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1-1 Spectromembrane®

Thin-Film Sample Support Carrier Frames

SpectroMembrane® is an innovative product for conveniently and effectively securing thin-film sample supports to XRF sample cups. It consists of a carrier frame to which a thin-film sample support is tautly pre-attached. Within the confines of the thin-film, a circular line of perforations defines the detachment boundary from the carrier frame during the assembly process.



SpectroMembrane® obviates direct thin-film handling together with eliminating potential contamination introduction possibilities and the annoyance of static electricity. Detachment of the thin-film from the carrier frame, as a pre-cut circle, is virtually performed automatically during the assembly process. The thin-film sample support substance is intended and adequately suitable for analyzing innumerable types of sample substances for a wide range of elements at various concentration levels.

Benefits of Using SpectroMembrane® Thin-Film Sample Support Carrier Frame

- The fastest, most assured and convenient method of thin-film sample support attachment
- Ready-to-use as supplied; no rolls to unspool and tear; no sheets to handle
- Eliminates direct thin-film handling potentially leading to contamination problems
- Eliminates static electrical charge-related handling difficulties
- Maintains thin-film tautness throughout all stages of assembly
- Automatically detaches the circular thin-film from the frame during assembly
- Suitable to innumerable analyte investigations and concentrations in diversified sample



STEP 1

Place SpectroMembrane over sample cup



STEP 2

Press ring or sleeve over SpectroMembrane and tear away carrier frame

SpectroMembrane® Thin-Film Sample Support Carrier Frames; 100 units/pkg)

CAT #	ITEM
3012	Mylar®, 2.5µ (0.00010"; 0.1 mil) gauge; 3" (7.6cm) diameter
3014	Mylar®, 3.6µ (0.00014"; 0.14 mil) gauge; 3" (7.6cm) diameter
3016	Mylar®, 6.0 µ (0.00024"; 0.24 mil) gauge; 3" (7.6cm) diameter
3018	Prolene®, 4.0µ (0.00016"; 0.16 mil) gauge; 3" (7.6cm) diameter
3020	Polypropylene, 6.0µ (0.00024"; 0.24 mil) gauge; 3" (7.6cm) diameter
3022	Polyimide (Kapton®), 7.5µ (0.00030"; 0.30 mil) gauge; 3" (7.6cm) diameter
3024	Polypropylene, 12.0 µ (0.00012"; 0.5 mil) gauge; 3" (7.6cm) diameter
3026	Σtnom™-S, 3.0µ (0.00012"; 0.12 mil) gauge; 3" (7.6cm) diameter

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® Mylar is a registered trademark of E.I. DuPont de Nemours & Co.

™Σtnom is a trademark of Chemplex Industries, Inc.

The SpectroMembrane embodiment is a registered U.S.A. patent no: 6,009,766

1-2 XRF Thin-Film Sample Supports

Prolene®, Ultra-Polyester, Polypropylene, Mylar® and Polyimide Thin-Film Sample Support Materials in Continuous Rolls, Pre-Cut Sheets and Circles

A thin-film sample support is a substance used for retaining liquid, powdered, slurry or solid specimens in XRF Sample Cups for wavelength (WDXRF) and energy dispersive (EDXRF) spectrochemical analysis. Of the many different types of materials available, few possess the necessary combination of properties to serve this application. The suitability of a thin-film substance for use as a sample support is a function of its capability to sagely retain the specimen during the preparation and analysis stags, permit maximum analyte-line transmittance and provide statistically reproducible analytical data.



Transmittance through Thin-Films

Analyte-line transmittance is a function of the mass attenuation coefficient of a thin-film substance in conjunction with its density and thickness for each considered analyte-line wavelength or KeV energy.

$$I/I_0 = \exp [-(\mu/d) (dt)]$$

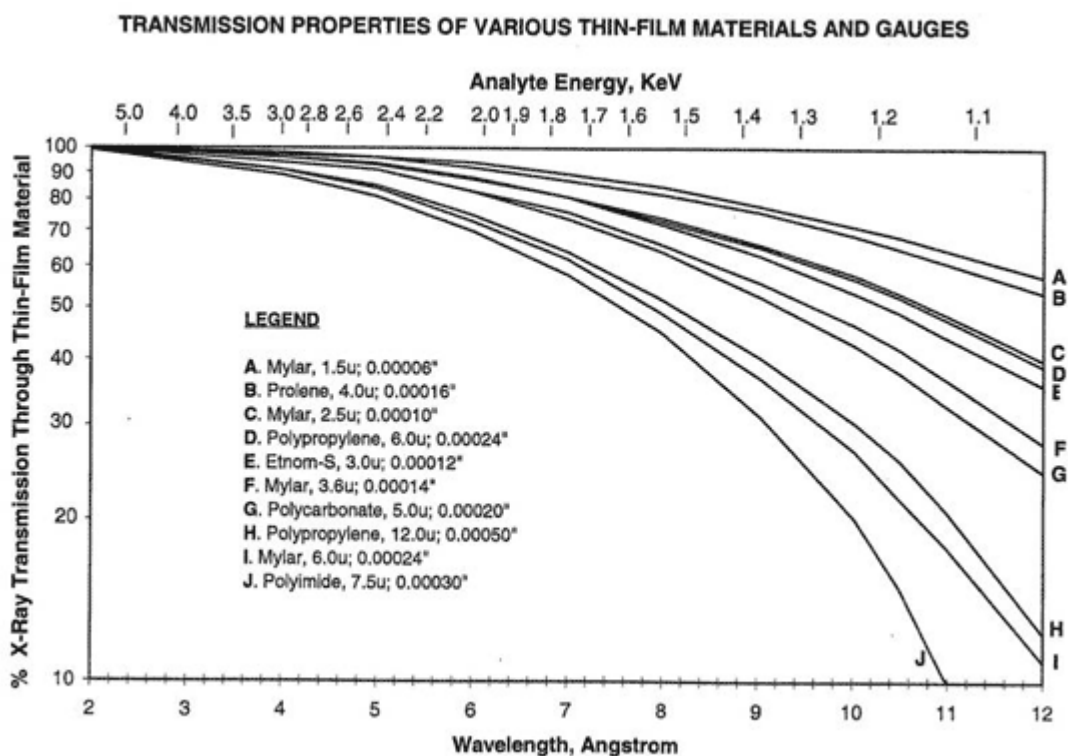
Where, I/I_0 = percent incident and transmitted radiation

μ/d = mass attenuation coefficient

dt = area concentration

A graphic presentation of this equation relates percent transmittance, I/I_0 , to analyte-line, Angstroms and KeV. It provides a simple visual method to help in evaluating selection of the various types of thin-film substances and gauges encompassing the entire spectral range, Illustration 1. By referring the subject analyte-line to the drawn curves the thin-film and gauge furnishing the greatest amount of percent transmittance represents the best choice not dismissing consideration over other factors. For multi-element analysis, the percent transmission for the longest wavelength, or smallest KeV value, anticipated should be given primary consideration.

Illustration 1



Degradation Resistance

Degradation resistance is a term assigned to a thin-film substance to resist chemical attack, irradiation, thermal softening, brittle's, tearing and stretching. These properties collectively govern the capability of a thin-film substance to safely retain a specimen in an XRF Sample Cup. Obvious attacks on the integrity of a thin-film substance include those imparted by immediate chemical and mechanical means. However, there are many types of samples and concentrations that may soften or dissolve the thin-film material as a function of time or catalyzed by exposure to the excitation energy source or thermal extremities. In any case, the end result may present a condition of the sample discharging into the sample chamber and causing damage to the system. This condition is particularly prevalent with inverted optics where the sample substance is gravity contained over a thin-film sample support substance in a sample cup. It is strongly suggested that a sample quantity of each thin-film sample support substance is subject to testing for the projected integration time in order to ascertain its integrity prior to actual use and applications. Although Illustration 2, Degradation Resistance Properties of Thin-Film Sample Support Substances, provides information relevant to each type of material it is not intended to preclude actual experimentation of the sample support substance.

Illustration 2

Degradation Resistance of Thin-Film Substances

Chemical Classification	Mylar®	Polycarbonate	Etnom-S	Polypropylene	Polyimide (Kapton®)	Prolene®	Ultra-Polyester
Acids, dilute or weak	G	G	G	E	N	G	G
Acids, concentrated	G	G	G	E	N	E	G
Alcohols, aliphatic	N	G	G	E	G	E	N
Aldehydes	U	F	F	E	E	E	U
Alkalis, concentrated	N	N	G	E	E	E	N
Esters	N	N	F	G	G	G	N
Ethers	F	N	F	N	U	N	F
Hydrocarbons, aliphatic	G	N	G	G	G	G	G
Hydrocarbons, aromatic	F	N	G	F	F	F	F
Hydrocarbons, halogenated	F	N	F	N	F	N	F
Ketones	N	N	G	G	G	G	N
Oxidizing Agents	F	N	F	F	N	F	F

E=Excellent, G=Good, F=Fair, N=Not Recommended, U=Unknown

NOTE: The information contained in the above illustrations are provided as a matter of information only and it is not intended to preclude actual testing of the subject material for suitability of use and applications.

Thin-Film Purity

Another important consideration in evaluating and selecting a thin-film substance is relevant to trace level impurities. For example, trace levels (PPM) of Ca, P, Sb, Fe, and Zn are generally present in Mylar and other polyester thin-films and reportedly Ca, P, Fe, Zn, Cu, Zr, Ti and Al in polypropylene. Additionally, there is a potential possibility that differences may exist between lots of the same substance. Since virtually any thin-film sample support substance may contain some impurities it is recommended that a blank is analyzed for each new and different thin-film sample support substance package started particularly if similar analytes in very low concentrations are anticipated to be present in a specimen.

Analyte-Line Concentration Consideration

The concentration of an analyte in a specimen in conjunction with its wavelength are important considerations in evaluating suitability selection of a thin-film substance. Relatively low to moderate concentration level of analytes characterized with short wavelengths (high KeV) do not necessarily require a thin-film sample support exhibiting a high percent transmittance since most materials permit 95% to 100% transmittance through all gauges for analyte-lines less than 4 Angstroms (3.1 KeV). Most of the difficulties arise from dealing with specimens consisting of elements having long wavelength (low KeV) analyte-lines present in low concentration levels; these dictate maximum percent transmittance.

Uniformity of Thickness

Any variations associated with the thickness of a thin-film sample support substance may potentially affect the intensity levels of analyte lines at low (PPM) concentrations. However, Chemplex thin-film sample support substances are manufactured to very close tolerances. For example, typical variations within a single package is approximately 1-

2% and not in excess of approximately 5% from one lot to another. The analyst is assured of highly reproducible intensities and analytical data.

Preferred Orientation

In the manufacture of thin-films, the potential possibility of preferred orientation may develop. If present, its effect on intensities may emerge in investigating low energy analyte-lines, e.g. less than 5 KeV, particularly with instrumentation lacking sample rotation. Although Chemplex Industries, Inc. takes all necessary precautions in ensuring multiaxially oriented thin-film sample support substances, the analyst should nevertheless be alerted to this potential condition.

Continuous Rolls, Pre-Cut Squares and Circles

The availability of thin-film sample supports of different chemical compositions and thicknesses in continuous rolls, pre-cut squares and circles offer the spectroscopist complete latitude in convenience of use and economy.

In continuous roll form, thin-film materials are supplied in widths of 3" (7.6cm) and 300' (91.4m) in length packaged in boxes with serrated cutting edges. Polyimide is also available in lengths of 50 feet (15.2m) per roll. Each 300" roll adequately serves approximately 1200 preparations at 2" (5 cm) lengths per sample. Pre-cut squares and circles are packaged in boxes containing thumb-holes for convenience of removal. The pre-cut squares and circles are also interleaved with paper which serves as a carrier for ease of handling and attachment to [XRF Sample Cups](#). The pre-cut squares are actually 2.5" x 3" (63.5mm x 76.2mm); more or less rectangular in shape. This feature is intended to facilitate handling and attachment to the sample cups.

Continuous Rolls

3" wide X 300' long; 7.6cm X 91.4m

CAT #	DESCRIPTION	GAUGE
090	Ultra-Polyester	0.000006"; 1.5um; 0.06 mil
100	Mylar	0.000010"; 2.5um; 0.10 mil
150	Mylar	0.000014"; 3.6um; 0.14 mil
250	Mylar	0.000024"; 6.0um; 0.24 mil
416	Prolene	0.000016"; 4.0um; 0.16 mil
425	Polypropylene	0.000024"; 6.0um; 0.24 mil
440	Polyimide (Kapton)	0.000030"; 7.5um; 0.33 mil
475	Polypropylene	0.000050"; 12.0um; 0.50 mil

Pre-Cut Squares (500 pieces/box)

2.5" X 2.5"; 63.5mm X 63.5mm

CAT #	DESCRIPTION	GAUGE
103	Mylar	0.000010"; 2.5um; 0.10 mil
153	Mylar	0.000014"; 3.6um; 0.14 mil
253	Mylar	0.000024"; 6.0um; 0.24 mil
413	Prolene	0.000016"; 4.0um; 0.16 mil
423	Polypropylene	0.000024"; 6.0um; 0.24 mil
443	Polyimide (Kapton)	0.000030"; 7.5um; 0.33 mil
473	Polypropylene	0.000050"; 12.0um; 0.50 mil

Pre-Cut Circles (500 pieces/box)

2.5" Diameter; 63.5mm

CAT #	DESCRIPTION	GAUGE
106	Mylar	0.000010"; 2.5um; 0.10 mil
156	Mylar	0.000014"; 3.6um; 0.14 mil
256	Mylar	0.000024"; 6.0um; 0.24 mil
426	Prolene	0.000016"; 4.0um; 0.16 mil
436	Polypropylene	0.000024"; 6.0um; 0.24 mil
446	Polyimide (Kapton)	0.000030"; 7.5um; 0.33 mil
476	Polypropylene	0.000050"; 12.0um; 0.50 mil

Pre-Cut Circles (1000 pieces/box)

2.5" Diameter; 63.5mm

CAT #	DESCRIPTION	GAUGE
107	Mylar	0.000010"; 2.5um; 0.10 mil
157	Mylar	0.000014"; 3.6um; 0.14 mil
257	Mylar	0.000024"; 6.0um; 0.24 mil
427	Prolene	0.000016"; 4.0um; 0.16 mil
437	Polypropylene	0.000024"; 6.0um; 0.24 mil
447	Polyimide (Kapton)	0.000030"; 7.5um; 0.33 mil
477	Polypropylene	0.000050"; 12.0um; 0.50 mil

Etnom™-S, Prolene®, Polypropylene, Mylar® and Polyimide Thin-Film Sample Support Materials in SpectroMembrane® Carrier Frames

SpectroMembrane® Thin-Film Sample Support Carrier Frames; 100 units/pkg)

CAT #	DESCRIPTION	GAUGE
3012	Mylar	2.5μ (0.00010"; 0.1 mil) gauge; 3" (7.6cm) diameter
3014	Mylar	3.6μ (0.00014"; 0.14 mil) gauge; 3" (7.6cm) diameter
3016	Mylar	6.0 μ (0.00024"; 0.24 mil) gauge; 3" (7.6cm) diameter
3018	Prolene	4.0μ (0.00016"; 0.16 mil) gauge; 3" (7.6cm) diameter
3020	Polypropylene	6.0μ (0.00024"; 0.24 mil) gauge; 3" (7.6cm) diameter
3022	Polyimide (Kapton)	7.5μ (0.00030"; 0.30 mil) gauge; 3" (7.6cm) diameter
3024	Polypropylene	12.0 μ (0.00012"; 0.5 mil) gauge; 3" (7.6cm) diameter
3026	E tnom™-S	3.0μ (0.00012"; 0.12 mil) gauge; 3" (7.6cm) diameter

IMPORTANT: The possibility of pinholes, pores and variations in gauge thickness existing in any thin-film sample support regardless of form and packaging may present leakage of a sample with subsequent potential contamination and damage to the analytical instrumentation and its components, variations in quantitative data and impose bodily injury to the user. It is strongly recommended that each item used be subjected to judicious testing, use, applications and evaluation prior to actual use by the user. The responsibility of acceptance and safety resides totally with the user.

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® Mylar and Kapton are registered trademarks of E.I. DuPont de Nemours & Co.

® SpectroMembrane and Chemplex are registered trademarks of Chemplex Industries, Inc.

™ Etnom is a trademark of Chemplex Industries, Inc.

The SpectroMembrane embodiment is a registered U.S.A. patent no: 6,009,766

1-3 Microporous Polypropylene Film

Gas Permeable Membrane for XRF Sample Cup Pressure Equalization in Inert Gas and Vacuum Environments

Microporous Polypropylene Film is a gas permeable membrane specifically intended to establish and maintain pressure equalization within an XRF Sample Cup and the instrumentation sample chamber. The film is characterized with the unique property of containing tortuous sub micron-size passageways extending from one surface side to the other. This permits gases and vapors to permeate and prohibits the penetration of sample particles.

The 1500 Series XRF Sample Cups are designed to accommodate the attachment of Microporous Film; they are furnished with two Snap-On Rings. One Snap-On Ring is used for securing a thin-film sample support substance and the other is intended to attach Microporous Film. When assembled to an XRF Sample Cup, Microporous Film enables evacuation of entrapped gases or relieves the sample cup of vapor pressure build-up through the micro pores in a vacuum environment. Under inert gas conditions such as helium, the micro pores function as passageways for the gas to enter the sample cup and purge out any entrapped gases or vapors. In atmospheric operating conditions, the film helps maintain pressure equalization by continuously allowing the exchange of contained gases with the surrounding air environment. In all cases the important consideration is to maintain a taut thin-film sample support plane, which defines the surface of the contained solution or powdered sample material. Any distension or convolution of the thin-film substance affects the sample-to-excitation source distance implying higher or lower than actual analyte concentration values.



Liquid sample contact with Microporous Film may diminish gas permeability with continued use; high surface tension liquids tend to bead and resist penetration and powdered sample particles are usually too large in size to penetrate the micro pores.

Microporous Film is supplied in continuous roll form: 2" wide x 200" long (6.4cm x 5.1m) and in 2-1/2" (6.4cm) diameter Pre-Cut Circles and is intended for accommodation by the [1530 and 1540 Double Open-Ended XRF Sample Cups](#).

In Continuous Roll form, Microporous Film requires trimming with scissors for dispensing and applications.

In Pre-Cut Circle form, Microporous Film is ready for use as supplied; no trimming is necessary. Each Pre-Cut Circle is also interleaved with paper that serves as a carrier support for further convenience.



Microporous Polypropylene Film Rolls and Pre-Cut Circles

CAT #	ITEM
325	Microporous Polypropylene Film - Roll, 2.5" wide x 200" long (6.4 cm x 5.1m)
325-C	Microporous Polypropylene Film; Pre-Cut Circles, 2.5" (6.4cm) diameter; 100 circles/pkg., 6 pkgs per carton

NOTE: Microporous Film is not intended for use as a thin-film sample support substance. The judicious testing, use and application of this product is the sole responsibility of the user. Chemplex Industries, Inc. offers no guarantee that this product will perform in accordance with its suggested use

1-4 Etnom™ S Thin-Film Sample Support

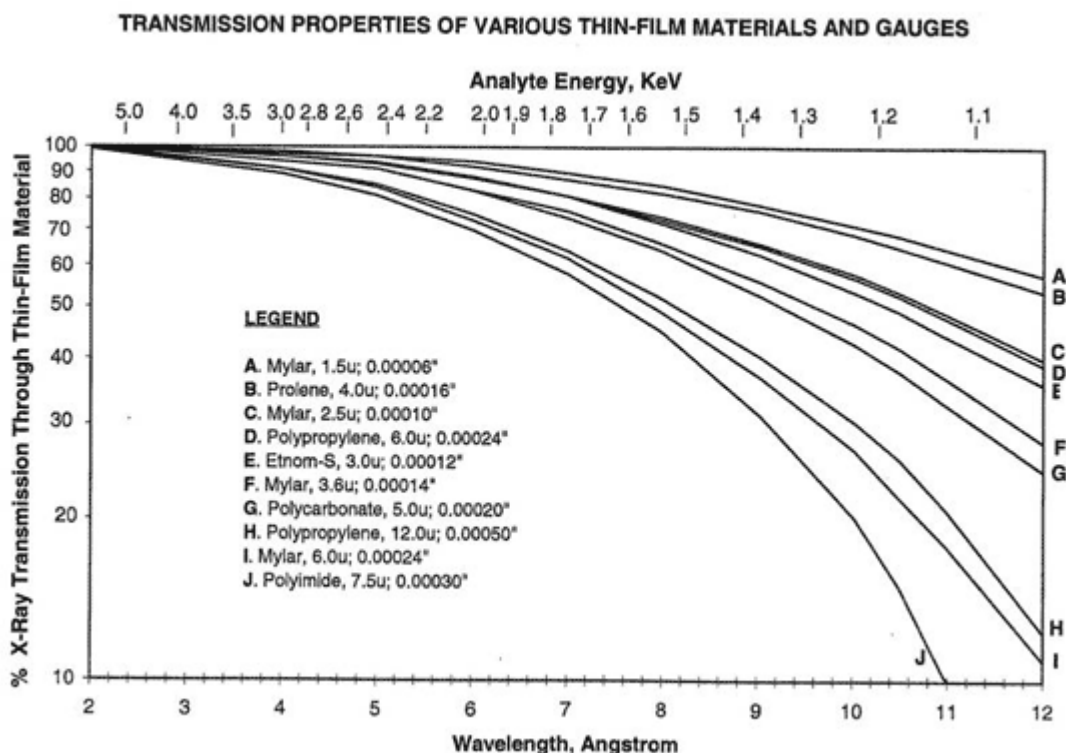


Etnom-S represents the most recent addition to the comprehensive line of thin-film sample support materials in patented SpectroMembrane® Sample Support Carrier Frames exclusively available through the research efforts of Chemplex Industries, Inc.

It is characterized with exceptional chemical resistant properties for retaining the most varied types of samples, greater resistance to degradation at elevated temperatures and relatively high primary and secondary x-ray transmission for investigating the typically less energetic spectral lines greater than 5.4 Angstroms (<2.3 KeV). This combination of properties classifies Etnom-S as a fundamental general-purpose thin-film sample support with extended x-ray spectrochemical analytical applications.

Features

- Mechanical strength and stability
- Resistant to sample chemical attack
- High analyte-line intensities
- Decreased integration times
- Lower limits of element detection
- Convenience of handling
- No contamination through handling
- Static electrical charge elimination
- No trimming or waste
- Taut thin-film sample support planes
- Increased productivity



Degradation Resistance of Thin-Film Substances

Chemical Classification	Mylar®	Polycarbonate	Etnom-S	Polypropylene	Polyimide (Kapton®)	Prolene®	Ultra-Polyester
Acids, dilute or weak	G	G	G	E	N	G	G
Acids, concentrated	G	G	G	E	N	E	G
Alcohols, aliphatic	N	G	G	E	G	E	N
Aldehydes	U	F	F	E	E	E	U
Alkalis, concentrated	N	N	G	E	E	E	N
Esters	N	N	F	G	G	G	N
Ethers	F	N	F	N	U	N	F
Hydrocarbons, aliphatic	G	N	G	G	G	G	G
Hydrocarbons, aromatic	F	N	G	F	F	F	F
Hydrocarbons, halogenated	F	N	F	N	F	N	F
Ketones	N	N	G	G	G	G	N
Oxidizing Agents	F	N	F	F	N	F	F

E=Excellent, G=Good, F=Fair, N=Not Recommended, U=Unknown

NOTE: The information contained in the above illustrations are provided as a matter of information only and it is not intended to preclude actual testing of the subject material for suitability of use and applications.

CAT #	ITEM
3026	SpectroMembrane® with Etnom-S Thin-Film; 0.00012", 3.0µ, 0.12mil

Note: The information herein contained is not intended to preclude actual testing to ascertain suitability of use. The responsibility of use and applications resides solely with the user.

® Chemplex and SpectroMembrane are registered trademarks of Chemplex Industries, Inc.
 ™ Etnom is a trademark of Chemplex Industries, Inc.
 Reg. U.S. Patent No: 6,009,766.

2-2 XRF Sample Cup Series 1000

Trimless Thin-Film Double and Single Open-Ended 32 and 40mm Cells with Friction-Fitting Sleeves and 45mm Cells with Vented Friction-Fitting Covers and Overflow Reservoirs

The 1000 Series XRF Sample Cups* are designed to eliminate the need to trim extraneous thin-film sample supports and facilitate the general sample preparation procedure. This is accomplished by the use of a full length friction-fitting sleeve that secures and envelopes a thin-film sample support to the cell body.

During the initial assembly stage, the sleeves circumferentially grasps the thin-film and immediately establishes a taut wrinkle-free sample plane. With increased applied pressure and advancement of the sleeve over the cell body, the thin-film sample support remains confined concurrent with maintaining a taut sample support plane. Assembly of the sample cup is completed when the sleeve abuts the underside of the flange of the cell body. There is no extraneous thin-film sample support to trim, when initially used in appropriate lengths, since all of the thin-film is entrapped in between the sleeve and cell body. The 1000 Series XRF Sample Cup is a two component system offered in both single and double open-ended versions and a large volumetric capacity 45mm size with a vented friction-fitting cover having an overflow reservoir.

Cat No. 1095
Double Open-Ended with Cover

The double open-ended styles permit attachment of thin-film sample supports prior to sample introduction for applications in air or inert gas environments. This allows for the preparation of large numbers of sample cups in advance. The single 32 and 40mm diameter open-ended version incorporate a thermoplastic seal that may be optionally ruptured for pressure equalization purposes. The 45mm cell includes a friction-fitting cover that incorporates a vent hole. These serve to maintain a planar sample surface by eliminating inward or outward distention of the thin-film sample support under positive inert gas and evacuated conditions, respectively. An overflow reservoir is also integrated in the single open-ended versions for collecting any temperature sensitive fluid sample substances having tendencies to expand during analysis. An overflow reservoir is integrated in the friction-fitting cover for the 45mm diameter cells.

The sleeves for the 32 and 40mm sizes are designed with a flange integrated in its outer diameter to facilitate handling and to self align the assembled XRF Sample Cup in the instrument. A slight bead on the interior diameter of the sleeve at the open end serves to firmly lock the taut thin-film in position and acts as a double seal. The apertures are larger than normal for maximizing sample excitation surface areas.

The 1000 Series XRF Sample Cups are made from natural polyethylene and both versions are offered in 32, 40 and 45mm diameters.

Specifications

XRF Sample Cups Series 1000 (100 units/pkg.*)

32 and 40mm Double Open-Ended XRF Sample Cups and 45mm Cells with Covers

CAT #	Outside Diameter		Height		Aperture		Cell	Capacity
	Inches	mm	Inches	mm	Inches	mm		cc
1060	1.25	32	1.00	25	0.98	25	9	N/A
1070	1.57	40	1.00	25	1.30	33	16	N/A
1095**	1.77	45	1.65	42	1.50	38	31	8

XRF Sample Cups Series 1000 (100 units/pkg*)

32 and 40mm Single Open-Ended XRF Sample Cups
with Venting Provision and Overflow Reservoir

CAT #	Outside Diameter		Height		Aperture		Cell	Capacity
	Inches	mm	Inches	mm	Inches	mm		cc
1065	1.25	32	1.00	25	0.98	25	9	3
1075	1.57	40	1.00	25	1.30	33	16	5

* Each set consists of a Cell and a Sleeve

** Each set consists of a Cell, Sleeve and a Vented Friction-Fitting Cover with an Integrated Overflow Reservoir.

IMPORTANT:All XRF Sample Cups present the possibility of leakage, especially when used in an evacuated environment, with potential damage to the analytical instrumentation. Experimentation with each sample cup prior to actual usage to ascertain its integrity is recommended. The judicious use and applications of this product is the sole responsibility of the user. Chemplex Industries, Inc. assumes no liability or guarantee that this product will perform in accordance with its suggested use.

* Registered US Patent Nos. 5,451,375 and 5,630,989

® Chemplex is a registered trademark of Chemplex Industries, Inc.

2-3.a XRF Sample Cup Series 1300

Double Open-Ended 32 and 40mm Cells with Resealable Venting and Overflow Reservoir Snap-On Closure

The 1300 Series XRF Sample Cups* are designed to convert from a sealed cell into a vented unit and back again into a sealed cell. This is accomplished by rotating a snap-on closure and obviates the need to rupture a thermoplastic seal for pressure equalization purposes. An overflow reservoir is also incorporated in the snap-on closure for collecting hears sensitive sample substances that may tend to expand during analysis.

Each sample cup consists of an open cell, a rotatable snap-on closure and a snap-on ring to secure a thin-film sample support. The upper interior end of the cell contains a narrow vertical groove in the side wall leading to the overflow reservoir. The rotatable snap-on closure is similarly designed with a vertical groove that represents an extension of the groove contained in the cell. When the two components are assembled and appropriately aligned an unobstructed passageway is established which permits the evacuation of entrapped gases or vapor pressure build-up within the sample cup. Additionally, this passageway serves as a conduit to the overflow reservoir for collecting thermally sensitive solution samples that tend to expand. The sample cup is resealed by turning the closure out of phase with the cell groove. The cell neck and snap-on ring incorporate the unique taper and "bead-to-indent" geometry responsible for creating and maintaining a taut wrinkle-free thin-film sample support plane during assembly.

The capability of venting the interior of the sample cup is important for maintaining a uniform distance from the excitation source to the sample surface, which is defined by the thin-film sample support. Any discrepancies in this distance will be reflected in the analytical data. Without proper venting, an internal build-up of pressure may result in the outward distension of the thin-film. This condition decreases the sample-to-excitation source distance and increases intensities which will erroneously imply a higher than actual analyze concentration value. Similarly, the opposite condition is presented if the sample cup is subjected to an inert gas environment such as helium. The thin-film substance tends to convolute into the cell which has the effect of increasing the sample-to-excitation source distance, decreasing intensity and implying lower than actual analyte concentrations.

The 1300 Series XRF Sample Cups incorporate all of the necessary features to resolve these problems and offer the option of conversion to a sealed container. They are made from natural polyethylene and offered in 32 and 40mm diameter sizes.

Specifications

XRF Sample Cups Series 1300 (100 units/pkg*)

32 and 40mm Double Open-Ended XRF Sample Cups with Resealing Venting and Overflow Reservoir Snap-On Closure

CAT #	Outside Diameter		Height		Aperture		Cell	Capacity cc	
	Inches	mm	Inches	mm	Inches	mm		Reservoir	
1330	1.25	32	0.90	23	0.98	25	7	3	
1340	1.57	40	0.90	23	1.27	32	12	5	

x Each set consists of a Cell, a Rotatable Snap-On Closure and a Snap-on Ring.

2.3.b XRF Sample Cup Series 1345 and 1348

Double Open-Ended 32mm and 40mm Cells with Friction-Fitting Caps, Internal Overflow Reservoir and Venting Provision

The 1345 and 1348 Series XRF Sample Cups incorporate a combination of features frequently requested by analysts. These sample cups consist of a friction-fitting closure, a cell designed with a built-in overflow reservoir and a snap-on ring that firmly secures a thin-film sample support material and maintains a taut sample plane.

The Internal Overflow Reservoir is cleverly located within the upper portion of the cell. Any thermally sensitive sample substances with tendencies to expand are collected within the sample cup reducing the likelihood of spillage into the sample chamber.

A friction-fitting cap is designed with a chamfer that tightens the seal with continued downward pressure. Integrated in the bottom of the cap is a circular wall that serves to automatically increase the volumetric capacity of the overflow reservoir. A thin thermoplastic seal located in the center of the cap optionally permits equalization of pressure within the sample cup and sample chamber for analysis conducted in inert gas or evacuated conditions.

The Snap-On Ring is designed with the time-proven bead-to-indent geometry acclaimed for firmly securing a thin-film sample support material to the cell. All components are fabricated from natural polyethylene.

Specifications

XRF Sample Cups Series 1345 and 1348 (100 units/pkg*)

Double Open-Ended 32mm and 40mm Cells with Friction-Fitting Caps, Internal Overflow Reservoir and Venting Provision

CAT #	Outside Diameter		Height		Aperture		Capacity cc	
	Inches	mm	Inches	mm	Inches	mm	Cell	Reservoir
1345	1.25	32	1.14	29	0.98	25	7	1-2
1348	1.57	40	1.14	29	1.27	32	12	2-3

Each set consists of a Cell, Friction-Fitting Cap and Snap-On Ring

IMPORTANT: All XRF Sample Cups present the possibility of leakage, especially when used in an evacuated environment, with potential damage to the analytical instrumentation. Experimentation with each sample cup prior to actual usage to ascertain its integrity is recommended. The judicious use and applications of this product is the sole responsibility of the user. Chemplex Industries, Inc... assumes no liability or guarantee that this product will perform in accordance with its suggested use.

* Registered US Patent No. 4,698,210

® Chemplex is a registered trademark of Chemplex Industries, Inc.

2-4 XRF Sample Cup Series 1400

Single Open-Ended 32 and 40mm Cells with Venting and Micro-Sample Mounting Provision

The 1400 Series XRF Sample Cups* offer flexibility in use and applications. They are designed to function as closed cells with provision for pressure equalization, adaptability for micro-sample containment and "thin layered" sample preparations.

Each sample cup consists of three components: a cell, a snap-on ring and a collar. The cell contains two circular depressions which are thermoplastically sealed during manufacture. By puncturing one of these seals, a passageway is established to release any entrapped gases or relieve vapor pressure build-up from a sample.

This prevents the thin-film sample support from distending or convoluting when subject to positive inert gas and evacuated environments, respectively, and maintains a uniform distance from the excitation source and sample plane.

The 1400 Series XRF Sample Cups incorporate the unique "bead-to-indent" geometry responsible for establishing a taut thin-film sample support surface and for effecting leak-resistant seals. The collar provided may be initially used as a device for preattaching a thin-film sample support, a secondary seal and for securing "thin layered" sample substances

such as powdered, liquid, evaporated droplet, histological tissue or impregnated filter paper. There is also provision for accepting micro-samples or internal reference standards mounted on the end of a rod or contained in a capillary tube.

The 1400 Series XRF Sample Cups are made of natural polyethylene in 32 and 40 mm diameter sizes. A special 35mm height size, Cat No.:1440L, is available for accommodation by the Oxford Lab-X systems and with other types of instrumentation requiring longer depths of penetration and greater sample volumes.

Specifications

XRF Sample Cups Series 1400 (100 units/pkg*)

32mm and 40mm Single Open-Ended Sample Cups with Venting and Micro-Sample Mounting Provision

CAT #	Outside Diameter		Height		Aperture		Capacity cc
	Inches	mm	Inches	mm	Inches	mm	Reservoir
1430**	1.25	32	0.90	23	0.98	25	9
1440	1.57	40	0.90	23	1.27	32	16
1440L***	1.57	40	1.40	35	1.27	32	26

* Each set consists of a Cell, a Snap-On Ring and a Collar.

** Accepted by Asoma instruments

*** Accepted by Oxford Lab-X Analytical Systems

IMPORTANT:All XRF Sample Cups present the possibility of leakage, especially when used in an evacuated environment, with potential damage to the analytical instrumentation. Experimentation with each sample cup prior to actual usage to ascertain its integrity is recommended. The judicious use and applications of this product is the sole responsibility of the user. Chemplex Industries, Inc. assumes no liability or guarantee that this product will perform in accordance with its suggested use.

SUGGESTED METHODS OF USE

Liquid, Powdered, Slurry Sample Preparations

- 1 Insert sample into cell.
- 2 Affix thin-film to sample with snap-on ring. This is designed to fit only one way. Alternatively, the thin-film may be preattached with the collar followed by the snap-on ring.
- 3 For pressure equalization purposes with inverted optics, rupture center thermoplastic seal. The off-centered thermoplastic seal is generally ruptured for micro-sample or internal reference standard applications.

NOTE: Not recommended for use in vacuum with upright geometry systems (top mounted x-ray tubes). Liquid samples may form bubbles on inside surface of thin-film; venting will also result in sample withdrawal by gravity and especially by an evacuated condition.

Micro-Sample and Internal Reference Standard Preparations

A receptacle on the inside of the cell accepts a 5/32" (4mm) glass or plastic rod or capillary tube, which may be secured from any laboratory supply firm. Internal reference standard or micro-samples may be mounted on the end of a rod or in a capillary tube cut to an appropriate length and inserted into the receptacle. Maintain a constant length of the rod or capillary tube with a sample mounted in place to ensure uniform intensity measurements. Any variations in the length may vary the target-to-sample distance which may affect the intensities and results. For safe-keeping, affix a thin-film sample support

over the cell opening with a snap-on ring.

For internal reference standard applications (e.g. forming a ratio to a specific spectral line, absorption studies, liquid density correlations, etc.) empirically determine appropriate length of rod or capillary tube with standard or sample mounted in position for desired intensity of monitored element. Once determined, hold this length constant or use the same mount for subsequent similar investigations. Powdered or liquid samples may be introduced directly into cell after inserting internal reference standard for density measurement applications.

"Thin-Layered" Sample Preparations

Liquids

Affix thin-film sample support with collar furnished. Form a slight concavity in the thin-film with a round-ended glass rod. Gentle heating will restore thin-film to original tautness. Insert solution droplet, evaporate if desired, and overlay with another piece of thin-film of suitable gauge with snap-on ring.

Powders

Affix thin-film sample support with collar furnished. Evenly spread powdered sample on thin-film. Overlay with another piece of thin-film of suitable gauge with snap-on ring. The powdered sample may be further spread for uniformity of distribution with another piece of thin-film.

* Registered US Patent No. DES 238,693

2-5 XRF Sample Cup Series 1500

Double Open Ended 32 and 40mm Cells with Microporous Film and Snap on Cap Attachment Provision

The 1500 Series XRF Sample Cups are designed with double open ends. They are adaptable to contain many types of sample materials in air, inert gas and evacuated conditions in conjunction with the use of Microporous Film and Vented Sample Cup Caps. These sample cups offer top sample loading after preattaching thin-film sample supports.

The 1500 Series XRF Sample Cups consist of three components: a cell and two identical snap-on rings. When assembled, the cell and snap-on rings form a "bead-to-indent" geometry responsible for creating taut thin-film sample support planes. There are two distinct ends to the cell. One end is identified by having a flange on the outer diameter. This represents the top end and functions to centrally position the assembled sample cup and for attaching Microporous Film and Vented XRF Sample Cup Caps.

A thin-film sample support is attached to the cell opposite the end with the flange. The sample is top loaded into the open end which may be optionally sealed with another piece of thin-film or, for pressure equalization purposes, with Microporous Film or a Vented XRF Sample Cup Cap.

The procedure for attaching Microporous Film is similar to affixing a thin-film sample support with a snap-on ring. Vented XRF Sample Cup Caps are designed to simply snap into position similar to attaching a snap-on ring. The 1500

Series Sample Cups are made of natural polyethylene and are offered in 32 and 40mm diameter sizes.

Specifications

XRF Sample Cups Series 1500 (100 units/pkg*)

Double Open-Ended 32 and 40mm Cells with Microporous Film and Snap-On Cap Attachment Provision

CAT #	Outside Diameter		Height		Aperture		Capacity cc
	Inches	mm	Inches	mm	Inches	mm	
1530	1.25	32	0.90	23	0.98	25	12
1540	1.57	40	0.90	23	1.27	32	18

* Each set consists of a Cell and two Collars

**Accepted by Asoma instruments

IMPORTANT All XRF Sample Cups present the possibility of leakage, especially when used in an evacuated environment, with potential damage to the analytical instrumentation. Experimentation with each sample cup prior to actual usage to ascertain its integrity is recommended. The judicious use and applications of this product is the sole responsibility of the user. Chemplex Industries, Inc. assumes no liability or guarantee that this product will perform in accordance with its suggested use.

2-6 XRF Sample Cup Series 1700

Single Open-Ended 32 and 40mm Cells with Snap-Post Venting and Overflow Reservoir

The 1700 series XRF Sample Cups* have features that provide the analyst with a convenient and rapid means for pressure equalization and handling temperature sensitive solution samples that tend to expand during analysis.

For venting purposes, these sample cups are manufactured with a snap-post as an integral part of the cell. By simply applying a sideward pressure to the snap-post, a thin thermoplastic seal is ruptured to establish a passageway. Distension and convolution of the thin-film sample support is avoided while maintaining a statistically reproducible distance from the excitation source to the sample surface, defined as the thin-film sample support.

The cell also incorporates an overflow reservoir for collecting and retaining thermally sensitive solutions samples that tend to expand during analysis. The snap-on ring incorporates a taper and "bead-to-indent" geometry for initially establishing and maintaining a taut thin-film sample support plane. A collar is also furnished as a preliminary holding device for thin-film sample support attachment prior to securing with a snap-on ring.

Specifications

XRF Sample Cups Series 1700 (100 units/pkg*)

Single Open-Ended 32 and 40mm Cells with Snap-Post Venting and Overflow Reservoir

CAT #	Outside Diameter		Height		Aperture		Capacity cc	
	Inches	mm	Inches	mm	Inches	mm	Cell	Reservoir
1730	1.25	32	0.90	23	0.98	25	7	2
1740	1.57	40	0.90	23	1.27	32	13	5

* Each set consists of a Cell, a Snap-On Ring and a Collar

IMPORTANT All XRF Sample Cups present the possibility of leakage, especially when used in an evacuated environment, with potential damage to the analytical instrumentation. Experimentation with each sample cup prior to actual usage to ascertain its integrity is recommended. The judicious use and applications of this product is the sole responsibility of the user. Chemplex Industries, Inc. assumes no liability or guarantee that this product will perform in accordance with its suggested use.

* Registered US Patent No. 4,665,759

2-7 XRF Sample Cup Series 1800

Single Open-Ended 32 and 40mm Cells Venting Provision and Overflow Reservoir

The 1800 Series XRF Sample Cups are versatile by offering the option to vent the cell for pressure equalization purposes and containing an overflow reservoir for accepting thermally sensitive solution samples tending to expand during analysis.

Each sample cup consists of a single open-ended cell, a snap-on ring and a collar. The cell incorporates an overflow reservoir and a centrally located circular depression which is thermoplastically sealed during manufacture. By puncturing the seal with a blunt tool, any entrapped gases or vapor pressure build-up is released during analysis. An equalization in pressure is maintained to ensure a flat thin-film sample support surface and statistically reproducible distances between the excitation source and sample, defined as the thin-film. Thermally sensitive solutions are collected in the overflow reservoir through the vent hole.

A thin-film sample support is attached to the cell with a snap-on ring. It is firmly clamped in position by means of the unique tapered "bead-to-indent" geometry matched to the cell neck. The collar is optionally used as a preliminary holding device for thin-film sample support attachment prior to securing with a snap-on ring.

The 1800 Series XRF Sample Cups are made of natural polyethylene and offered in 32 and 40mm diameter sizes.

Specifications

XRF Sample Cups Series 1800 (100 units/pkg*)

Single Open-Ended 32 and 40mm Cells with Venting Provision and Overflow Reservoir

CAT #	Outside Diameter		Height		Aperture		Capacity cc	
	Inches	mm	Inches	mm	Inches	mm	Cell	Reservoir
1830	1.25	32	0.90	23	0.98	25	7	3
1840	1.57	40	0.90	23	1.27	32	12	5

* Each set consists of a Cell, a Snap-On Ring and a Collar

IMPORTANT All XRF Sample Cups present the possibility of leakage, especially when used in an evacuated environment, with potential damage to the analytical instrumentation. Experimentation with each sample cup prior to actual usage to ascertain its integrity is recommended. The judicious use and applications of this product is the sole responsibility of the user. Chemplex Industries, Inc. assumes no liability or guarantee that this product will perform in accordance with its suggested use.

2-8 XRF Sample Cup Series 1080, 1085 AND 1850

Single and Double Open-Ended 47mm Cells with Venting Provision and Overflow Reservoir

The 1080, 1085, and 1850 Series XRF Sample Cups are offered for use with Horiba manual and multi-sample automatic instruments in addition to other equipment requiring a shallow sample cup with a large sample excitation area.

1080 and 1085 Series XRF Sample Cups

The 1080 and 1085 Series Sample Cups* consist of a cell and a friction-fitting sleeve for securing and enveloping a thin-film sample support. These sample cups are intended for x-ray instrumentation with automatic multiple-sample changers, i.e. Horiba 1800 Series. They are uniquely designed to eliminate the need to trim extraneous thin-film sample support material from around the edges after assembly. The thin-film sample support substance is entrapped in between the sleeve and length of the cell. The thin-film sample support surface is slightly recessed to avoid physical contact with a counter surface or the instrument components during analysis.

Two different styles are offered: double and single open-ended. The double open-ended version, Cat. No. 1080, permits attachment of thin-film sample supports prior to sample introduction and offers top sample loading. This also enables preassembly of large numbers of samples in wait for analyses. The single open-ended version, Cat. No. 1085, incorporates an overflow reservoir and provision for venting.

1850 Series XRF Sample Cups

The 1850 Series Sample Cups consist of a single open-ended cell and a snap-on ring. The cell incorporates a centrally located circular depression which is thermoplastically sealed during manufacture. By puncturing this seal, a pressure equalization passageway is established to release entrapped gases or relieve vapor pressure build-up within the sample cup. The overflow reservoir accepts small quantities of solution samples having thermal expansion tendencies. The cell neck and snap-on ring incorporate a tapered "bead-to-indent" geometry responsible for creating a taut thin-film sample support surface.

This entire sample cup series is made of natural polyethylene and offered in 47mm diameters x 19mm in height.

Specifications

XRF Sample Cups Series 1900 (100 units/pkg*)

Single Open-Ended 32 and 40mm Cells with Venting Provision and Overflow Reservoir

CAT #	Outside Diameter		Height		Aperture		Capacity cc	
	Inches	mm	Inches	mm	Inches	mm	Cell	Reservoir
1850	1.85	47	0.75	19	1.4	36	15	6
1840**	1.85	47	0.75	19	1.5	38	15	N/A
1085**	1.85	47	0.75	19	1.5	38	15	5

* Each set consists of a Cell and a thin-film attachment device (a snap-on ring or a friction-fitting sleeve).

** Intended for use with Horiba x-ray instrumentation with automatic multiple sample changers.

IMPORTANT All XRF Sample Cups present the possibility of leakage, especially when used in an evacuated environment, with potential damage to the analytical instrumentation. Experimentation with each sample cup prior to actual usage to ascertain its integrity is recommended. The judicious use and applications of this product is the sole responsibility of the user. Chemplex Industries, Inc. assumes no liability or guarantee that this product will perform in accordance with its suggested use.

* Registered US Patent Nos. 5,451,375 and 5,630,989

2-9 XRF Sample Cup Series 1900

Double Open-Ended 32 and 40mm Cells

The 1900 Series XRF Sample Cups are intended to meet the specialized needs of spectroscopists routinely engaged in analyzing very large numbers of samples in air or helium paths.

The 1900 Series XRF Sample Cups consist of three components: a double open-ended cell, a snap on ring and a collar. The cell neck and snap-on ring incorporate a tapered "bead-to-indent" geometry for clamping thin-film sample supports. The collar provided is principally used as a means for temporarily securing a thin-film substance to the cell followed by attachment with a snap-on ring. The opposite end of the cell is fully open for ease and speed of top side sample introduction. These sample cups have their greatest utility in handling large numbers of samples, high density loose powders and non-volatile liquids in air and inert gas environments.

The 1900 Series XRF Sample Cups are made of natural polyethylene and offered in 32 and 40mm diameters. A special 40mm diameter by 35mm high cell, Cat. No. 1940L, is also available for use with Oxford Lab-X analytical systems, which require a greater depth of penetration.

Specifications

XRF Sample Cups Series 1900 (100 units/pkg*)

Double Open-Ended 32 and 40mm Cells

CAT #	Outside Diameter		Height		Aperture		Capacity
	Inches	mm	Inches	mm	Inches	mm	cc
1930	1.25	32	0.90	23	0.98	25	9
1940	1.57	40	0.90	23	1.27	32	16
1940L**	1.57	40	1.40	35	1.27	32	26

* Each set consists of a Cell, a Snap-On Ring and a Collar

**Accepted by Oxford Lab-X instruments (formerly 1540L).

IMPORTANT All XRF Sample Cups present the possibility of leakage, especially when used in an evacuated environment, with potential damage to the analytical instrumentation. Experimentation with each sample cup prior to actual usage to ascertain its integrity is recommended. The judicious use and applications of this product is the sole responsibility of the user. Chemplex Industries, Inc. assumes no liability or guarantee that this product will perform in accordance with its suggested use.

2-10 XRF Sample Cup Series 1935-OX

Double Open-Ended 32mm Cells with Friction-Fitting Caps for Oxford Analyzers

The 1935-Ox Series XRF Sample Cup is designed specifically for use with Oxford analyzers. The cell is double open-ended and fits directly into the aluminum sample cup sleeve supplied with the instrument to form a taut thin-film sample support plane with respect to the integrated "O" ring. Upon assembly with the aluminum sleeve, the prescribed distance between the excitation source and sample plane is maintained assuring statistical reproducibility and virtually obviating the need for recalibration. The sample cups are fabricated of polyethylene which, through its lubricious property, allows for easy insertion and removal from the aluminum sleeve. The cells are furnished with friction-fitting caps with vents.

Specifications

XRF Sample Cup Series 1935-OX (100 Cells and Caps)

CAT #	ITEM
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1935-OX	Sample Cups for Oxford analyzers
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3-1 Vented XRF Sample Cup Cap Series 1600

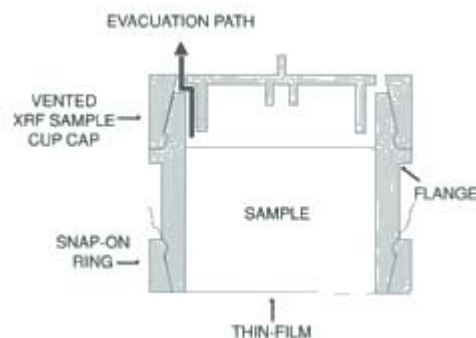
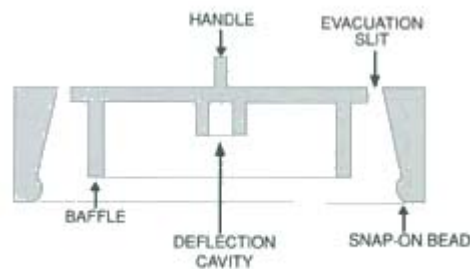
Vented Snap-On Caps for 1530 and 1540 Series XRF Sample Cups

Chemplex XRF Sample Cup Caps are vented snap-on closures intended to create resistance for loose dense powders and non-volatile solution samples to escape containment in sample cups in vacuum or helium systems.

When assembled, the caps form a circular baffle with the cell necks of the 1500 Series XRF Sample Cups. Four narrow slits in the caps allow for the continuous evacuation of entrapped gases or vapor pressure build-up from within the sample cup while presenting resistance to sample withdrawal. Under atmospheric conditions, the caps permit equalization of pressure between the interior of the sample cup and instrument chamber. In helium conditions the four thin slits function to permit introducing helium into the sample cup which maintains pressure equalization.



In all instances, the important consideration is to maintain the thin-film sample support planar with respect to the distance between the excitation source and sample plane defined by the thin-film sample support surface. Under evacuated conditions, the thin-film attached to a sealed sample cup tends to distend outwardly. This decreases the sample-to-excitation source distance and increases intensity measurements falsely indicating higher than actual analyst concentrations. In positive pressure conditions without sample cup venting, the thin-film tends to convolute inward toward the cell increasing the sample-to-excitation source distance and decreasing intensity measurements implying lower concentration values than actual.



XRF Sample Cup Caps are made of natural polyethylene and offered in 32 and 40mm diameter sizes for accommodation by the 1530 and 1540 XRF Sample Cups, respectively. For best results, attach the caps to the ends of the sample cups having a circumferential flange on the other diameter.

Specifications

Vented XRF Sample Cup Cap Series 1600 (100 units/pkg)

CAT #	Nominal size	XRF Sample Cup Application
1630	32mm	Cat. # 1530
1640	40mm	Cat. # 1540

IMPORTANT: Judicious experimentation with solution samples characterized with relatively high degrees of fluidity and volatility, and powdered samples of low density and relatively small particle size in conjunction with the use of XRF Sample Cup Caps and XRF Sample Cups is suggested prior to actual use particularly under evacuated conditions. The responsibility in the use and applications of this product resides solely with the user.

3-2 XRF Sample Cup Snap-On Ring and Thin-Film Sample Support Fastener

The Snap-On Ring Fastener is a simple and easy-to-use device engineered specifically to facilitate assembling Chemplex XRF Sample Cups. This handy device is compact and sturdily constructed to provide continuous use especially for high volume sample preparations.



The Snap-On Ring Fastener consists of a base plate connected with a stanchion to a spring-loaded lever from which a plunger is attached. The base plate is designed to accommodate the 32, 40 and 47mm diameter Chemplex XRF Sample Cups with Snap-On Rings and to automatically position either size in perfect alignment with the plunger. The planes of the plunger and the sample cup maintain parallelism during the assembly process resulting in an even distribution of applied pressure to the Snap-On Ring. Consequently, the thin-film sample support is uniformly grasped around the circumference of the Cell as the Snap-On Ring is snapped into place. The spring-loaded lever is returned to its upward position and the Snap-On Ring Fastener is ready for the next sample preparation. The motion is virtually effortless, fast and the prepared XRF Sample Cups have taut thin-film sample supports.



The Chemplex Snap-On Ring Fastener is usable with the following sample cups that include a Snap-On Ring: 1330, 1340, 1430, 1440, 1530, 1540, 1545, 1730, 1740, 1830, 1840, 1930, 1940 and 1850.

Specifications

XRF Sample Cup Snap-On Ring and Thin-Film Sample Support Fastener

CAT #	ITEM
1300	Snap-On Ring Fastener

3-3 Palm-Held “Snap-On Ring” and “Sleeve” Fastener for XRF Sample Cups

A handy palm-held device helps attach “Snap-On Rings” and “Sleeves” to XRF Sample Cups. Accommodates most XRF Sample Cups with “Snap-On Rings” and “Sleeves” for affixing thin-film sample support materials.



1. Place “Snap-On Ring” or “Sleeve” in position on XRF Sample Cup.
2. Insert Palm-Held Fastener over assembled cup holding “Snap-On Ring” or “Sleeve” in position with one finger extended through the center access hole.
3. Press downward.

Specifications

Palm-Held "Snap-On Ring" and "Sleeve" Fastener for XRF Sample Cups

CAT #	ITEM
1325	Palm-Held Snap-On Ring and Sleeve Fastener

3-4 XRF Sample Cup Vent Hole Punch

The XRF Sample Cup Vent Hole Punch is a handy device designed to facilitate puncturing a hole in single closed-ended XRF Sample Cups for venting purposes. It consists of a spring-loaded palm-size plunger fitted into a cylindrical body which is counterbored to accept 32mm, 40mm and 47mm diameter XRF Sample Cups. Simply place the Vent Hole Punch over the sample cup and gently depress plunger to establish a vent path. Release the pressure and the plunger automatically retracts leaving a vent hole of appropriate diameter and depth of penetration.



The Vent Hole Punch is fabricated from aluminum and is especially useful for repetitive sample preparations. It is useable with the following Chemplex XRF Sample Cups equipped with thin thermoplastic seals: 1065, 1075, 1085, 1430, 1440, 1830, 1840 and 1850.

Specifications

XRF Sample Cup Vent Hole Punch

CAT #	ITEM
1350	Vent Hole Punch

4-1 GyalGrinder®

PER LA MACINAZIONE DI CAMPIONI SOLIDI DA SOTTOPORRE AD ANALISI CHIMICA MEDIANTE ICP, AA, XRF O METODI CHIMICI TRADIZIONALI

Il mulino GyalGrinder® riduce innumerevoli tipi di campioni per XRF a dimensioni, forma e distribuzione uniformi, tali da non influire sui risultati analitici e fornire campioni fisicamente riproducibili.



La GyalGrinder® incorpora molte caratteristiche tecniche per facilitare il processo di macinazione ed è ergonomicamente progettata per minimizzare le difficoltà dell'operatore, specialmente per la preparazione di campioni in routine.

L'intensità dell'impatto è variabile e può essere quindi controllata in modo da ridurre al minimo l'introduzione di elementi dovuti all'usura della giara.

Un sistema di bloccaggio a singola leva, utilizzabile con una sola mano, blocca con sicurezza in posizione la giara e consente un facile inserimento e una facile rimozione della giara stessa.

Il mulino è dotato di timer digitale di programmazione dei tempi di macinazione.

Sono disponibili varie giare di macinazione.

Caratteristiche:

- Marchio CE
- L'Intensità variabile del controllo dell'impatto estende il campo di applicazione a molti tipi di campioni.
- Temporizzatore digitale programmabile che consente di visualizzare il tempo e assicura cicli di macinazione riproducibili.
- Allarme e LED che si illumina ad indicare la fine del ciclo.
- Sistema di bloccaggio a singola leva che facilita l'operazione di caricamento e scaricamento della giara.
- Sistema di abbattimento del rumore riduce il livello di disturbo.
- Armadio pesante di acciaio.
- Virtualmente senza servizio grazie a una sola parte in movimento.
- **Sistema di abbattimento del rumore:** Parti meccaniche e sostanze che assorbono il suono mantengono un livello di disturbo minimo.
- **Progettata ergonomicamente** per il massimo confort dell'operatore. L'armadio con appoggio al suolo è alto e confortevole. L'operatore non è costretto a piegarsi per utilizzare il mulino. I controlli sono posizionati sulla parte alta del mulino sul coperchio e quindi facilmente accessibili.
- La base dell'armadio è dotata di ruote piroettanti per un facile spostamento e di piedini per un facile livellamento.



Applicazioni tipiche:

Catalizzatori • Cemento • Ceramiche • Prodotti chimici • Clinkers • Carbone • Coke • Calcestruzzo • FerroLeghe • Fondenti • Vetri • Ferro • Rocce calcaree • Minerali • Pesticidi • Rocce • Miscela grezze • Refrattari • Polveri metalliche • Sabbie • Scorie • Terreni • e molti altri tipi di materiali che richiedono una riduzione controllata e uniforme delle dimensioni delle particelle e una distribuzione omogenea.

Test tipici di macinazione con la GyalGrinder®

Sostanza	Dimensione iniziale	Frequenza e livello di intensità dell'impatto	% in peso che passa attraverso un setaccio di 44 micron	Tempo di macinazione* In minuti
Amianto	Fibre	Alto	100	9
Cemento, Portland	> 60 mesh	Moderato	100	1
Ferro - cromo	>100 mesh	Alto	100	3
Ferro -manganese	> 200 mesh	Alto	100	2
Ferro - molibdeno	> 80 mesh	Alto	100	3
Ferro - niobio	> 80 mesh	Alto	100	2
Ferro - silicio	> 80 mesh	Moderato	100	3
Ferro - titanio	> 80 mesh	Moderato	100	4

Sostanza	Dimensione iniziale	Frequenza e livello di intensità dell'impatto	% in peso che passa attraverso un setaccio di 44 micron	Tempo di macinazione* In minuti
Fibra di vetro	Fibra	Moderat	100	1
Spatofluore	> 100 mesh	Moderato	100	2
Vetro, calce sodata	Rottame	Bassa	100	4
Grafite	Fibra	Bassa	100	1
Olio di schisto	5 mm	Bassa	100	1
Fosfati	> 50 mesh	Basso	100	1
Ossido di Silicio	> 10 mesh	Moderato	100	1

*Dati ottenuti con la giara di acciaio temperato cat. No. 5050

Nota: Questa informazione è fornita come guida per illustrare le prestazioni del mulino. È responsabilità dell'utilizzatore effettuare un test finale indipendente per verificare i parametri ottimali per una determinata sostanza specifica.

Giare di macinazione

Le giare di macinazione per impiego con la GyrGrinder® sono disponibili in vari materiali. La scelta della giara più appropriata deve essere fatta in funzione del materiale da macinare e in funzione della tolleranza accettabile della contaminazione causata dall'inevitabile usura del materiale di cui è costituita la giara.

▪ Acciaio temperato

L'acciaio temperato è relativamente duro e idoneo per applicazioni generali. Sulla scala MOHS ha una durezza di 5-6 (Rockwell C60-65). È ragionevolmente resistente all'abrasione e dura molto se impiegato con impatto a elevata e moderata frequenza e intensità di impatto. Il materiale di usura è ferro con un contributo minore di cromo, silicio, manganese e carbonio risultanti dalla macinazione di materiali relativamente duri, agglomerati o rottami.

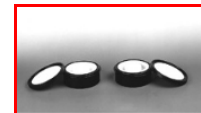


▪ Carburo di tungsteno

Il carburo di tungsteno è relativamente duro per applicazioni generali. Ha una durezza di 8-1/2 (Scala MOHS). Rappresenta una sostanza molto valida per macinare sostanze molto dure. Per la maggior parte delle applicazioni è consigliata un'intensità di impatto intermedia. Contaminanti dovuti all'usura sono tungsteno, cobalto e carbonio; quantità minori di titanio e niobio sono spesso presenti.

▪ Ceramica allo Zirconio

È caratterizzata da una durezza di circa 8 (scala MOHS) e una resistenza elevata all'abrasione. Essa consiste prevalentemente di Ossido di Zirconio con elementi minori di usura di magnesio e di ossidi di afnio (tipicamente meno del 3%). Per la maggior parte delle applicazioni una intensità di impatto basso o medio è sufficiente.



▪ Nitruro di Silicio

Il nitruro di Silicio è una sostanza estremamente dura con una grande resistenza all'abrasione. Ha una contaminazione ridotta al minimo. È simile al carburo di tungsteno e rappresenta una opzione in alternativa senza la possibilità potenziale di scheggiature o fratture. La generazione di riscaldamento per frizione è inoltre ridotta consentendo macinazioni a lunga durata. Richiede una intensità di impatto intermedia per la maggior parte dei campioni. I materiali di usura sono 3% Al₂O₃, 2% SiO₂ e meno dello 0,05% di altre impurezze metalliche.

Dimensioni e peso modello CE codice 5000E:

61 x 61 x 102 cm - 170 kg - 230 VAC/50 o 60 HZ**

** Fornita con cavo ma senza presa di alimentazione. La terra è indicata.

Giare di macinazione

Cat.	Item
5050	Giara di acciaio temperato
5060	Giara di carburo di tungsteno
5070	Giara in ceramica allo Zirconio
5090	Giara in Nitruro di Silicio

Garanzia: 12 mesi compresa manodopera e ricambi se la riparazione è effettuata presso il nostro laboratorio. Per gli interventi effettuati, su Vostra richiesta, presso il Vostro stabilimento saranno a Vostro carico solo le spese relative alle ore di viaggio (non le ore di lavoro) e le spese di viaggio dal Centro di Assistenza Tecnica di Milano.

NB. La garanzia non è applicata alle giare in materiali duri come es. carburo di tungsteno, ossido di zirconio e nitruro di silicio. Le giare possono rompersi per un impiego in condizioni di impatto ad alta energia o per riscaldamento. Possono rompersi anche per semplice caduta. **Le rotture, incrinature o scheggiature non sono coperte da garanzia.**

4-3 SpectroMill® I and II Ball Pestle Impact Grinders

For Blending Powdered Samples and Comminuting Samples into Powders

Chemplex CE Certified SpectroMills are electromechanical devices for precisely blending and comminuting sample substances into finely divided powders. The process is simple, fast and effective for producing highly reproducible powdered samples for x-ray spectrochemical analysis with applications extending into other scientific disciplines.



Principle of Operation

The principle of operation is based on the impact and milling actions of one or more ball pestles on a sample substance contained in a vial. The speed in which the ball pestles are alternately thrust from one end of the vial to the other is assisted by inertial accentuation through the mechanics of the SpectroMill. Ball pestle path of travel follows a configuration and impact with the sample particles is highly energetic. Constituent sample particles are unable to elude the comminution process. In minutes, samples are homogeneously blended and comminuted to an acceptable uniform particle size and distribution for statistically reproducible powdered samples.

SpectroMill I

SpectroMill - I has a single adjustable vial clamping mechanism which permits a single sample, or cluster of samples in a vial adapter, to be processed. The vial clamp is adjustable to accommodate different style and size comminution vials. Comminution time is precisely controlled with a programmable solid state digital timer with an LED display and a cycle completion alarm and LED.



SpectroMill - II

SpectroMill - II has two adjustable vial clamping mechanisms. This extends the scope and speed of sample preparations by simultaneously processing two separate sample substances. Alternatively, only one sample may be processed in one of the vial clamping mechanisms. Vial adapters further extend the range by processing clusters of samples in one or both of the vial clamps. A programmable solid state digital timer with an LED display, cycle completion alarm and LED is also included.



Features:

- **CE Certification**
- Single or multiple sample processing
- Variably adjustable vial clamp for diversified vial accommodation
- Programmable solid state electronic timer with LED display, audible completion cycle alarm and LED
- Low profile design
- Vibration absorbing engineering
- Heavy duty 1/3 HP thermally protected motor
- Heavy gauge steel construction
- Safety features

4-4 MultiAxial™ Powered Sample Blender



The blending of powdered samples in laboratory size quantities has often presented difficulties because of the unavailability of appropriately scaled down equipment and the excessive length of time generally required to perform a simple chore. In response to this need, Chemplex Industries, Inc. offers a compact countertop powder blender specifically intended to process laboratory size samples efficiently and expediently.

The Chemplex MultiAxial Powder Blender directs the constituent particles of a powdered sample to intermix concurrent with a significant reduction in processing time. The principle of operation is based on the off-centered continuous rotation of a powdered sample contained in chamber. The ends of the sample chamber are diametrically displaced from each other. As the sample

chamber is rotated, constituent sample particles tumble over each other as they are propelled to migrate to the opposite diametrically opposed end. Concurrent with the sample particle migration, the entire sample chamber rotates and similarly the sample. The process is continuous until the desired blend is attained.

The MultiAxial Powder Blender consists of a clear plastic sample chamber that boasts a 1200 cc volumetric capacity. The most effective blending is performed with the chamber filled approximately 1/2 to 2/3 of capacity. The sample chamber is easily removed for cleaning and sample introduction. One end of the sample chamber is permanently sealed; the other has a friction fitting cap with an O-ring and a handle. A programmable electric interval timer permits powder sample blending up to sixty minutes.

The Chemplex MultiAxial Powder Blender is sturdily built, occupies minimal laboratory counter top space and is extremely quiet in operation.

Specifications

MultiAxial Powdered Sample Blender:

14" high x 10.25" deep x 11.25" wide; (35.6cm X 26cm X 28.6cm)
Weight 22 lbs. (10kg); 33 RPM

CAT #	ITEM
2000	MultiAxial Powder Blender - 115 VAC / 60 HZ
2000-E	MultiAxial Powder Blender - 230 VAC / 50 HZ*
2100	Sample Chamber, Spare Dimensions: 9.25" high x 3.5" diameter; (24cm X 9cm)

* Not equipped with electrical plug; earth ground is indicated.

® MultiAxial is a trademark of Chemplex Industries, Inc.

4-5 Impact Mortar and Pestle

Rocks and other similar types of sample materials are seldom of suitable size for direct spectrochemical analysis. Quite often a rock specimen must first be crushed into smaller chunks and then comminuted in other types of equipment, such as a SpectroMill or GyrulGrinder, for uniform particle size reduction and homogeneous distribution.

The Chemplex Mortar and Pestle is a simple device designed to crush and pulverize many types of sample materials in preparation for further treatment. The unit consists of a cylindrical pestle and a mortar sample chamber attachable to a mortar base plate with a knurled coupling. A specimen is placed in the mortar chamber followed by insertion of the pestle. By raising and lowering the pestle, the contained sample is mechanically crushed and safely confined within the chamber for removal and subsequent particle size reduction processing. All components are easily disassembled for cleaning and the entire device is sufficiently small for both field and laboratory applications.



Specifications

Impact Mortar and Pestle

5 in3 (70 cm3) sample capacity

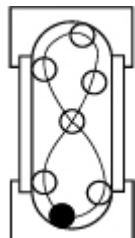
CAT #	ITEM
850	Impact Mortar and Pestle Stainless and hardened chrome steel 7-1/2" (19cm) high x 3-9/16" (9cm) diameter

IMPORTANT: The Impact Mortar and Pestle is not guaranteed against chipping. Safety goggles and personal protective wear are recommended.

5-1 SpectroVials®

Blending and Comminuting Vials for Ball Pestle Impact Grinders®

SpectroVial® blending and comminution vials* are designed for processing samples in SpectroMill® Ball Pestle Impact Grinders. The contoured ends on the inside of both the caps and bodies, which are also fabricated of similar materials, are responsible for their effectiveness in the blending and comminution processes.



The concaved ends eliminate pockets for sample particles to accumulate and elude the blending and comminution processes. The contained ball pestles are accelerated in speed as they are guided through their "figure 8" paths of travel through the SpectroVials as imparted by the mechanics of the SpectroMill Ball Pestle Impact Grinders. Particle intermixing is more efficient and effective and samples are processed more uniformly in particle size and distributed more homogeneously.

Polystyrene SpectroVials

These clear, hard and rigid plastic vials have thick walls to withstand repeated impacts of ball pestled; the exterior ribbed structures impart greater strength. Especially useful for blending powders and comminuting relatively soft sample substances. Tabs on friction-fitting caps are easy to disassemble. Methyl methacrylate ball pestles are suggested.



Stainless Steel SpectroVials

Stainless steel SpectroVials are general purpose blending and comminuting vials and most useful for processing moderately hard sample substances. The threaded caps have contoured interior ends characteristic of all Chemplex SpectroVials. Stainless steel ball pestles are suggested.



Titanium Carbide SpectroVials

This material boasts a Rockwell C hardness similar to tungsten carbide. Their extreme hardness is well suited for comminuting very hard sample substances. The caps are also threaded and have contoured interior ends. Tungsten carbide ball pestles are recommended.

Agate SpectroVials

Agate is a hard naturally occurring fine grained mineral. Used for comminuting hard substances with reduced likelihood of cross contamination. Typically contains less than 0.02% of each of the following elements: Na, Mg, Al, K, Ca and Fe. Because of its natural occurrence, elements and concentrations will vary. Agate vials have contoured interior ends and are encased in aluminum for protection. Use only with agate ball pestles.



Stainless Steel Slip-Fit SpectroVials

Slip-Fit vials are fabricated from a highly rust resistant grade of stainless steel and are noted for their ease of assembly and cleaning. The interior contoured end caps are designed to easily slip onto the vial bodies which significantly reduce sample preparation time. The Slip-Fits serve as general purpose blending and comminution vials for moderately hard sample materials. Stainless steel ball pestles are suggested.



Specifications

SpectroVials - Polystyrene (100 units/set)

CAT #	Recmnd Sample Charge cm ³	Length		Diameter		Recmnd Ball Pestle
		mm	Inches	mm	Inches	
1121	1-2	48	1.9	15	0.6	1205
1122	2-5	48	1.9	22	0.9	1207
1133	5-10	75	3.0	26	1.0	1208
1134	10-20	75	3.0	33	1.3	1211

SpectroVials - Stainless Steel (Qty: 1)

CAT #	Recmnd Sample Charge cm ³	Length		Diameter		Recmnd Ball Pestle
		mm	Inches	mm	Inches	
1161	1-2	51	2	16	0.6	1245
1162	2-5	51	2	22	0.9	1247
1173	5-10	76	3	26	1.0	1248
1174*	10-20	76	3	27	1.3	1251 & 1252
1175**	10-30	66	2.5	54	2.1	1247 & 1252

* 1 of each

** Supplied as a single open-ended vial

SpectroVials - Titanium Carbide (Qty: 1)

CAT #	Recmnd Sample Charge cm ³	Length		Diameter		Recmnd Ball Pestle**
		mm	Inches	mm	Inches	
1151	1-2	51	2	16	0.6	1235
1152	2-5	51	2	22	0.9	1236
1153	5-10	76	3	26	1.0	1237
1154*	10-20	76	3	27	1.3	1238 & 1239

* 1 of each

** Tungsten carbide ball pestles are supplied with titanium carbide SpectroVials.

IMPORTANT: Titanium carbide is a brittle and hard material and cannot be guaranteed against chipping and breaking.

SpectroVials - Slip-Fits Stainless Steel (Qty: 1)

CAT #	Recmnd Sample Charge cm ³	Length		Diameter		Recmnd Ball Pestle
		mm	Inches	mm	Inches	
1143	1-8	55	2.156	22	0.875	1247
1146	5-15	84	3.312	38	1.500	1252
1149*	12-30	94	3.687	56	2.218	1252

* Quantity: 2

SpectroVials - Agate (Qty: 1)

CAT #	Recmnd Sample Charge cm3	Length		Diameter		Recmnd Ball Pestle*
		cm	Inches	cm	Inches	
1180	30-50	9	3.5	6	2.4	1280

* Agate ball pestles are supplied with agate SpectroVials.

IMPORTANT: Agate is a naturally occurring form of quartz. It is extremely brittle and easily prone to fracture, chipping and/or breakage. Chemplex Industries, Inc. can not offer any type of guarantee on this substance.

BALL PESTLES

Plastic (methyl methacrylate)

CAT #	Diameter mm	Qty/Pkg	CAT #	Diameter mm	Qty/Pkg
1205	5	100	1245	5	6
1207	7		1247	7	
1208	8		1248	8	
1211	11		1251	11	
			1252	12.7	

Stainless Steel

Tungsten Carbide

CAT #	Diameter inches (mm)	Qty/Pkg	CAT #	Diameter inches (mm)	Qty/Pkg
1235	0.187" - 5mm	6	1280	0.500"-12.7mm	2
1236	0.281" - 7mm				
1237	0.312" - 8mm				
1238	0.437" - 11mm				
1239	0.500" - 12.7mm				

Agate

* Registered US Patent No. 4,402,909

® SpectroVial and SpectroMill are registered trademarks of Chemplex Industries, Inc.

™ Slip-Fit is a trademark of Chemplex Industries, Inc.

6-1 Powdered Sample Blending, Grinding and Briquetting Additives

The most widely practiced method in preparing powdered sample substances for x-ray spectrochemical analysis is by "dry-grinding". This is generally followed by briquette formation. The procedure's convenient, easy rapid and effective.

Most powdered sample materials are generally considered multi-phased or compositionally complex. They are comprised of individual particles or crystallites frequently dissimilar in composition, density, hardness, configuration, size and distribution. Each particle tends to behave as a separate entity independent from its surrounding constituents and exerts an influence on analyte-line intensity and elemental concentration. The difficulty resides in attempting to reduce the differences between each constituent particle to a level or average particle size and distribution at which their fluorescent behavior is similar and the bulk specimen is spectrochemically represented. In many instances the specimen exhibits a deficiency in one or more properties essential to producing dense homogeneous samples which is attributed to the different individualities and behavior of the constituent sample particles. These conditions are easily rectified by admixing the powdered sample material with an additive selected for its ability to aid in the grinding, blending or briquetting process. The choice of an appropriate additive is therefore primarily based upon correction of a characteristic sample deficiency concurrent with maintaining minimal effects on analyte-lines of interest, absorption properties and sample preparation error.



Regrettably no single additive incorporates the necessary properties to satisfactorily resolve all of the various combinations of particle related individualities and problems associated with processing the innumerable types of compositionally complex powdered sample materials routinely analyzed. The chemical and physical characteristics of materials widely differ in addition to the analytical needs of different laboratories and the various types of processing equipment available. In most instances, an empirical evaluation is frequently instituted to determine the most suitable type of additive to satisfy a specific sample preparation

deficiency. Generally, 1 to 5 weight % additive is sufficient to resolve many troublesome sample materials. Once a procedure is established with an appropriate additive it usually remains constant with respect to subsequent similar sample material preparations. For these reasons, a variety of blending, grinding and briquetting additives are offered.

BLENDING, GRINDING AND BRIQUETTING ADDITIVE GUIDE

PROMINENT CHARACTERISTICS

X-Ray Mix

Highly "plasticizes" and firmly bonds samples together under briquetting pressure. Sample pellets are characteristically smooth, unblemished, glossy and highly resistant to breakage. Available in bulk powder form for blending and in preweighed 1/4 and 1/2 gm tablets for ease of dispensing. May exhibit heat sensitive tendencies with long comminution cycles and degradation with continual or intense irradiation exposure. A general purpose additive applicable to diversified sample material preparations. Water soluble for easy clean-ups

SpectroBlend®

44u powder well suited for blending and as a diluent for high concentrations. A well-balanced combination of constituents for lubricity and grinding abrasiveness. A general purpose additive having extended processing capability to a larger variety of sample materials. Exhibits excellent resistance to frictional heat generated by long grinding cycles, avoids caking and forms durable pellets with moderately "plasticized" surfaces. Resistant to degradation by thermal and irradiation exposure. Available in 1/4 gm and 1/2 gm tablets. Water soluble for easy clean-ups.

Boric Acid Tablets

A very abrasive heat resistant additive particularly suitable for processing samples with very strong tendencies to weld during comminution in metallic grinding vessels. Briquetted pellets appear chalky and not quite as durable as processing with one of the other additives. Frequently used in conjunction with x-ray mix to impart lubricity for "plasticizing" pellets. Available in 1/2 gm preweighed tablets.

SpectroMix®

Characterized by a combination of properties between X-Ray Mix and SpectroBlend. Suitable for blending and as a diluent for high concentrations. Sample pellets are moderately "plasticized". Resists caking during comminution and greatly facilitates clean-ups with generally a dry paper towel

ADDITIVE CHEMICAL COMPOSITIONS

ADDITIVE	CHEMICAL COMPOSITION
X-Ray Mix	48.7% C, 42.6% O, 8.1% H, 0.6% B
SpectroBlend®	81.0% C, 2.9% O, 13.5% H, 2.6% N
Boric Acid	77.6% O, 17.5% B, 4.9% H
SpectroMix®	55.1% C, 28.4% O, 8.0% H, 8.5% Na

TYPICAL ADDITIVE SAMPLE MATERIAL APPLICATIONS

Cement - Raw-Mix - Sinters - Slags - Catalysts - Ores - Refractories - Fertilizers - Soil - Phosphate - Rock - Oxides - Alumina - Bauxite - Carbonates - Silicates - Organics - Inorganics And many other types of sample materials exhibiting difficulty in processing for x-ray spectrochemical analysis.

Specifications

Blending, Grinding and Briquetting Additives

CAT #	ITEM
600	X-Ray Mix; Powder; 1 lb. (454gm/btl)
625	X-Ray Mix 1/4 gm Tablets; 500 tablets/btl
650	X-Ray Mix 1/2 gm Tablets; 500 tablets/btl
660	SpectroBlend; 44u Powder; 1 lb. (454gm/btl)
690	SpectroBlend; 1/2 gm Tablets; 500 tablets/btl
750	Boric Acid 1/2 gm Tablets; 1000 tablets/btl
9000	SpectroMix; Powder: 1 lb. (454m/btl)

® Chemplex, SpectroBlend and SpectroMix are registered trademarks of Chemplex Industries, Inc.

6-2 Liquid-Binder™

Aqueous Grinding and Briquetting Additive

For quantitative x-ray analysis, all particles comprising a powdered sample should be reduced to the same average size and uniformly distributed. Conventional methods of comminution are generally effective in meeting this objective and in reducing most particle-related problems to within analytically tolerable levels.

Most powdered materials are comminuted in a dry-state primarily for convenience and speed. Compositionally complex powders consisting of particles of different size, shape, density and hardness are sometimes more difficult to prepare for quantitative analysis. During the comminution process, segregation by size may occur with powders that are non-uniform in particle size or hardness, and by density with non-homogeneous powders. Attempts to rectify this condition by sieving may only aid in classifying the particles and accentuating variations in analyte-line intensity. By converting the powder to a slurry with Liquid-Binder and comminution the mixture in the conventional manner, these variables are frequently alleviated or eliminated. As a slurry, the particles are dispersed by the liquid carrier and continuously circulated within the comminution vessel. The accumulation of sample material into dense packs (commonly referred to as the "caking" effect) is averted ensuring uniform and smaller reduction of all particles and avoidance of segregation.



Friction heat generated during dry-grinding by the more abrasive and hard particles or by the equipment tends to soften and reweld heat-sensitive materials prohibiting effective particle-size reduction and distribution. The thermal conducting behavior of a liquid carrier also serves to lessen and dissipate heat reducing the likelihood of particle rewelding to occur and preserving the microstructure of the particles.

Low cohesive powders are not conducive to briquette formation and require admixing a binding ingredient such as Liquid-Binder. Powders are briquetted to reduce the effects of segregation and surfaced roughness. Sample briquettes formed from heterogeneous powders are likely to exhibit differences in one part of the sample surface to another resulting in significant deviations from the bulk of the sample and variations in analyte-line intensity. Analyte-line intensity is related to particle size and briquetting pressure. Smaller-size particles yield higher analyte-line intensities at a given briquetting pressure. For a given particle size, a higher briquetting pressure produces an increase in

analyte-line intensity. This is particularly prevalent with the longer analyte-line wavelengths or less energetic energies. The greatest amount of analyte-line intensity is realized at a briquetting pressure of 20 tons/in² or greater for particles ranging in size from 100 to 300um. Elements in the long wavelength region, lower KeV, frequently require higher pressures, and lower pressures may be adequate for short wavelength, higher energy, investigations.

Briquetting also produces a more uniform packing density and smooth sample surface. By using the same weight quantity of each specimen in an analysis and maintaining the same briquetting pressure, various in packing density and analyte-line intensity are avoided. Surface roughness, e.g. particle size, should be less than the critical thickness of the sample for the longest wavelength, lowest energy, to be measured. Generally, particle size effects on powders become insignificant or substantially disappear when the particles are reduced to or less than 38um. Briquetting and rotation of the specimen during x-ray analysis are useful in reducing the effects of surface roughness.

XRD Analysis

In order to obtain quality x-ray diffraction patterns with smooth lines, the crystallites of a powder must be reduced in size without distorting the lattice structure. Samples which have been dry-ground are prone to microstructural damage and particle rewelding which will impair the quality of the diffraction lines. By converting the specimen to a slurry with liquid-Binder and wet-grinding, the crystallites are reduced to a finer particle size, more uniformly distributed and randomly oriented.

The inherent binding property of Liquid-Binder is useful in forming self-supporting cylindrical samples for direct mounting in a camera. A slurry of the powder is dried in a tube of suitable length and bore and extruded as a diffraction sample. Alternatively, a supporting wire of fiber is dipped in Liquid-Binder, dried tacky and dusted with the powder. If sample quantity permits, successive coatings are similarly applied to yield an adequate diameter for rolling into a cylindrical sample. Care must be exercised to minimize preferred orientation of the crystallites.

Mounting Medium

Liquid-Binder also serves as a dispersing/mounting medium. A powdered sample is converted to a slurry and allowed to flow as uniformly as possible over the surface of a microscope slide. The solvent is evaporated by gentle heating under an infrared lamp while the slide is maintained in a horizontal position to avoid local accumulation of a sample material. A variation of this method is to coat one surface of a slide with a thin layer of Liquid-Binder, allowing it to dry tacky and dusting the adhesive layer with the powder.

SUGGESTED PROCEDURE

Liquid-Binder contains 100 mg of polymeric binding ingredient per cc of solvent, methylene chloride. For most powdered material preparations, an admixture containing 5 cc Liquid-Binder (equivalent to 0.5 gm binder) and 10 gm sample is sufficient in producing slurries of adequate consistency for subsequent wet- grinding and firm briquettes. Variations in the Liquid-Binder to sample ratio may be made to suit specific requirements. After the grinding process is complete, evaporate the methylene chloride solvent under an infrared lamp with occasional stirring of the slurry to expedite drying. If possible, execute the drying process while the specimen is yet contained in the grinding assembly because momentary re-grinding is generally necessary to break up any agglomeration attributed to the strong adhesive property of the polymeric binding substance. Liquid-binder is also water soluble permitting easy clean-ups.

Cat. No.800 CAUTION: Liquid-Binder contains methylene chloride. Avoid inhalation and contact. Wear safety goggles and other personal protective wear. Use with adequate ventilation and rinse thoroughly with water in the event of contact. May attack certain types of plastics, paints, finishes and sample materials. Test before using. Chemplex Industries, Inc. assumes no liability for the use and applications of this product.

Specifications

Liquid-Binder™

CAT #	ITEM
800	Liquid-Binder, 1 pt., 480 cc

CAUTION: Liquid-Binder contains methylene chloride. Avoid inhalation and contact. Wear safety goggles and other personal protective wear. Use with adequate ventilation and rinse thoroughly with water in the event of contact. May attack certain types of plastics, paints, finishes and sample materials. Test before using. Chemplex Industries, Inc. assumes no liability for the use and applications of this product.

™ Liquid-Binder is a trademark of Chemplex Industries, Inc.

6-3 Pellet Cups®

Compressible Straight-Walled and Tapered Powdered Sample Briquetting Cups



The method of converting a powdered sample substance into a self-supported specimen is performed by briquetting the sample in a Pellet Cup. The sample pellet is reinforced on all side except for the surface to be analyzed, durable for safe handling and analysis. Briquetting helps to surmount many particle related difficulties that may potentially affect analytical accuracy. Chemplex offers the most comprehensive line of Pellet Cups in different styles and sizes to serve virtually any powdered sample briquetting application.

Straight-Walled Aluminum Pellet Cups



Most powdered sample substances consist of particles relatively uniform in size, configuration and distribution. These types of samples are generally conducive to briquette formation with virtually no evident surface marring. For these straight-forward applications, the traditional straight-walled aluminum Pellet Cups serve their greatest usefulness.

Tapered Pellet Cups



Multi-phased powdered sample materials consisting of relatively large, hard or elastic particles of different densities and chemistry often resist briquette formation. Irregularities in particle size, shape and distribution may also result in segregation during the briquetting process. This may be accompanied with the development of fault lines at the surface. Tapered Pellet Cups overcome some of these difficulties. The taper tends to limit particle displacement at the surface of the pellet, maintaining it in a natural and unstressed condition. The greatest particle movement and displacement occurs in the bottom of the cup where the diameter is smaller and by design least influential to the sample surface. Tapered

Pellet Cups are notably slightly larger in diameter than straight-walled cups. This minimizes sample spill over into the die during the briquetting procedure.

Materials

Straight-Walled Pellet Cups are offered in aluminum and Tapered Pellet Cups are offered in both aluminum and plastic. The aluminum cups are taller and capable of accepting greater volumes than the plastic versions. The plastic PlastiCups accommodate small volumes but are significantly more lubricious to facilitate removal from the die.

Suggestions and Methods of Use

Thickness Briquette thickness varies in accordance with the density of the sample material. Dense materials produce thick pellets and less dense powders become thin wafers susceptible to fissure development and damage. Generally a briquette thickness of 1/8" to 3/16" (3mm to 5mm) suffices and produces satisfactory results. This is also subject to evaluation of critical thickness with respect to the analyte-lines of interest. The thickness of low density sample materials is controlled by introducing a backing ingredient prior to briquette formation. X-Ray Mix Powder or SpectroBlend are suggested as backing agents because of their cohesive properties with many types of sample substances.

Briquetting Pressure For a given particle size, the intensity of an analyte-line is directly proportional to the briquetting pressure applied to the sample. sample materials containing analytes characterized by long wavelength lines low KeV, generally require higher briquetting pressure to attain maximum intensity than the more energetic short-line wavelengths. Samples comprised of multiple analytes should be briquetted to a high enough pressure to satisfy the least energetic analyte-line. Empirical experimentation to determine the combination of required conditions to attain maximum analyte-line intensities for the constituent elements in a powdered sample is recommended.

Degassing Powdered materials tend to occlude air during the briquetting process. Sample materials of this nature may abruptly outgas and explode due to expansion of entrapped air or gas especially in a vacuum operated system. This potential problem may be averted by evacuating the die with the contained powdered sample material during the briquetting process.

Typical Tapered Pellet Cup Applications

Ores - Cement - Raw Mix - Bauxite - Sags - Sinters - Fertilizer - Halide - Catalysts - Refractories - Metallurgical Powders - Phosphates - Refractories - Soil - Sand - Pulp - Calcareous and Silicious Materials - Flux-Fused Samples - Ceramics - Minerals - Oxides - Carbonates - and Many Other Types of Sample Materials

Specifications

Compressible Straight-Walled Aluminum Pellet Cups

CAT #	Diameter of Sample Pellet Produced	Normal Dimensions		Pellet Cups per Carton
		Diameter	Height	
500	1.25" (32mm)	1.19" (30.2mm)	0.32" (8.1mm)	1000
500-100	1.25" (32mm)	1.19" (30.2mm)	0.32" (8.1mm)	100
530	1.38" (35mm)	1.31" (33.3mm)	0.32" (8.1mm)	600
530-100	1.38" (35mm) 1.57"	1.31" (33.3mm)	0.32" (8.1mm)	100
540	(40mm)	1.52" (38.6mm)	0.38" (9.7mm)	600
540-100	1.57" (40mm)	1.52" (38.6mm)	0.38" (9.7mm)	100

Compressible Tapered Aluminum Pellet Cups

CAT #	Diameter of Sample Pellet Produced	Normal Dimensions		Pellet Cups per Carton
		Diameter	Height	
505	1.25" (32mm)	1.22" (30.9mm)	0.30" (7.6mm)	1000
505-100	1.25" (32mm)	1.22" (30.9mm)	0.30" (7.6mm)	100
535	1.38" (35mm)	1.36" (34.5mm)	0.35" (8.9mm)	600
535-100 545	1.38" (35mm) 1.57"	1.36" (34.5mm)	0.35" (8.9mm)	100
545-100	(40mm)	1.57" (39.9mm)	0.37" (9.4mm)	600
547	1.57" (40mm)	1.57" (39.9mm)	0.37" (9.4mm)	100
547-100	1.77" (45mm)	1.76" (44.8mm)	0.37" (9.4mm)	500
	1.77" (45mm)	1.76" (44.8mm)	0.37" (9.4mm)	100

Compressible Tapered PlastiCups™

CAT #	Diameter of Sample Pellet Produced	Normal Dimensions		Pellet Cups per Carton
		Diameter	Height	
552	1.25" 32mm)	1.22" (30.9mm)	0.25" (6.4mm)	500
553	1.38" 35mm)	1.36" (34.5mm)	0.25" (6.4mm)	500
554	1.57" 40mm)	1.57" (39.9mm)	0.25" (6.4mm)	500

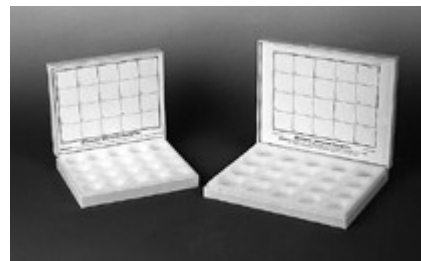
® Chemplex and Pellet Cups are registered trademarks of Chemplex Industries, Inc.

™ Pellet Cup and PlastiCup are trademarks of Chemplex Industries, Inc.

6-4 XRF Sample Storage Boxes

For Storing, Protecting and Cataloging Briquetted Powdered and Solid Samples and Standards

XRF Sample Storage Boxes provide the analyst with an expandable storage system for protecting and cataloging- solid type samples and standards for future referral. Each specimen is contained in a soft polyurethane foam compartment and each box occupies a minimum of storage space in drawers, cabinets or on shelving. The Sample Storage Boxes are fabricated of solid fiberboard with attractively covered simulated leather and steel reinforced. The lid is spring-loaded to remain closed for safe sample containment or to remain in an open position while storing or retrieving samples. A chart located in the lid is numerically indexed to the compartments and permits recording pertinent information on each stored specimen. The front exterior of the lid has an area for recording the general contents of the box to facilitate retrieval.



FEATURES

VERSATILE Catalog and store WDXRF EDXRF XRD, optical, emission and electron-microprobe samples and standards; optical glasses, lens, sample embedments, metallographic samples, polished ores and many other similar types of samples and standards.

ORGANIZATIONAL Eliminates potential sample loss or misplacement and saves time in searching for samples or standards; samples are conveniently cataloged, stored and accessible for future use.

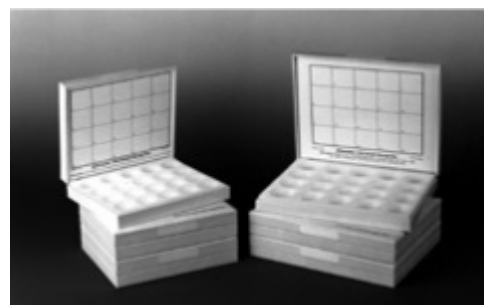
PROTECTIVE Samples and valuable standards are protected from scuffing or accidental breakage; soft cushioning urethane foam firmly secures samples in individual compartments. Permits identifying.

COMPACT Small compact design requires little space for side-by-side or stacked storage in drawers, cabinets or on shelves.

STURDY Heavy gauge construction safely protects samples.

EXPANDABLE Open stock assures expansion of sample storage system as requirements increase.

INDEXED Exterior "write-in" area permits identifying general contents.



Specifications

XRF Sample Storage Boxes

CAT #	Dimensions	Arrangement	Pellet Size
2025	7.75" x 6.375" x 1.75" (19.7 x 16.2 x 4.4cm) 20 Compartments	5 across X 4 deep	1.18" to 1.38" (30 to 35mm)
2035	9.5" x 7.5" x 1.5" (24.1 x 19.1 x 3.81cm) 20 Compartments	5 across X 4 deep	1.57" (45mm)

7-1 SpectroSet-Up® Single Element Powdered Briquettes

X-ray spectroscopy is a non-destructive comparative method of analysis frequently requiring the use of reference materials to establish instrument operating parameters, monitor instrument performance and for standardization purposes. For the latter application, standard reference materials are readily available and selected to closely approximate unknowns in all practical respects. The chemical composition of primary standards are predominately ascertained or certified usually by an absolute method of analysis. However, reference materials related to instrument optimization and performance do not necessarily dictate the stringent analytical specificity as primary standards. They nevertheless command importance particularly in consideration that the degree of accuracy of a given analysis is reflected by the operational condition of the instrument. It is within this area that Chemplex SpectroSet-Up Briquettes have attained their greatest utility.



Periodically, x-ray analytical instrumentation requires adjustments of various operating controls for optimization with respect to the excitation and detection of the various element and their respective analyte-lines of interest. In most instances, once the equipment is initially set-up or optimized, subsequent adjustments are infrequently required or conducted provided a critical component is not removed for replacement. The general operating performance of the instrument is almost mandatory to routinely monitor "drift" that, if left undetected, may influence analytical accuracy. It is obviously important that reference materials employed in these capacities are reliable, provide a reasonable degree of chemical and mechanical stability and are adequate in concentrations.

Chemplex SpectroSet-Up Standards are intended specifically for this application. They are processed from selective high-purity oxides of elements or other suitable compounds noted for chemical stability. These compounds are reduced to a uniform particle size and homogeneously blended with Chemplex X-Ray Mix Powder, Cat No.600, to specific concentrations with regard to the principal analyte of interest. Under hydraulic pressure the admixture is formed into a briquette completely encased in a Chemplex tapered aluminum Pellet Cup of suitable diameter with the exception of the surface face that will be subject to excitation. The resultant briquette is characterized as firm, durable, free from stress or strain cracks and "plasticized" for repeated use and storage.

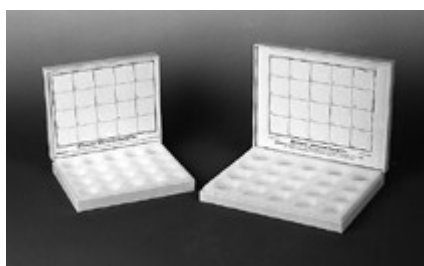
ELEMENT	SYMBOL	CAT #	ELEMENT	SYMBOL	CAT #
Boron	B	6805	Rubidium	Rb	6837
Fluorine	F	6809	Strontium	Sr	6838
Sodium	Na	6811	Yttrium	Y	6839
Magnesium	Mg	6812	Zirconium	Zr	6840
Aluminum	Al	6813	Niobium	Nb	6841
Silicon	Si	6814	Molybdenum	Mo	6842
Phosphorus	P	6815	Silver	Ag	6847
Sulfur	S	6816	Cadmium	Cd	6848
Chlorine	Cl	6817	Indium	In	6849
Potassium	K	6819	Tin	Sn	6850
Calcium	Ca	6820	Antimony	Sb	6851
Scandium	Sc	6821	Tellurium	Te	6852
Titanium	Ti	6822	Iodine	I	6853
Vanadium	V	6823	Cesium	Cs	6855
Chromium	Cr	6824	Barium	Ba	6856
Manganese	Mn	6825	Lanthanum	La	6857
Iron	Fe	6826	Cerium	Ce	6858
Cobalt	Co	6827	Gadolinium	Gd	6864
Nickel	Ni	6828	Hafnium	Hf	6872
Copper	Cu	6829	Tantalum	Ta	6873
Zinc	Zn	6830	Tungsten	w	6874
Gallium Ga	Ga	6831	Mercury	Hg	6880
Germanium	Ge	6832	Lead	Pb	6882
Arsenic	As	6833	Bismuth	B	6883
Selenium	Se	6834	Thorium	Th	6890
Bromine	Br	6835	Uranium	U	6892

Specifications

• SpectroSet-Up Standards, Individual

1 wt. % of a single analyte in X-Ray Mix Powder, Cat. No. 600, briquetted in a tapered aluminum Pellet Cup, Cat No. 505, 535, or 545 to produce a 32mm, 35mm or 40mm diameter reference standard, respectively.

To order, specify each SpectroSet-Up Standard by catalog number and element from the above table and specify diameter, e.g. 32, 35 or 40mm.



• SpectroSet-Up Standard Sets Cat. # 6800

Consists of 20 SpectroSet-Up Standards of customer choice assembled in an XRF Sample Storage Box, Cat. No.2025 or 2035.

To order, individually specify each of the 20 standards from the above table by catalog number, element and specify diameter, e.g. 32, 35 or 40mm. Preface the entire order with "SpectroSet-Up Standard Set, Cat. No. 6800".

• Custom Formulated SpectroSet-Up Standards

Single and multiple analytes of varying concentrations are available as custom manufactured products. All inquiries should be in writing to avoid inadvertent errors.

IMPORTANT: SpectroSet-Up Standards are not intended to be subject to the intense heat and/or irradiation and vacuum for successive lengthy periods of time. The potential possibility of damage to the product may occur.

® SpectroSet-Up is a registered trademarks of Chemplex Industries, Inc.

7-2 SpectroPellet® Mutli-Element Glass Pellets Standard References

Chemplex Multi-Element SpectroPellets are glass-formed pellets each containing 43 different elements at various concentration levels of their respective oxides. The concentration levels provide adequate distribution of analyte-line intensities for setting up instrumentation operating conditions, monitoring the performance of x-ray analytical instrumentation, semi-quantitative analysis and in assisting in setting up fundamental parameter programs.

SpectroPellet Multi-Element Glass Pellets are manufactured from actual glass melts. Each SpectroPellet is optically polished on the analytical investigative surface for uniformity and repeatability of measurements and ground on the obverse side. They are offered in sets of four (4) that



collectively provide a distribution of concentration point correlations for analyte line-to-concentration calibrations.

Each set is provided with a guiding analysis based on the calculations from each glass melt. They are thoroughly homogeneous and chemically and mechanically stable for longevity of use. All concentrations are expressed as the oxides of the elements and compounds indicated.

Typical Applications

Minerals • Cement • Raw Mix • Clinkers • Glass • Oil • Steel • Non-Ferrous and Nobel Metals Plastics for Stabilizers, Pigments and Catalysts • and many other similar applications in various scientific disciplines



Analyte-Line	Oxide	#1	#2	#3	#4
Aluminum	Al ₂ O ₃	28	19	15	3
Antimony	Sb ₂ O ₃		2	0.4	1
Arsenic	As ₂ O ₃	0.8	2.2	0.5	
Barium	BaO	1		5	0.3
Bismuth	Bi ₂ O ₃	1	0.18	0.08	
Boron	B ₂ O ₃	20	14.94	5	1.82
Cadmium	CdO	0.15			1
Calcium	CaO		14	0.6	4
Cerium	Ce ₂ O ₃		1		0.4
Cesium	Cs ₂ O			0.05	0.15
Chromium	Cr ₂ O ₃			0.6	0.1
Cobalt	CoO			1	0.5
Copper	CuO			0.3	2
Gallium	Ga ₂ O ₃			1	0.1
Germanium	GeO ₂	0.3	1.5		
Indium	In ₂ O ₃			0.1	0.4
Iron	Fe ₂ O ₃	7	0.6		0.1
Lanthanum	La ₂ O ₃		1	0.3	
Lead	PbO		3	0.5	0.1
Magnesium	MgO		10	0.1	1
Manganese	MnO	0.5		12	
Molybdenum	MoO ₃		1		0.2
Neodymium	Nd ₂ O ₃	0.5	0.1		
Nickel	NiO	0.3		2	
Niobium	Nb ₂ O ₅	0.7			0.1
Phosphorous	P ₂ O ₅	14	5	0.6	
Potassium	K ₂ O	8		2	20
Praseodymium	Pr ₂ O ₃	0.4		0.15	
Rubidium	Rb ₂ O	0.04			0.2
Silicon	SiO ₂	9.11	4	31.83	56
Silver	Ag ₂ O		0.1	0.5	
Sodium	Na ₂ O	6.5	11	16	0.8
Strontium	SrO		0.5	0.1	
Tantalum	Ta ₂ O ₃			0.05	0.5
Thorium	ThO ₂		0.18	0.44	0.33
Tin	SnO ₂			0.8	0.2
Titanium	TiO ₂	0.1		1	2
Tungsten	WO ₃	1.2	0.4		0.1
Uranium	U ₃ O ₈	0.1			0.5
Vanadium	V ₂ O ₅	0.3	1.5		0.7
Yttrium	Y ₂ O ₃			0.2	0.6
Zinc	ZnO		6.6	1.8	0.8
Zirconium	ZrO ₂		0.2		1
Total Oxide Concentration		100	100	100	100

Specifications

SpectroPellet Multi-Element Glass Pellet

CAT #	ITEM
6940	SpectroPellet Multi-Element Glass Pellet 40mm (1.57") Diameter; 5mm (0.2") thick

NOTE: SpectroPellet Multi-Element Glass Pellets are fabricated of glass and are not guaranteed against chipping or breakage in transmit, usage and/or storage. They are subject to deterioration and as any ordinary glass material substance. These materials are not certified and are offered for sale without any guarantee regardless of intended and/or advertised use whether express or implied.

® SpectroPellet is a registered trademark of Chemplex Industries, Inc.

7-3 SpectroStandard® SpectroCertified® Non-Aqueous Single Element Formulations

Spectrochemical methods of analysis have extended the range of elements and concentration levels determinable in non-aqueous solutions. This has intensified the need for more accurate, reliable and stable reference materials adaptable to serve diversified scientific disciplines. In recognition of these requirements, Chemplex Industries, Inc. has available an unprecedented formulation of organo-elemental solutions for spectrochemical applications.

Chemplex Organo-Elemental SpectroStandards are synthesized from spectrographically pure starting reagents and diluted by weight to concentration with an exceptionally pure sulfur-free water-white Base Oil, Cat. No.5900. They are readily miscible with each other for preparing special formulations, petroleum products and a host of non-aqueous matrices for compositional compatibility to unknowns for spectrochemical applications in varied fields of interest. Chemplex Single Element SpectroStandards are SpectroCertified formulations preformulated to 5000 ug/gm element.



Typical Applications

In lubricant additive chemistry, additive-treated oils are manufactured to meet a multitude of lubrication needs, e.g. to reduce oxidation and thermal degradation of an oil, decrease harmful deposits on lubricated parts, control frictional properties, reduce wear, and minimize corrosion and rust. Various types of organo-metallic compounds are utilized in formulating additives. The determination of the metallic constituents in additives may be spectrochemically performed by referral to Chemplex SpectroStandards.

The analysis of lubricating oils for trace metals serves as a wear indicator of oil-wetted parts within an engine to predict and avert engine failure. Similarly, quantifying wear metals deposited in oils from components in other types of lubricated systems, e.g. steam, gas and aircraft turbines, railroad and marine diesel engines, gear lubricants, provide failure information. The availability of a broad range of SpectroStandards and their miscibility with each other and varied hydrocarbons better equips the analyst in determining trace wear metal constituents.

In environmental protection studies, the concentration levels of various constituents in fuel oils and petroleum spirits, e.g. sulfur, lead, are monitored for limiting emissions into the atmosphere. These investigations may be readily performed by referral to Chemplex SpectroStandards.

Specifications

SpectroStandard Base Oil

CAT #	ITEM
5900	SpectroStandard Base Oil 20 cSt., SpectroCertified; 1 pint (480cc)

SpectroStandard Single-Element Formulations

ITEM

SpectroStandard Element Formulations SpectroCertified

Concentration: 5000 µgm/gm per element

Viscosity: 75cSt

Quantity: 59 cc/bt

Order by Catalog Number and Element shown below

IMPORTANT: The concentrations of all elements are expressed in PPM, µgm element per gm product. Gravimetrically dilute to lower concentrations or formulate special blends. Use SpectroStandard Base Oil, Cat. No.5900, as the diluent.

Element	Symbol	Cat. #
Aluminum	Al	5113
Antimony}	Sb	5151
Barium	Ba	5156
Bismuth	Bi	5183
Boron	B	5115
Cadmium	Cd	5148
Calcium	Ca	5120
Chromium	Cr	5124
Copper	Cu	5129
Iron	Fe	5126
Lead	Pb	5182
Lithium	Li	5103
Magnesium	Mg	5112
Element	Symbol	Cat. #
Manganese	Mn	5125
Molybdenum	Mo	5142
Nickel	Ni	5128
Phosphorus	P	5115
Potassium	K	5119
Silicon	Si	5114
Silver	Ag	5147
Sodium	Na	5111
Tin	Sn	5150
Titanium	Ti	5122
Vanadium	V	5123
Zinc	Zn	5130
Zirconium	Zr	5140

® SpectroStandards and SpectroCertified are registered trademarks of Chemplex Industries, Inc.

7-4 Sulfur SpectroStandard® Organo-Elemental SpectroCertified® Standards

Organo-Elemental SpectroCertified® Standards

Chemplex Sulfur SpectroStandards® are SpectroCertified™ non-aqueous, preformulated spectrochemical standard reference materials. They are formulated in different matrices to provide the broadest range of applications and nearest to the unknown sample matrices. A Certificate of Analysis is furnished with each individual bottle formulation.



SpectroCertified® Sulfur in Light Mineral Oil

Formulated in accordance with ASTM D-2622 and D-4294 methods;
20cSt viscosity

Concentration		SpectroStandard Catalog Number
ug/g (PPM)	Wt.%	
Blank	0	SSLM-000
100	0.01	SSLM-100
200	0.02	SSLM-200
300	0.03	SSLM-300
400	0.04	SSLM-400
500	0.05	SSLM-500
1,000	0.10	SSLM-1,000
2,000	0.20	SSLM-2,000
3,000	0.30	SSLM-3,000
4,000	0.40	SSLM-4,000
5,000	0.50	SSLM-5,000
10,000	1.00	SSLM-10,000
20,000	2.00	SSLM-20,000
30,000	3.00	SSLM-30,000
40,000	4.00	SSLM-40,000
50,000	5.00	SSLM-50,000

SpectroCertified® Sulfur in Iso-Octane

Concentration		SpectroStandard Catalog Number
ug/g (PPM)	Wt.%	
Blank	0	SSRI-000
100	0.01	SSRI-100
200	0.02	SSRI-200
300	0.03	SSRI-300
400	0.04	SSRI-400
500	0.05	SSRI-500

SpectroCertified® Sulfur in #2 Diesel Fuel

Concentration		SpectroStandard Catalog Number
ug/g (PPM)	Wt.%	
Blank	0	SSDF2-000
100	0.01	SSDF2-100
200	0.02	SSDF2-200
300	0.03	SSDF2-300
400	0.04	SSDF2-400
500	0.05	SSDF2-500
1,000	0.10	SSDF2-1,000
2,000	0.20	SSDF2-2,000
3,000	0.30	SSDF2-3,000
4,000	0.40	SSDF2-4,000
5,000	0.50	SSDF2-5,000
10,000	1.00	SSDF2-10,000
20,000	2.00	SSDF2-20,000
30,000	3.00	SSDF2-30,000
40,000	4.00	SSDF2-40,000
50,000	5.00	SSDF2-50,000

SpectroCertified® Sulfur in Crude Oil

Concentration		SpectroStandard Catalog Number
ug/g (PPM)	Wt.%	
Blank	0	SSCO-000
1,000	0.1	SSCO-1,000
2,000	0.2	SSCO-2,000
3,000	0.3	SSCO-3,000
4,000	0.4	SSCO-4,000
5,000	0.5	SSCO-5,000
10,000	1.0	SSCO-10,000
20,000	2.0	SSCO-20,000
30,000	3.0	SSCO-30,000
40,000	4.0	SSCO-40,000
50,000	5.0	SSCO-50,000

SpectroCertified® Sulfur in Residual Oil

Concentration		SpectroStandard Catalog Number
ug/g (PPM)	Wt.%	
Blank	0	SSRO-0000
10,000	1.0	SSRO-10,000
20,000	2.0	SSRO-20,000
30,000	3.0	SSRO-30,000
40,000	4.0	SSRO-40,000
50,000	5.0	SSRO-50,000

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8-1 SpectroCertified® Pre-Fused Fusion Fluxes

The flux fusion process is an effective and simple method for preparing powdered sample substances for XRF, ICP and AA analysis. The method is based on the dissolution of a sample in conjunction with an appropriate fluxing ingredient at an appropriate temperature. For direct XRF analysis, the molten mixture is cast into glass-like beads or further processed for ICP or AA solution analysis. The most effective fluxing agents are lithium borates as represented by Chemplex SpectroCertified® Fusion Fluxes.



Attributes of SpectroCertified® Pre-Fused Fusion Fluxes

- **High Density:** reduces exceeding the volumetric capacity of crucibles to maintain sample-to-fusion flux ratio recipes and avert the potential possibility of spill over.
- **High Purity:** reduces the introduction of potentially influential foreign element contamination by selective control of starting material purity and the pre-fusion process.
- **Low Melting Point:** assures the dissolution process at effective temperatures but safely below temperatures of constituent elements considered sensitive to volatility loss.
- **Low LOI:** eliminates time consuming accounting for loss on ignition; typically less than 0.03% loss on ignition.
- **Anhydrous:** reduces water content and eliminates the conventional procedure of drying prior to use.
- **Homogeneity:** ensures compositionally similar constituent particles for homogeneous melts.
- **Granulation:** promotes uniform particle size, configuration and distribution by minimizing the introduction of “dust” particles to insignificant levels of concern; typically contain less than 0.05% particles less than 100 microns.
- **Diversified Mixtures:** offers the flexibility of selecting from assorted mixtures of different melting points to reduce eutectic melting temperatures of samples and controlling volatile element evolution.
- **Free-Flowing:** facilitates handling manually or with automatic dispensing devices.

Technical Specifications (SpectroCertified Formulations)

CAT. NO.	MIXTURE	M. P., °C/°F	DENSITY, gm/cc	LOI, %	% PARTICLES <100 μ
30-1000	100% Lithium Tetraborate	920/1688	1.25	<0.03	<0.05
30-2000	100% Lithium Metaborate	845/1553	1.2	<0.03	<0.05
30-3000	80% Lithium Tetraborate 20% Lithium Metaborate	880/1616	1.25	<0.03	<0.05
30-4000	66% Lithium Tetraborate 34% Lithium Metaborate	875/1607	1.25	<0.03	<0.05
30-5000	50% Lithium Tetraborate 50% Lithium Metaborate	870/1598	1.2	<0.03	<0.05
30-6000	35.3% Lithium Tetraborate 64.7% Lithium Metaborate	825/1517	1.15-1.2	<0.03	<0.05

Typical Levels of Impurities

CONCENTRATION, PPM	IMPURITIES
0 - 1	Pb, Ni, Mn, Cd, Zn, Co, Ag
1 - 5	K, Cu, Se, As, Al, Sn, Na, Fe
2 - 10	Si, S, Ca, Mg



Specifications

(Supplied in 1 lb (454gm) bottles with Complete Technical Specifications on Labels)

CAT. NO. DESCRIPTION

30-1000	SpectroCertified Pre-Fused Lithium Tetraborate; $\text{Li}_2\text{B}_4\text{O}_7$
30-2000	SpectroCertified Pre-Fused Lithium Metaborate; LiBO_2
30-3000	SpectroCertified Pre-Fused 80% Lithium Tetraborate + 20% Lithium Metaborate
30-4000	SpectroCertified Pre-Fused 66% Lithium Tetraborate + 34% Lithium Metaborate
30-5000	SpectroCertified Pre-Fused 50% Lithium Tetraborate + 50% Lithium Metaborate
30-6000	SpectroCertified Pre-Fused 35.3% Lithium Tetraborate + 64.7% Lithium Metaborate

® SpectroCertified is a registered trademark of Chemplex Industries, Inc.

8-2 Crucible and Mold Polishing Machine

A handy device for restoring platinum crucibles and molds to almost original mirror-like finishes of negative coefficient of adhesion property. Reduces the tendency of the elusive drop suspending at the rim of the crucible and greatly facilitates the removal of cast beads for XRF analysis.

Supplied with separate crucible and mold holders that will accommodate most sizes and styles.



POLISHED CRUCIBLE AND MOLD



CRUCIBLE AND MOLD HOLDERS

Specifications

CAT #	ITEM
18-0000	Crucible and Mold Polishing Machine; includes crucible and mold polishing holders
18-1000	Crucible Polishing Holder, Spare
18-2000	Mold Polishing Holder, Spare
19-0000	Crucible/Mold Polishing Kit; includes polishing compounds, polishing felt, emery grit and polishing oil
19-1000	Polishing Compound (3 μ and 6 μ)
19-2000	Polishing Felt
19-3000	Emery Grit Paper
19-4000	Polishing Oil

Specify electrical requirements; 115 VAC/60Hz or 230 VAC/50,60Hz.

8-3 Bead-Out™ Fused XRF Bead Extractor Pen

The Bead-Out™ Fused XRF Bead Extractor Pen is an ingenious device that safely and quickly removes fused XRF beads directly from molds and greatly facilitates bead handling for analysis and storage. Simply, depress the bar on the handle and gently press soft silicon suction cup located at the end of a 1" (25.4 mm) bent probe to the surface of the bead. Release the button and the bead is attached to the suction cup by a gentle vacuum. To release the bead, simply depress the button on the pen; the vacuum is interrupted. The suction cup is soft and will not mar the sample bead surface. The Bead-Out Fused XRF Bead Extractor Pen is also provided with a pocket clip. Spare probes and suction cups are available.



Specifications

CAT #	ITEM	Qty/Pkg
27-1000	Bead-Out™ Fused XRF Bead Extractor Pen	1
27-2000	1" Bent Probe with Silicon Suction Cup	1
27-3000	Spare Silicon Suction Cups	1

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