

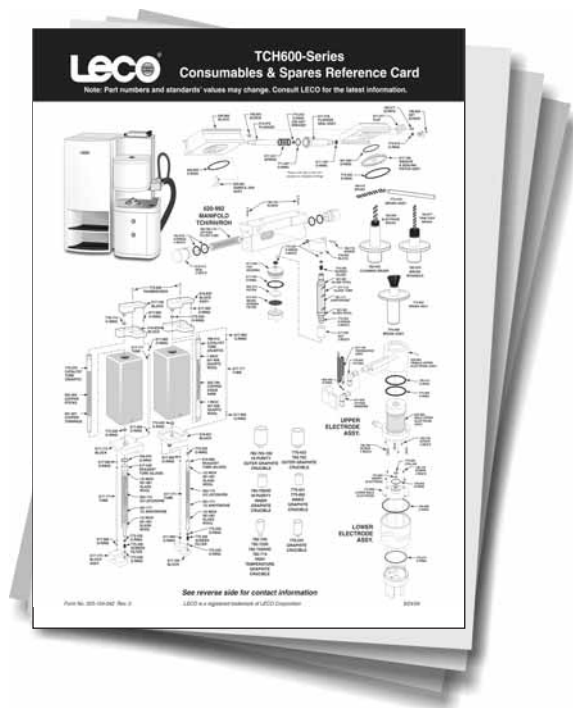
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To get the best results from your instrument, use only genuine LECO consumables!

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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.



Ordering Information/General Terms

Ordering, Customer Assistance, and all Other Inquiries

Toll-Free



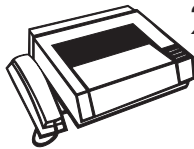
800-292-6141
or a toll call is 269-985-5496

Email



info@leco.com

Fax



269-982-8977

Mail



LECO Corporation
3000 Lakeview Avenue
St. Joseph, MI 49085-2396

VISA, Mastercard, and American Express Accepted.



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.

General Combustion/Fusion Supplies

Reagents/Catalysts

Part No.	Description	Contents
501-171	Anhydrone - for H ₂ O absorption	1 lb. (454 g)
764-098	Cellulose - Traps SO ₃	1 lb. (454 g) pkg
502-190	Copper Oxide Wire - for converting CO to CO ₂ and H ₂ to H ₂ 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
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	Halogen Trap Reagent	200 g
769-610	Halogen Trap Reagent	225 g
502-176	Lecosorb (8/20 Mesh) - for CO ₂ removal	500 g
502-174	Lecosorb (20/30 Mesh) - for CO ₂ removal	500 g
501-060	Manganese Dioxide - SO ₂ scrubber	60 g
501-587	Platinum/Silica - for converting CO to CO ₂ in combustion analysis	15 g
501-170	Rare Earth Copper Oxide - for converting CO to CO ₂ and H ₂ to H ₂ O	50 g
761-747	Schutze™ Reagent - for converting CO to CO ₂	100 g
502-480	Schutze™ Reagent - for converting CO to CO ₂	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)
763-065	Nickel Basket	1 g ea. (100/bottle)

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 5.

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

RH-402

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

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 5.

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

Part No.	O-Ring Location
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

Part No.	O-Ring Location
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

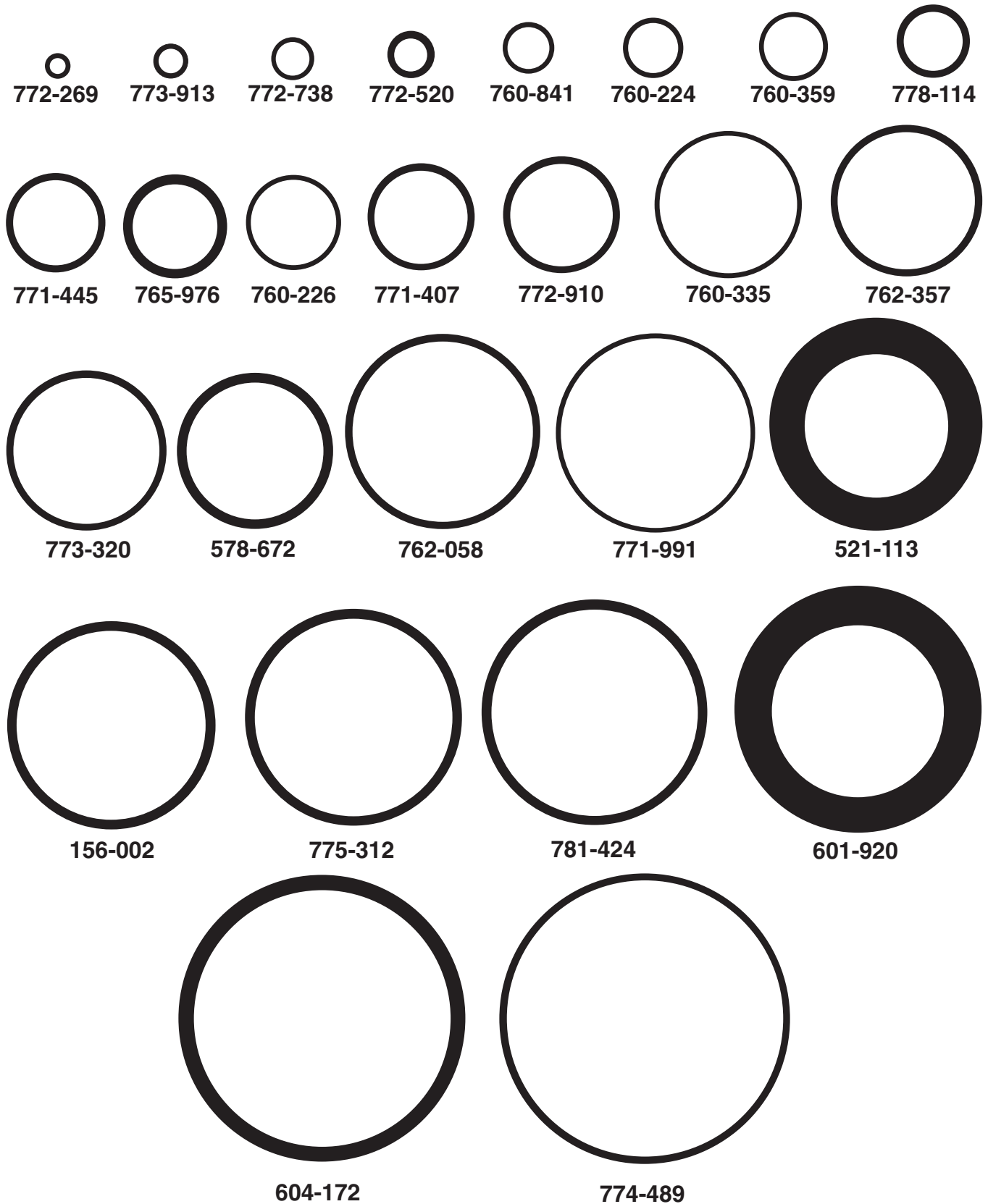
Part No.	O-Ring Location
156-002	Lower Electrode Assembly
601-684	Loading Head Assembly
617-083	Incoming Scrubber/Catalyst Heater
617-440	Loading Head Filter Assembly
618-412	Seal Block End, Supelco™
765-976	Incoming Scrubber
772-520	Reagent Tubes
773-913	Loading Head/TC Cell
774-425	Loading Head Assembly
778-114	Incoming Scrubber Assembly

WR-112

Part No.	O-Ring Location
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.



Carbon, Sulfur Determination

The **CS600-Series** simultaneous carbon and sulfur determinator is a Windows®-based software controlled instrument for wide-range measurement of carbon and sulfur content of metals, ores, ceramics, and other inorganic materials. The CS600 uses an induction furnace and measures carbon and sulfur by infrared absorption. It comes equipped with automatic combustion zone, cleaning, and dust removal. A 20-position batch processing autoloader is available as an option.

LECO's CS600-Series also includes a Carbon-only determinator (C600), Sulfur-only determinator (S600), a Carbon/High Sulfur determinator (CSHS600), a Carbon/Low Sulfur determinator (CSLS600), a High Sulfur determinator (SHS600), and a dual-range Sulfur (SDR600). For more information, contact LECO.



Application Examples

Ultra Low Carbon and Sulfur Analysis in Steel, Ni Base, and Co Base Alloys (request Form No. 203-821-004)

Sulfur in Copper Base Materials (request Form No. 203-821-109)

Accessories Required

528-018HP Crucibles (high-purity)
502-173 LECOCEL II HP
502-231 Low C/S Iron Chip
502-401 UHP Iron Chip Calibration Std.
773-579 Stainless Steel Scoop Assy.
761-929 Crucible Tongs
528-018 Ceramic Crucible
502-403 Copper Pin
501-263 Copper Accelerator
503-032 Glass Scoop
760-138 Tweezers



Evacuated Pin Tubes for Rapid Sampling of Molten Metals

Available in different types: Standard (511-039); Precision (511-037); and High Vacuum (511-390-100)



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

The LECO **TF-10 Induction Furnace** can be used to preburn samples.



Capsules and Crucibles

Refer to page 10 for a visual guide to selecting the correct replacement capsule or crucible.

RC-412

Part No.	Description	Contents
781-335	Quartz Boat	1/box
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
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
783-568	Lower Electrode Tip - for 764-330 Crucibles (RH-404EN)	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
620-814	Lower Electrode Tip - for use with all crucibles except 782-719 and 782-720	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 gettering 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 10 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
620-814	Lower Electrode Tip - for use with all crucibles except 782-719 and 782-720	1/pkg
619-895	Graphite Crucible - 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
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	1/pkg
782-795HD	Inner Crucible - for oxygen in silicon applications, use with 782-703 Crucibles	1000/pkg

Capsules and Crucibles

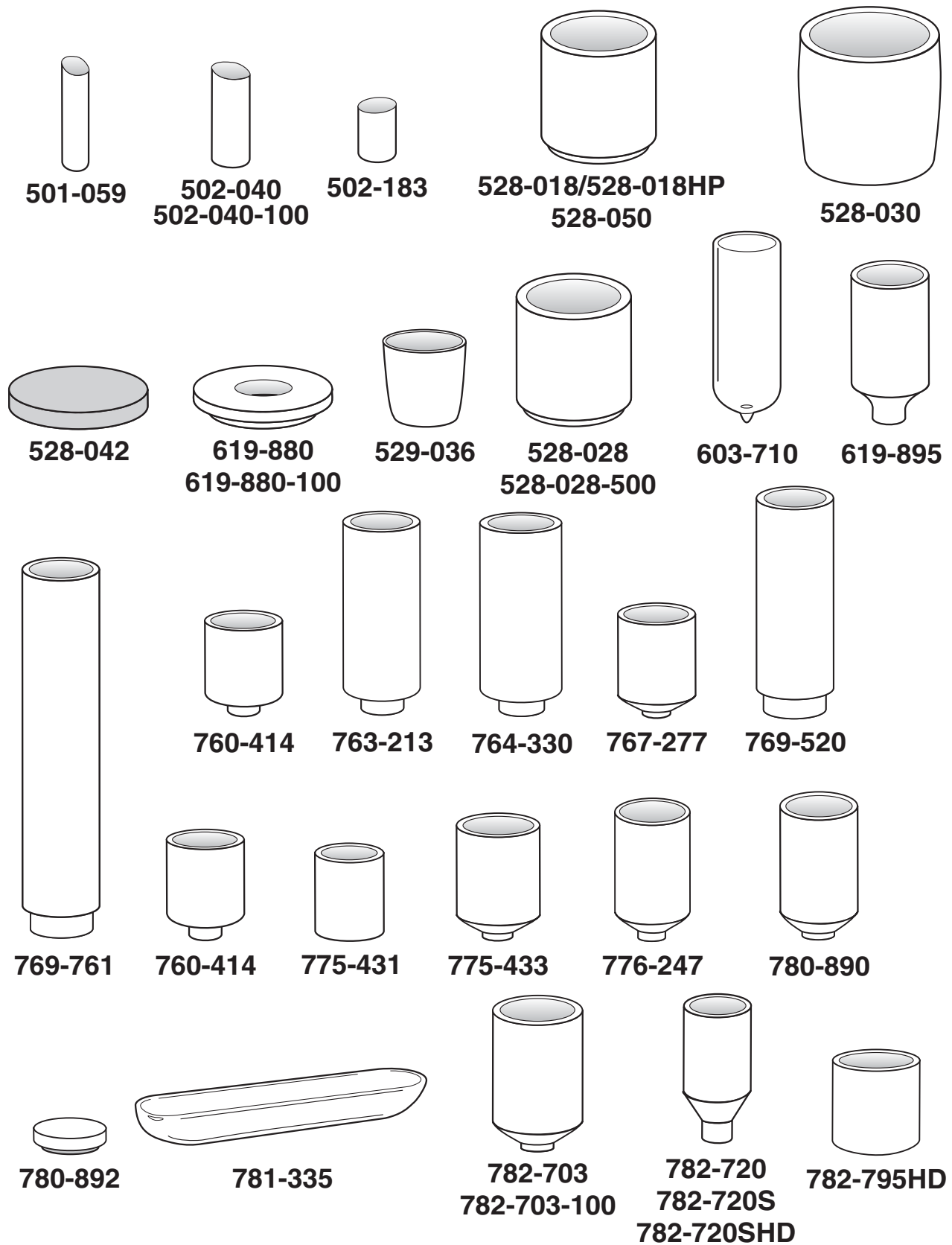
Refer to page 10 for a visual guide to selecting the correct replacement capsule or crucible.

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	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	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

Capsules and Crucibles

Most commonly used items represented.



Oxygen, Nitrogen, Hydrogen Determination

The inert gas fusion (IGF) principle has been used to determine oxygen, nitrogen and hydrogen contents of a variety of metals for many years. Simultaneous oxygen and nitrogen, as well as hydrogen only, analytical instruments are currently in use in a variety of laboratories throughout the world. Significant advancements in technology and method development by LECO Corporation has led to the introduction of the **TCH600**, a simultaneous oxygen, nitrogen and hydrogen determinator. The TCH600 is a microprocessor-based, software-controlled instrument that measures oxygen, nitrogen, and hydrogen in a wide variety of metals, refractories, and other inorganic materials. The inert gas fusion principle is employed and analysis is performed as indicated under inert gas fusion.

Inert Gas Fusion

The inert gas fusion (IGF) principle was introduced in the mid-twentieth century. This method is also referred to as gas fusion analysis (GFA), or carrier gas hot extraction method (CGHE). The principle of operation is based on the fusion of a sample in a high purity graphite crucible at temperatures up to, or in some cases exceeding, 3000°C in an inert gas such as helium. The typical IGF instrument is computer controlled and consists of an alloy-tipped water-cooled electrode furnace and a measurement unit containing the bulk of the electronics and detectors. A pre-weighed sample (nominal 1 gram for steel) is placed in a loading chamber located above the graphite crucible in the electrode furnace. After a short purge cycle, electric current is passed through the crucible heating it up to 3000°C while the carrier gas is flowing over it in order to "out-gas" (remove contaminants) the crucible. Following this out-gas cycle, the crucible temperature is lowered by reducing the current and the sample is transferred to the hot crucible by a sample drop



LECO's TCH600-Series also includes a Nitrogen/Oxygen determinator (TC600), a Nitrogen-only determinator (TN600), an Oxygen-only determinator (RO600), and an Oxygen/Hydrogen determinator (ROH600). Auto Cleaning and Auto Loading options are available for all models. For more information, contact LECO.

Application Examples

Reactive/Refractory Metals and Their Alloys
(TC600) (request Form No. 203-821-185)

Ultra-Low Nitrogen and Oxygen in Iron, Steel,
Nickel-Base, and Cobalt-Base Alloys
(TC-600) (request Form No. 203-821-184)

Typical Accessories

776-247 Crucibles
502-344 UHP Nickel Baskets
501-073 Graphite
503-032 Glass Scoop
501-646 N/O Steel Pin Standard
502-201 Titanium Pin Standard
502-047 Zirconium Pin Standard
501-320 Titanium Pin Standard

Combustion/Reaction Tubes and Glassware

Refer to page 14 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)

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

601-390	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)

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

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)
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

502-023	Reagent Tube (Glass)
601-390	Reagent Tube (Glass)
604-112	Catalyst 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	Combustion 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 14 for a visual guide to selecting the correct replacement tubes and glassware.

Hydrogen

DH-103

601-201	Reaction Tube (Quartz)
775-601	Reagent Tube (Glass)
776-279	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)

Nitrogen, Oxygen

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)

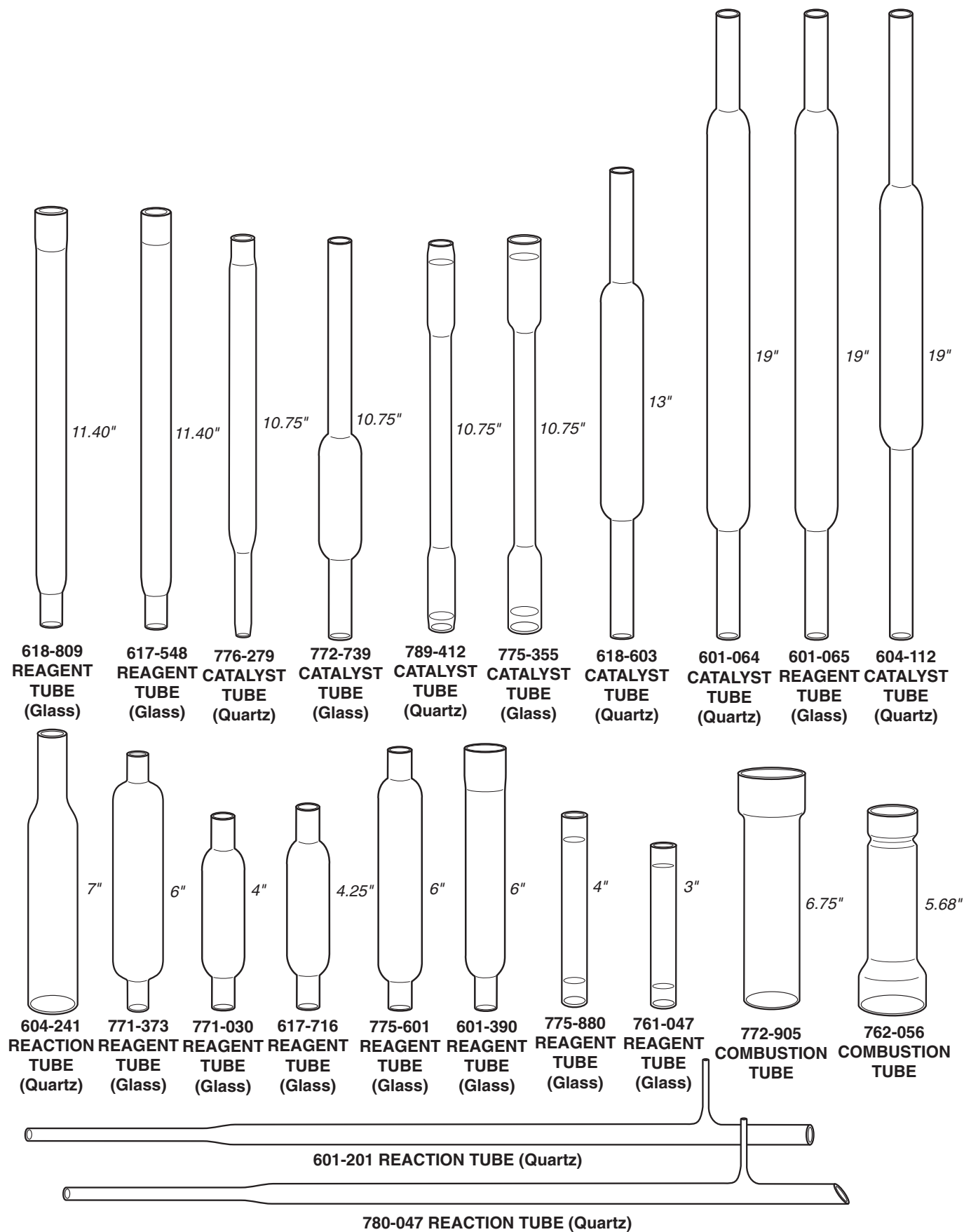
TCH600/ROH600/RH600/RHEN600/ TC600/RO600/TN600, TC500/RO500/ TN500, TC400/RO400/TN400

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.

Combustion/Reaction Tubes and Glassware

Most commonly used items represented.



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
501-987	Steel Chips—Silicon; China Metallographic Import	0.019	0.0090	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

Oxygen, Nitrogen

Part No.	Description	% O	% N	Contents
502-399	JK 47	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 g
502-061	5 gram Steel Pins	0.8 - 2.0	125 g
501-529	1 gram Steel Pins	4.0 - 7.0	100 g
502-060	5 gram Steel Pins	4.0 - 7.0	125 g
502-024	0.1 gram Titanium Pins	20.0 - 30.0	10 g
502-154	0.25 gram Titanium Pins	75.0 - 120.0	25 g
502-135	0.25 gram Titanium Pellets	7.0 - 20.0	25 g
762-741	0.25 gram Titanium Pellets	25.0 - 60.0	25 g

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 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 g
502-457	1 gram Steel Pins	213	33	0.9	100 g

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.

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 g
501-501	1 gram Steel Rings	0.020 - 0.040	0.005 - 0.030	454 g
501-992	1 gram Steel Rings	0.02 - 0.04	0.0005 - 0.002	454 g
502-271	1 gram Steel Rings	0.030 - 0.080	0.150 - 0.250	454 g
501-502	1 gram Steel Rings	0.04 - 0.10	0.005 - 0.030	454 g
501-503	1 gram Steel Rings	0.10 - 0.25	0.005 - 0.030	454 g
501-510	1 gram Steel Rings	0.14 - 0.20	0.075 - 0.150	454 g
501-504	1 gram Steel Rings	0.25 - 0.50	0.005 - 0.030	454 g
501-505	1 gram Steel Rings	0.50 - 0.80	0.005 - 0.030	454 g
501-506	1 gram Steel Rings	0.80 - 1.00	0.005 - 0.030	454 g
502-364	1 gram Steel Rings	0.80 - 1.00	—	454 g
502-280	1 gram Steel Rings	—	0.075 - 0.150	454 g
502-348	1 gram Steel Pins	0.0005 - 0.0015	0.0005 - 0.0015	100 g
502-412	1 gram Steel Pins	0.0050 - 0.0100	0.0050 - 0.0100	100 g
501-674	1 gram Steel Pins	0.015 - 0.035	0.005 - 0.025	454 g
502-455	1 gram Steel Pins	0.035	0.0024	100 g
502-449	1 gram Steel Pins	0.04 - 0.065	0.280 - 0.365	454 g
501-675	1 gram Steel Pins	0.050 - 0.080	0.005 - 0.025	454 g
501-676	1 gram Steel Pins	0.09 - 0.25	0.003 - 0.025	454 g
501-677	1 gram Steel Pins	0.30 - 0.40	0.005 - 0.025	454 g
501-678	1 gram Steel Pins	0.50 - 0.60	0.005 - 0.025	454 g
501-679	1 gram Steel Pins	0.85 - 1.00	0.005 - 0.025	454 g
502-318	Ore (Drill Tailings)	0.50 - 0.55	0.35 - 0.40	25 g
502-319	Ore (Drill Tailings)	1.35 - 1.40	1.45 - 1.55	25 g
502-320	Ore (Drill Tailings)	4.11	4.31	25 g
502-372	Ore (Drill Tailings)	7.0 - 7.50	3.25 - 3.75	25 g
502-403	Copper Pins	—	0.0005 - 0.0015	100 g
501-673	Steel Chips—Low C/S	0.0003 - 0.0015	0.0005 - 0.0025	454 g
501-105	Iron Powder	2.0 - 2.4	0.005 - 0.02	250 g
502-413	Iron Powder	2.5 - 3.0	0.020 - 0.080	250 g
502-052	Iron Powder	3.6 - 4.0	0.02 - 0.08	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

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.

Nitrogen, Oxygen

Part No.	Description	ppm O	ppm N	Contents
501-990	1 gram Copper Pellets	175 - 325	—	100 g
501-147	1 gram Copper Pins	175 - 325	—	100 g
501-148	1 gram Copper Pins	325 - 475	—	100 g
501-149	1 gram Copper Pins	475 - 700	—	100 g
501-550	0.5 gram Steel Pins	15 - 45	15 - 45	50 g
502-102	0.5 gram Steel Pins	25 - 55	200 - 250	100 g
501-551	0.5 gram Steel Pins	100 - 225	25 - 85	50 g
501-552	0.5 gram Steel Pins	125 - 225	35 - 85 ppm	50 g
501-553	0.5 gram Steel Pins	200 - 400	450 - 600	50 g
502-016	0.5 gram Steel Pins	—	1500 - 2500	50 g
502-072	0.5 gram Steel Pins	—	5000 - 5500	50 g
502-456	1 gram Steel Pins	4 - 6	23	100 g
502-256	1 gram Steel Pins	5 - 20	125 - 175	100 g
502-197	1 gram Steel Pins	10 - 50	—	100 g
501-991	1 gram Steel Pellets	15 - 45	15 - 45	100 g
501-643	1 gram Steel Pins	15 - 45	15 - 50	100 g
501-643-100	1 gram Steel Pins	15 - 45	15 - 45	454 g
502-257	1 gram Steel Pins	25 - 75	300 - 600	100 g
501-644	1 gram Steel Pins	40 -150	50 - 100	100 g
502-198	1 gram Steel Pins	65 -150	—	100 g
502-458	1 gram Steel Pins	75	870	100 g
501-645	1 gram Steel Pins	150 - 300	250 - 400	100 g
502-199	1 gram Steel Pins	175 - 400	—	100 g
501-646	1 gram Steel Pins	200 - 450	20 - 50	100 g
502-193	1 gram Steel Pins	—	10 - 50	100 g
502-194	1 gram Steel Pins	—	65 -150	100 g
502-195	1 gram Steel Pins	—	175 - 300	100 g
502-328	1 gram Steel Pins	—	300 - 600	100 g
502-411	1 gram Nickel Pins	2 - 8	—	100 g

Part No.	Description	% O	% N	Contents
501-653	0.1 gram Titanium Pins	0.040 - 0.050	0.002 - 0.005	10 g
501-657	0.1 gram Titanium Pins	0.070 - 0.085	0.005 - 0.009	10 g
501-664	0.1 gram Titanium Pins	0.14 - 0.16	0.012 - 0.020	10 g
501-320	0.1 gram Titanium Pins	0.16 - 0.25	0.012 - 0.020	10 g
502-201	0.1 gram Titanium Pins	0.250 - 0.270	0.017 - 0.020	10 g
502-047	0.1 gram Zirconium Pins	0.125 - 0.135	—	10 g
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

Hydrogen Determination

The **RH600** is a Windows®-based software-controlled instrument that determines the hydrogen content of a sample using a self-contained electrode furnace by the inert gas fusion principle.

As in other LECO inert gas applications, a pre-weighed sample (weight dependent on application), is placed in a loading chamber located above the graphite crucible in the electrode furnace. After a short purge cycle, electric current is passed through the crucible, heating it up to 3000°C while the carrier gas is flowing over it in order to "out-gas" (remove contaminants) the crucible. Following this out-gas cycle, the crucible temperature is lowered by reducing the current and the sample is transferred to the hot crucible by a sample drop mechanism. The sample melts and any oxygen in the sample reacts with carbon from the crucible to form carbon monoxide (CO), some carbon dioxide (CO₂) may also be released depending on the sample type and crucible temperature. Nitrogen in the sample is released as molecular nitrogen (N₂) while hydrogen elutes as hydrogen gas (H₂). These gasses are swept out of the furnace and on to the detectors by the carrier gas.



Typical Accessories/RH600

776-247 Graphite Crucibles
502-190 Copper Oxide Wire
501-073 Graphite Powder
501-529 1 g Steel Pin, Hydrogen Std.

Hydrogen is measured by infrared detection as water in an IR cell oven. Sample gases pass through heated copper oxide which converts CO to CO₂ and hydrogen to H₂O. Gases are then routed to an IR module and pass through an H₂O detector for total hydrogen measurement.

LECO also offers the RH-402 Hydrogen determinator. The RH-402 utilizes induction heating which allows for larger sample weights and the option of using hot extraction techniques (e.g. for some steel applications). Hydrogen is determined by thermal conductivity, and is compliant with ASTM E-1447.

Hydrogen sampling can be easily accomplished by immersing a pin tube* in the molten metal, then immediately placing it into water to cool, then switching to a dry-ice/acetone mixture for holding until analysis.

*511-390 Evacuated Pin Tube



Application Examples

Determination of Hydrogen in Aluminum and Aluminum Alloys (RH-402)
(request Form No. 203-821-199)

Typical Accessories/RH-402

603-710 Quartz Crucible (hot extraction)
761-747 Schutze Reagent
769-761 Tall Graphite Crucible for Al
762-747 1 g Steel Pin Standard

Miscellaneous Operating Accessories

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

Carbon and Sulfur Determinators

CS-400 Series, CS-300, CS-200 Series

501-082	Wire Brush
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)
780-927	Printer Paper Roll
780-928	Black Ink Ribbon

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

CS600 Series, CS-444 Series

501-082	Wire Brush
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)

Nitrogen and Oxygen Determinators

TC-300 Series

501-241	Vacuum Grease Lubricant
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
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 Lubricant
502-023	Funnel
503-032	Glass Accelerator Scoop
601-483	Paper
601-484	Printer Ribbon Cartridge
603-350	O-Ring Installation Tool
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)

Miscellaneous Operating Accessories

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

TCH600 Series, TC500 Series, TC400 Series

501-241	Vacuum Grease
502-374	Particle Filter
503-032	Glass Accelerator Scoop
603-350	O-ring Installation Tool
617-486	Fitting Removal Tool
617-528	Oxygen Scrubber Sealing Cap
617-726	Oxygen Scrubber Removal Tool
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)
782-918	Cleaning Brush Assembly (782-877 Brush Only)
782-942	Cleaning Brush Assembly (782-938 Brush Only)
783-785-110	Supelco™ OMI Filter

Hydrogen Determinators

DH-103

760-138	Tweezers, Straight
775-306	Secondary Filter
775-307	Filter Tool (Thumbscrew)
778-605	Needle
780-928	Black Ink Ribbon

RH-402

501-241	Vacuum Grease Lubricant
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 Lubricant
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

Sampling Tubes and Accessories

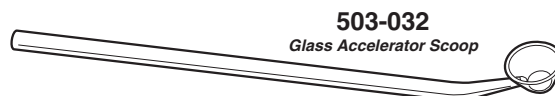
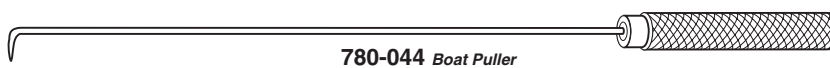
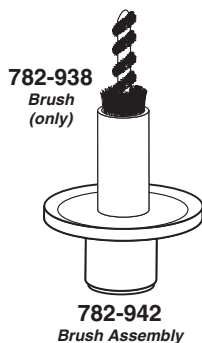
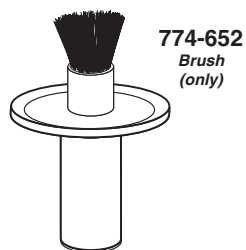
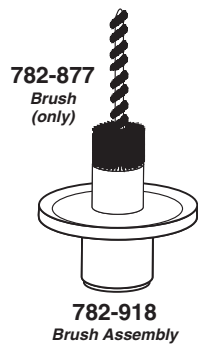
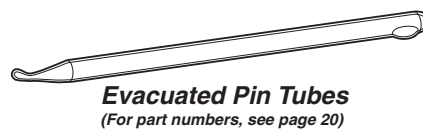
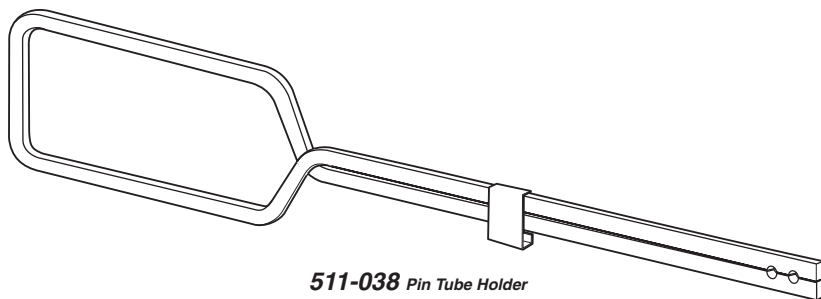
Evacuated Pin Tubes

511-036	Standard Type, 4 mm
511-039	Standard Type, 3.5 mm
511-037	Precision Type, 4 mm
511-390	High Vacuum, 6 mm
511-390-100	High Vacuum, 6 mm

Accessories

511-038	Pin Tube Holder (a convenient tool for safely inserting the pin tube)
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Miscellaneous Operating Accessories



Carbon, Hydrogen, Moisture Determination

The **RC-412** is a unique multiphase carbon, hydrogen, moisture determinator. Qualitative and quantitative analyses can be performed with the RC-412. The RC-412 can be run in an oxidizing or inert atmosphere, thus allowing for organic or inorganic carbon determination.

In an oxidizing atmosphere, most forms of C are converted to CO_2 . Organic C produces both H_2O and CO_2 , thus one can verify the presence of organic C.

The RC-412 furnace allows for temperature ramping from 25°C to 1100°C . A starting temperature, ending temperature, ramp rate, and holding time between phases (up to ten different phases), can be programmed into the determinator.

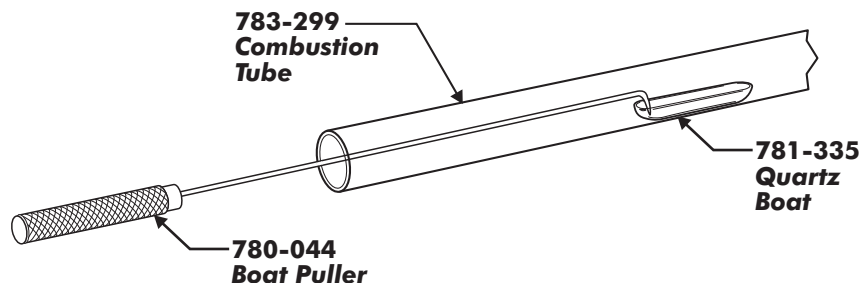


Application Examples

- Moisture in Welding Flux (request form no. 203-821-021)
- Carbon and Moisture in Aggregates (request form no. 203-821-010)
- Surface Carbon (in Copper tubing, on sheets, or wire)
- Moisture in Cements
- Moisture in Mold Powders

Typical Accessories

- 501-170 Copper Oxide
- 782-059 Nickel Liner
- 502-156 Fluorhib
- 502-091 Calcium Oxalate @ 12.21% H_2O
- 502-029 Synthetic Sample, 1.0% C
- 502-030 Synthetic Sample, 5.0% C

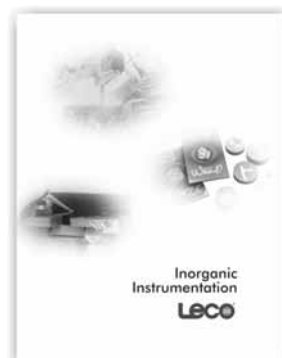


Instrumentation

For almost 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



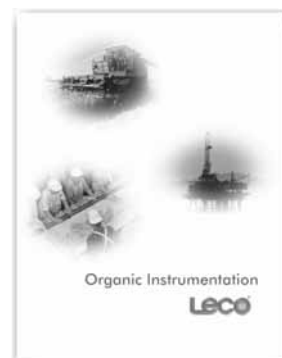
Metallographic/Optical *(for more information, request form no. 203-927)*

- 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
- Sulfur/Carbon
- Nitrogen/Protein
- Fat
- Moisture/Ash
- Calorimetry
- Mercury



Separation Science (Mass Spectrometry/Chromatography)

- GC-TOFMS Systems *(for more information, request form no. 203-990)*
- GCxGC-TOFMS Systems *(for more information, request form no. 209-161)*
- GCxGC-FID/ECD Systems *(for more information, request form no. 209-157)*
- LC-TOFMS Systems *(for more information, request form no. 209-148)*



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LECO (Vietnam) Co., Ltd.
Ho Chi Minh City, Vietnam
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Fax: 848-9105-646



Consumable Order Form

www.leco.com • 800-292-6141

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

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

To complete form, place cursor in first field and type. Tab to move to next field.

Order Confirmation Requested

Terms Net 30 • FOB St. Joseph, Michigan