical *(for more information, request form no. 203-927)*

- Sample Preparation Equipment
- Image Analysis Systems
- Image Management
- Hardness Testing Systems
- Video Accessories



## Organics *(for more information, request form no. 203-102)*

- Carbon/Hydrogen/Nitrogen/Sulfur/Micro O
- Sulfur/Carbon
- Nitrogen/Protein
- Fat
- Moisture/Ash
- Calorimetry
- Mercury
- IQ/OQ Documentation Packages available  
*(for more information, request form no. 209-189)*



## Mass Spectrometry *(Separation Science)*

- GCMS Systems *(for more information, request form no. 209-182 or 209-187)*
- GCxGC-MS Systems *(for more information, request form no. 209-183)*
- GCxGC-FID/ECD Systems *(for more information, request form no. 209-184)*
- LCMS Systems *(for more information, request form no. 209-186)*

# Contact Information

## **United States**

800-292-6141 • 269-985-5496  
Fax: 269-982-8977

## **Canada**

800-268-0215 • 905-564-6577  
Fax: 905-564-6582

## **Outside United States/Canada**

269-983-5531  
Fax: 269-983-3850

## **Email/LECO Web Site**

info@leco.com • www.leco.com

## **International Offices/Subsidiaries**

### **Africa**

LECO Africa (Pty.) Ltd.  
Kempton Park, South Africa  
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Fax: 27-11-974-1848

### **Argentina**

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Fax: 55-212-538-4299

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Fax: 905-564-6582

### **China**

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Beijing, China  
Ph: 86-10-6512-8877  
Fax: 86-10-6528-0373

### **Czech Republic**

LECO Instrumente Plzen s.r.o.  
Plzen/Czech Republic  
Ph: 420-37-751-0811  
Fax: 420-37-725-9304

### **France**

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Cedex, France  
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Fax: 33-139-86-4105

### **Germany**

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Fax: 49-2166-687-100

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Fax: 852-2708-4388

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Fax: 52-81-83-49-6485

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Fax: 31-46-4747333

### **Poland**

LECO Polska Sp. zo. o  
Katowice, Poland  
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Fax: 48-32-2000-536

### **Russia**

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Fax: 7495-710-3826

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Fax: 3491-804-0577

### **Sweden**

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Fax: 886-22-518-4671

### **Thailand**

LECO Instruments (Thailand) Ltd.  
Bangkok, Thailand  
Ph: 66-2-886-4350  
Fax: 66-2-886-4351

### **United Kingdom**

LECO Instruments (U.K.) Ltd.  
Stockport, Cheshire, England  
Ph: 44-161-487-5900  
Fax: 44-161-456-0969

### **Venezuela**

Instrumentos LECO Venezuela, C.A.  
Puerto Ordaz, Edo. Bolivar, Venezuela  
Ph: 58-286-994-4835  
Fax: 58-286-994-1570

### **Vietnam**

LECO (Vietnam) Co., Ltd.  
Ho Chi Minh City, Vietnam  
Ph: 848-3829-8979  
Fax: 848-3829-8978



# Consumable Order Form

1-800-292-6141 • sales@leco.com • www.leco.com

**To place an order, complete and fax to: 269-982-8977**

Contact Name \_\_\_\_\_ LECO Acct No. \_\_\_\_\_  
 Phone \_\_\_\_\_ Fax \_\_\_\_\_ email \_\_\_\_\_  
 Ship To \_\_\_\_\_ Bill To \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Method of Payment**    Tax Exempt    Purchase Order (Number) \_\_\_\_\_  
 Credit Card (Number) \_\_\_\_\_ Exp. Date \_\_\_\_\_  
 Name of Cardholder \_\_\_\_\_

**Shipping**    Prepay & Charge    COD  
 Collect (if UPS or FED-X, your collect account number is required) \_\_\_\_\_

**Freight Method**    UPS    UPS Next Day    UPS 2nd Day  
 Other \_\_\_\_\_  
 Ship Complete    OK to ship partial

LECO Part No.	Description	Qty.	Price

**Order Confirmation Requested**

*Terms Net 30 • FOB St. Joseph, Michigan*