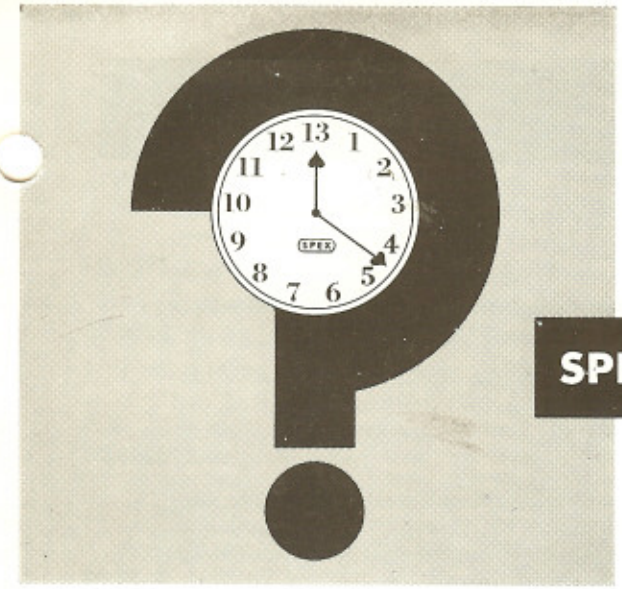


Need a 26 hour day to prepare samples?

SPEX-essories STRETCH your $MV^2=E=\$\$\$$

Thousands of our mechanical impact mortars are in constant use at as many different tasks. A few typical applications are:

No. 8500—SHATTERBOX

FOUNDRY CONTROL — pulverizing slags rapidly prior to analysis

GEOCHEMISTRY — rapid powdering of ores, rocks and minerals

PORTLAND CEMENT — grinding raw mixes for x-ray analysis

No. 8000—MIXER/MILL

SEMI-CONDUCTORS — preparing powders of brittle materials such as germanium, silicon, bismuth, platinum sponge, and antimony without metallic contamination

PORTLAND CEMENT — mixing formulations to measure setting properties

PHARMACEUTICALS — simultaneous mulling of tablets and selective extraction

PAINT TECHNOLOGY — determining thixotropy of additives

CERAMICS — rapid pulverization of fired substances

ATOMIC ENERGY — grinding radioactive materials in a sealed container

No. 5000—MIXER/MILL

BIOCHEMISTRY — pulverizing bone

ELECTRON MICROSCOPY — dispersing pigments in water

FOOD STUDIES — rapid emulsification; preparing extracts

INFRARED SPECTROSCOPY — grinding samples and KBr for preparing pressed discs

X-RAY SPECTROSCOPY — blending and grinding fluxes

No. 3110—WIG-L-BUG

EMISSION SPECTROSCOPY — mixing samples and graphite powder with no metallic contamination

SPEX INDUSTRIES INC. 3880 PARK AVENUE, METUCHEN, N. J.

AUGUST, 1964

THE SHATTERBOX

An extremely fast, efficient grinder, the Shatterbox spins a heavy, hardened concentric puck and ring around the inside of a closed, removable dish at 900 rpm. Although ball-bearing steel is the most popular material for a grinding container, tungsten carbide and high-alumina ceramic have their place, too. Typically, 10 ml of a sample may be ground in 3 minutes to —325 mesh. With reasonable precautions, the particle size distribution from sample to sample may be maintained remarkably constant.

A quick scan of the material listed below will reveal how universal the Shatterbox is turning out as a tool for grinding production samples quickly and reproducibly prior to x-ray and emission spectrochemical analysis. From the standpoint of sale, probably the most interesting, if unexpected, use of the instrument is in grinding Portland cements and intermediate raw mixes. Scattered throughout the country, many Shatterboxes are now whirling away on a 24-hour-a-day, 7-day-a-week basis busily engaged in the control of uniform, high-quality concrete.

In the metals industries, the Shatterbox is helping to stabilize the composition of slags, raw materials and master alloys. Other users are manufacturers of welding fluxes, fertilizer, pesticides, inorganic chemicals as well as research laboratories in the geological and mining fields.

May we test grind some of your samples? No obligation, naturally.

8500 **Shatterbox®**, grinder and blender, 1/3 hp motor 50-60 cy., 115v or 230v (specify), 0-15 min. timer, 13" dia. x 20" high, 160 lbs. ..... Each **$960.00**

8501 **Grinding Container,** hardened steel, 100 ml capacity, 6" dia. x 3" high, 19 lbs. ..... Each **$200.00**

8502 **Grinding Container,** hardened steel, with provision for filling with inert gas; gasketed and held closed with 4 thumb screws, 100 ml capacity ..... Each **$245.00**

8503 **Grinding Vial,** hardened steel, for multiple sample handling, 15 ml capacity, the Shatterbox will hold 7 of these vials (requires 8503R rack) ..... Each **$ 42.00**
Set of 7 **$275.00**

8503R **Rack,** for holding up to 7 8503 vials ..... Each **$ 85.00**

8504 **Tungsten Carbide Grinding Container,** 100 ml capacity, 6" dia. x 3" high, 42 lbs. ..... Each **$950.00**

8505 **Alumina Ceramic Grinding Container,** 100 ml capacity, 6" dia. x 3" high, 9 lbs. ..... Each **$310.00**

(SPEX SPEAKER, Vol. VIII—No. 2)

Grinding Tests Using 8501 Hardened Steel Container

Material	*Form as received*	*Time, min.*	*Amount grams*	*% Passing 325 mesh*
Asbestos	Fibrous	12	20	100
Cement, Portland raw mix	+60 mesh	2½	40*	100
Ferro-chromium	+100 mesh	5	25	100
Ferro-manganese	+200 mesh	3	25	100
Ferro-molybdenum	—80 mesh	4	25	100
Ferro-niobium	—80 mesh	3	25	100
Ferro-silicon	—80 mesh	4	25	100
Ferro-titanium	—80 mesh	6	25	100
Ferro-vanadium	—80 mesh	7	25	100
Fiberglas	thin sheets	2	10	100
Fluorspar	+100 mesh	3	50	100
Pesticide	—100 mesh	15	50	100
Phosphate, raw mix	+60	2½	40	100
Iron powder	—80	6	5	68
Sand	—10	10	100	100
Slag, blast furnace	chunks	1	10**	100
Slag, open hearth	chunks	1	20	76
Transite	chunks	10	35	100

* sodium alkylarylsulfonate added, 5%
** Household detergent (Tide) added, 10%

SPEX INDUSTRIES, INC. · 3880 PARK AVENUE · METUCHEN, N.J. · ☎ 201-549-7144

No. 5000 MIXER/MILL

Like the larger No. 8000 Mixer/Mill, the high grinding and mixing efficiency of the No. 5000 is a result of its three-dimensional action. Along the axis of the vial there is a component 1" long; at right angles 3/16" wide and up and down the oscillation is about 1/4". The resulting action is consistent with the general shape and size of the vials. That is, at every stroke there is an impact at the end of the vial—over 100 per second—to crush the material rapidly and reproducibly. Among its advantages over other small mixers are:

1) The Mixer/Mill jaws are continuously adjustable accommodating any size vial from 1" to 2-1/2" long and up to 3/4" dia. with no special adapters required.

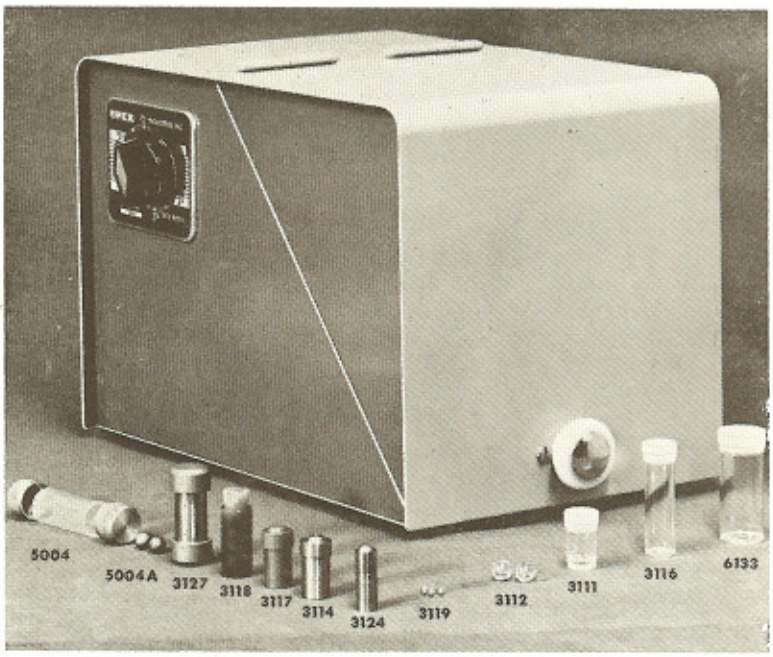
2) Two vials may be shaken simultaneously.

3) It is extremely rugged with a strong enough motor to oscillate at 3200 rpm with a full load, assuring rapid grinding.

4) A unique timer switch runs the instrument for periods up to 6 minutes or, at another setting, up to one hour.

5) A protective and attractive housing encloses the entire mechanism including the vials during operation of the instrument.

6) Its motion along all three axes exceeds that of any other instrument its size affording more vigorous and therefore faster grinding action.



5000 **Mixer/Mill®**, 115v, 60 cy. or 230v, 50 cy. (specify), for quantities under 10 ml, dual timer permits mixing up to 6 or 60 min., built for heavy duty use with continuously variable jaws holding vials up to 3/4" dia. x 2-3/8" long, safety enclosure, 12" x 8" x 8", 22 lbs. ..... Each **$174.00**

3111 **Vial,** 1/2" dia. x 1" long, polystyrene with polyethylene cap, 2 ml capacity

100	**$ 3.80**
1000	**$ 30.00**
1000 (in lots of 5000 or more)	**$ 24.00**

3112 **Ball,** clear Plexiglas, 3/8" dia.

100	**$ 1.80**
1000	**$ 12.00**
1000 (in lots of 5000 or more)	**$ 10.00**

3114 **Vial, stainless steel,** 1/2" dia. x 1" long, 1 ml grinding capacity with stainless steel ball 1/4" dia. ..... Each **$ 8.50**

3116 **Vial,** 1/2" dia. x 2" long, polystyrene with polyethylene cap, 5 ml capacity

100	**$ 5.00**
1000	**$ 40.00**
1000 (in lots of 5000 or more)	**$ 30.00**

(Minimum order $10.00)

3117 **Vial, tool steel** (hardened), 1/2" dia. x 1" long, 1 ml grinding capacity, with hardened steel ball 1/4" dia. ..... Each **$ 8.50**

3118 **Vial, agate,** 9/16" dia. x 1-5/16" long, 1 ml grinding capacity, with agate ball 1/4" dia. Each **$ 43.00**

3119 **Ball,** clear Plexiglas, 1/8" dia. (for small samples).

100	**$ 1.20**
1000	**$ 8.00**
1000 (in lots of 5000 or more)	**$ 6.00**

3120 **Vial, high purity graphite,** 1/2" dia. x 1" long, for ashing samples up to 500°C and grinding without transfer ..... 48 **$ 24.00**

3124 **Micro-vial, stainless steel,** with three 1/8" dia. ball, 1/2 ml grinding capacity ..... Each **$ 8.50**

3127 **Vial, hardened alloy steel,** 3/4" dia. x 2" long, 3 ml grinding capacity, with stainless steel ball 1/4" dia. ..... Each **$ 16.00**

5004 **Tungsten Carbide grinding vial,** consisting of two tungsten carbide lined end caps, 12 replaceable center sections of Lucite, two 1/4" dia. tungsten carbide balls ..... Each **$ 36.00**

5004A **Tungsten Carbide ball,** 1/4" dia., (spare) four **$ 2.00**

5004C **Lucite Center Sections,** (spare) ..... 20 **$ 10.00**
100 **$ 36.00**

5004W **Tungsten Carbide Lined End Caps** (spare) ..two **$ 20.00**

6133 **Vial,** 3/4" dia. x 2" long, polystyrene with polyethylene cap, 10 ml capacity

100	**$ 6.50**
1000	**$ 53.00**

GRINDING TESTS USING 8000 MIXER/MILL

Material	*Form*	*Method*	*Time min.*	*Amount grams*	*% Passing 325 mesh*
Antimony	Pieces	L-D	5	26	97
Asbestos	Fluff	WC-D	10	*	*
Bauxite	60 mesh	TS-W	30	3	*
Bismuth	Chunks	PJ-D	20	5	75
Bone	Chunk	AC-D	10	*	55
Boron Carbide	Chunk	WC-D	15	7	100
Brake Linings	Chunk	WC-D	*	*	*
Carbon (activated)	Pieces	TS-D	10	10	90
Carnauba Wax	Piece	PJ-D	2	5	20
Cement (portland)	Powder	AC-W	30	20	100
Chrome Ore	Chunk	WC-D	10	15	39
Chromium	Chunk	WC-W	20	10	50
Cobalt		WC-W	10	10	91
Copper Shot		WC-D	15	2	95
Ferro Cr	100 mesh	WC-W	20	5	94
Ferro Nb		WC-W	60	5	10
Floor Tile	Chunk	WC-D	**	**	**
Germanium	Pieces	L-D	5	5	38
Ilmenite	Grains	WC-D	10	5	98
Limonite Ore	Grains	TS-W	30	3	100
Porcelain	Chunk	WC-D	15	6	83
Potassium Pyrosulfate	Fused Button	PV-D	10	5	100
Reforming Catalyst	Beads, 1/8"	AC-D	5	5	*
Sand	Grains	WC-D	2	12	86
Silica	Chips	L-D	30	15	*
Silica	Chips	AC-D	20	5	97
Silicon	Chunks	WC-D	15	10	92
Silicon	Lumps, 1/4"	L-D	10	5	30
Slag (blast furnace)		TS-W	20	3	100
Slag (copper)	100 mesh	WC-W	10	5	84
Slag (open hearth)		TS-W	20	3	100
Straw		TS-D	10	5	**
Ti-diborate		WC-D	15	5	100
Tomato Stems		TS-D	10	5	**
Transite	Chunks	WC-D	*	*	*
Tungsten Carbide		WC-W	15	10	100
Tungsten	Lumps	WC-D	10	25	50
Welding Flux		WC-W	30	5	82
Wood	Pieces	AC-D	10	1	50
Zirconium Carbide		AC-W	30	15	100

TS—No. 8001 Tool Steel Vial

AC—No. 8003 Ceramic Vial

WC—No. 8004 Tungsten Carbide Vial

PV—No. 6133 Polystyrene Vial

PJ—No. 8002 Polystyrene Jar

L—No. 8006 Lucite Vial

-D—Dry ground

-W—Wet ground (water or 1, 1, 1-trichloroethylene slurry)

* Suitable for X-ray or Emission Spectroscopy

** Satisfactory for Extractions

(Minimum order $10.00)

8000 **Mixer/Mill®,** 115v, 60 cy. for mixing quantities of 10-100 ml, grinding 3-25 ml, 1 hour timer, continuously variable jaws holding vials up to 2-1/8" dia. x 3-1/4" long, rugged construction and housing, shock mounted, 15" x 16" x 12", 75 lbs. ..... Each **$390.00**

220v, 50 cy. model ..... Each **$400.00**

8001 **Grinding Vial,** hardened steel, 2" dia. x 2-7/8" long with O-ring sealed lid, four 1/4" dia. and two 1/2" dia. steel balls included, grinding capacity about 25 ml. ..... Each **$ 54.00**

8002 **Mixing Jar,** polystyrene with screw-on plastic cap, 2-1/8" dia. x 2-1/2" long, 100 ml mixing capacity ..... 100 **$ 20.00**

8003 **Ceramic Vial,** made of 96% alumina-ceramic with a 1/2" dia. ball, grinding capacity about 15 ml ..... Each **$ 44.00**

8003A **Ceramic Ball,** made of 99% alumina-ceramic 1/2" dia., spare (one furnished with 8003) Each **$ 2.25**

8004 **Tungsten Carbide Grinding Vial,** 2-1/8" dia. x 2-3/8" long, with two WC balls and an alternate Lucite cylinder, grinding capacity about 20 ml ..... Each **$145.00**

8004A **Tungsten Carbide Ball,** 7/16" dia. (spare) Each **$ 1.00**

8006 **Lucite Grinding vial,** with 1/2" dia. Lucite balls; grinding capacity about 20 ml. ..... **$ 20.00**

8010 **Vial Adapter,** for holding seven 3111 (1/2" x 1" plastic); or seven 3116 (1/2" x 2" plastic); or seven 3114 (1/2" x 1" stainless); or seven 3117 (1/2" x 1" hardened tool steel ..... Each **$ 18.00**

8011 **Vial Adapter,** for holding four 3127 (3/4" x 2" hardened steel) or four 6133 (3/4" x 2" plastic) or four 5004 tungsten carbide vials. Each **$ 18.00**

3112 **Ball,** clear Plexiglas, 3/8" dia.
100 ..... **$ 1.80**
1000 ..... **$ 12.00**
1000 (in lots of 5000 or more) ..... **$ 10.00**

3116 **Vial,** 1/2" dia. x 2" long, polystyrene with polyethylene cap, 5 ml capacity
100 ..... **$ 5.00**
1000 ..... **$ 40.00**
1000 (in lots of 5000 or more) ..... **$ 30.00**

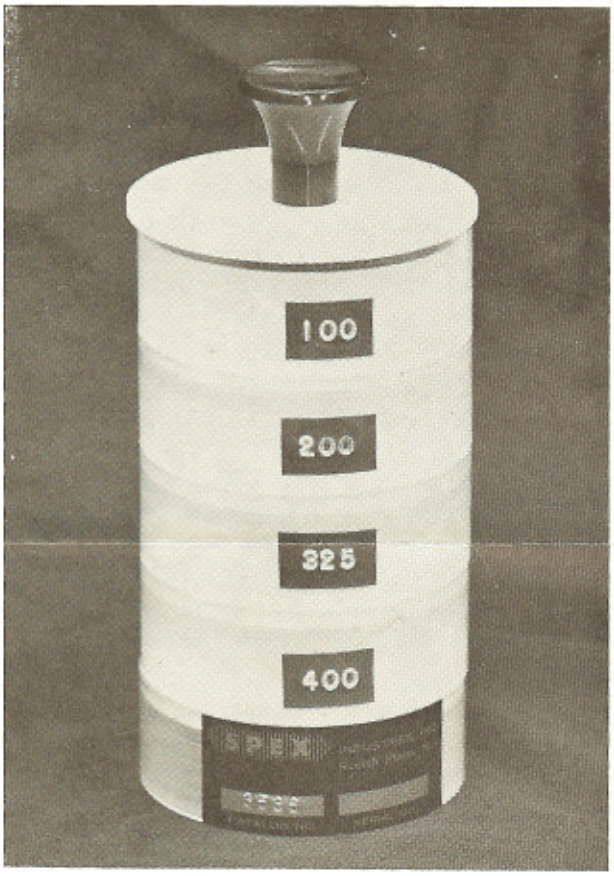
6133 **Vial,** 3/4" dia. x 2" long, polystyrene with polyethylene cap, 10 ml capacity
100 ..... **$ 6.50**
1000 ..... **$ 53.00**

6134 **Vial,** 1" dia. x 3" long, polystyrene with polyethylene cap, 30 ml capacity
100 ..... **$ 11.00**
1000 ..... **$ 85.00**

6135 **Vial,** 1-1/4" dia. x 3" long, polystyrene with polyethylene cap, 60 ml capacity
100 ..... **$ 12.00**
1000 ..... **$ 95.00**

NYLON SIEVES

Every step in the handling of high purity materials is a potential source of contamination. Our nylon sieves were designed to eliminate one such source of metallic impurities. Each sieve consists of a sheet of monofilament nylon cloth stretched in an "embroidery" frame consisting of two telescoping Lucite rings. The cloth, available in four mesh sizes, meets ASTM specification E11-58T for size and uniformity of mesh.



3536 **Sieve Set,** consisting of 4 frames and 1 tray with 1 each of the screens listed below .....Set **$ 39.00**

3530 **Sieve frame,** consisting of two telescoping Lucite rings, 70 mm dia. x 25 mm high, specify for 100, 200, 325 or 400 mesh .....Each **$ 10.00**

Screen, nylon monofilament cloth, 3-1/2" dia.:

3531 **100 mesh** (each opening 149 microns)....twelve **$ 6.00**

3532 **200 mesh** (each opening 74 microns).....twelve **$ 8.00**

3533 **325 mesh** (each opening 44 microns).....six **$ 6.00**

3534 **400 mesh** (each opening 37 microns).....three **$ 7.50**

3535 **Tray, plastic,** 70 mm dia. x 25 mm high, with cover .....Each **$ 4.50**

BORON CARBIDE MORTARS and PESTLES

Boron carbide is one of the best materials for hand grinding. Possessing a hardness close to diamond, it is also extremely inert, resisting attack by most acids and alkalies. In addition, boron carbide is unbonded so that the only possible metallic contaminating element is boron itself. Here it differs from, say, tungsten carbide which is usually bonded with cobalt. The material from which the mortars are produced is made by the Norton Company. Compressed under great pressure, its density approaches the theoretical value.

The 1/2" and 1" mortars are mounted in removable plastic bases for ease in handling; 2" d. and larger are encased in stainless steel. Pestles are attached to an aluminum handle.

We can supply mortar and pestle combinations with cavities ranging from 1/2" to 3" in diameter. Also available are double cavity mortars—a crater on both ends of a cylinder. Please write us for price and delivery information on these special sets.

3201 **Mortar and pestle, boron carbide.** Mortar cavity 1/2" d. by 5/32" deep, highly polished. Pestle 1/4" d. .....Set **$ 50.00**

3202 **Mortar and pestle, boron carbide.** Mortar cavity 1" d. by 1/4" deep, highly polished. Pestle 9/16" d. .....Set **$ 98.00**

3205 **Mortar and pestle, boron carbide.** Mortar cavity 1-1/2" d. by 3/4" deep, highly polished. Pestle 9/16" d. .....Set **$268.00**

3203 **Mortar and pestle, boron carbide.** Mortar cavity 2" d. by 1" deep, highly polished. Pestle 9/16" d. .....Set **$405.00**

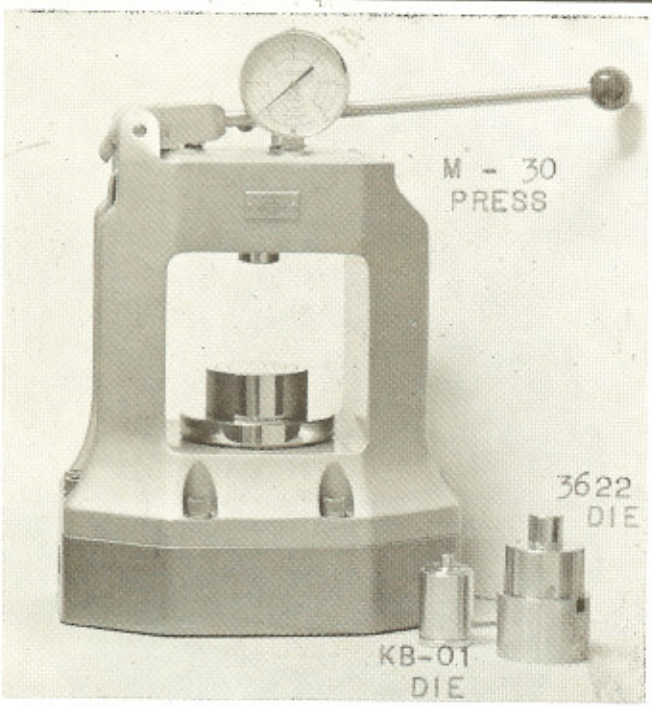
3204 **Mortar and pestle, boron carbide.** Mortar cavity 3" d. by 1-1/2" deep, highly polished. Pestle 1" d. .....Set **$500.00**

3206 **Mortar and pestle, boron carbide** for grinding under a microscope. Mortar cavity 1/4" d., highly polished. Pestle, 1/8" d. cemented to 60° offset aluminum handle .....Set **$ 50.00**

(Minimum order $10.00)

SPEX INDUSTRIES, INC. · 3880 PARK AVENUE · METUCHEN, N.J. · ☎ 201-549-7144

HYDRAULIC PRESS and DIES



This 30-ton hydraulic press is our latest model replacing both the RH-30 and K-32 series before it. Except for the compact feature, which has been retained, much of the design is new and improved.

The M-30 has an upward stroke of 1 inch and is ideally suited for KBr disc and X-ray pelletizing techniques as well as the production of graphite tablets. Its convenient overall size and high power make it ideal for all small press work both in research and industry.

Designed to be virtually maintenance free, this press operates by moving the cylinder upwards against a stationary ram. The body is cast from high tensile, non-deforming Meehanite with practically all exposed machine parts of stainless steel or generously chromium or nickel plated for maximum corrosion protection.

Pressure	Maxium—30 tons (67,200 pounds)
Platen Stroke	Maximum—1 inch
Vertical Opening	Maximum—6 inches
Distance between pillars	7.5 inches

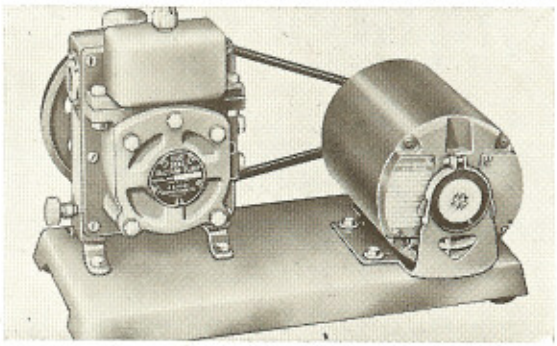
M-30 Hydraulic Press, 30 ton, 16" x 11" x 23.5", 330 lbs. ..... Each **$580.00**

KB-01 Evacuable Die, may be used either with or without vacuum; optically flat, polished and parallel hardened tool steel faces; produces pellets 13 mm dia. x up to 1/4" thick, 3 lbs. ..... Each **$150.00**

6004 Potassium Bromide, infrared grade, 80-200 mesh, vacuum dried ..... 100g **$ 13.00**

3622 Die, optically flat, polished and parallel hardened tool steel faces; produces pellets 1-1/4" dia. x up to 5/16" thick, 10 lbs. ..... Each **$215.00**

3623 Evacuable Die, may be used either with or without vacuum; optically flat, polished and parallel hardened tool steel faces; produces pellets 1.235" dia. x up to 5/16" thick. Recommended for use with vacuum x-ray spectrometers, 10 lbs. ..... Each **$245.00**



3624 Vacuum Pump, Welch Duo-Seal No. 1400B with belt guard (not shown), 1/3-hp. motor, 1725 rpm, open motor, base, pulley, belt tightening provision, supply of Duo-Seal oil, 16" x 8" x 3", 70 lbs. ..... Each **$148.00**

WIG-L-BUG

A widely accepted dental tool for triturating amalgams, the standard instrument is particularly useful for mixing and grinding small samples.

Use the plastic vials for mixing powders or preparing mulls with mineral oil. For grinding hard materials, use the steel vials. With these, you can obtain -200 mesh materials in 2-3 minutes. For preparing KBr pellets, use stainless steel vials, and grind for under 1 minute.

Only Nos. 3111, 3112, 3114, 3117, 3119, and 3124 vials and balls are recommended for use with the Wig-L-Bug.

3110B* Wig-L-Bug, black housing, 115 volts, 50-60 cy., with 3113 vial adapter, 10" x 4" x 6", 10 lbs. ..... **$ 77.00**

3110W* Wig-L-Bug, ivory housing, 115 volts, 50-60 cy., with 3113 vial adapter ..... **$ 84.00**

3140* Wig-L-Bug, 115 volts, 50-60 cy., with 3113 vial adapter, 1-hour timer and fan-cooled motor **$ 98.50**

3113 Adapter for 1/2" dia x. 1" long vials ... Each **$ 4.00**

(*)Prices on request for other supply voltages

P. O. BOX 798 • METUCHEN, N. J. 08841

RETURN REQUESTED

Bulk Rate
U. S. POSTAGE
2¾¢ PAID
Plainfield, N. J.
Permit No. 166

PURE MATERIALS

We are now offering individual elements and inorganic compounds of the highest practicable purity, prepared in co-operation with Ledoux and Co., analytical chemists. They are sold with an accompanying certificate of spectrographic analysis covering each batch.

Our policy with respect to these chemicals is as follows:

1. To provide materials of the highest possible purity commensurate with their cost of preparation.
2. To provide a certificate of analysis representing the actual batch of material. The results are obtained using accepted semi-quantitative techniques.
3. To upgrade our stocks constantly as purer materials become available. Prices will also vary accordingly.
4. To provide, on a custom basis, other forms and compounds as required. We invite your inquiries in this regard.

Cat. No.	Material	% Purity*	Form	Price Per Lot as Specified
1220	Calcium Carbonate	5-9s	Powder	4.00/g 37.00/10g
1265	Cerium Oxide	4-9s	Powder	2.00/10g
1221	Cesium Chloride	3-9s	Powder	6.70/10g 29.75/50g
1331	Cesium Carbonate	3-9s	Powder	6.70/10g
1441	Cesium Chromate	3-9s	Powder	6.70/10g
1122	Chromium	5-9s	Pellets	4.25/10g 38.00/100g
1222	Chromium Oxide	5-9s	Powder	2.45/g 22.55/10g

* Purity indicated is that of the material or of the base metal from which it was prepared.

(Minimum Order $10.00)

WE LIST ABOVE JUST SEVEN OF THE 120 ODD HIGH PURITY CHEMICALS WE MAINTAIN IN STOCK BUT SHALL GLADLY SEND THE COMPLETE LISTING UPON RECEIPT OF YOUR REQUEST ON COMPANY LETTERHEAD.