

PHOENIX FUSION MACHINES



Sample Preparation Specialists



ACCURATE AND PRECISE
PROCESS CONTROL WITH
HIGH QUALITY SAMPLE OUTPUT



THE PHOENIX SERIES OF FUSION MACHINES ARE DESIGNED TO
PREPARE PERMANENT AND HOMOGENEOUS FUSED BEADS UNDER
ACCURATELY REPRODUCIBLE CONDITIONS. THE PROCESS INVOLVES
DISSOLVING SAMPLES AND MIXING THEM INTO A LITHIUM BORATE
FLUX AT TEMPERATURES RANGING FROM 800 TO 1250 DEGREES
CELSIUS. (TYPICAL FUSION TEMPERATURE IS 1050 DEGREES CELSIUS).
THIS IS DONE OVER OXYGEN ENRICHED FLAMES USING SPECIALLY
DESIGNED BURNERS. THE SAMPLE IS AUTOMATICALLY POURED INTO
PRE-HEATED MOULDS (OR BEAKERS). THE MOULDS ARE THEN RETRACTED
OVER SEPARATE COOLING JETS FOR PRECISE CONTROL OF COOLING.



Phoenix Fusion Machines

Phoenix fusion machines are used to prepare a wide range of samples for analysis by, x-ray fluorescence, atomic absorption inductively coupled plasma-atomic emission and a variety of classical chemical techniques. The sample types include oxides, sulphides and silicates which comprise many of the ores and concentrates in the mining and metallurgy industry.

The Phoenix can be used for grade and sample quality control in:

- Glass and ceramics industry
- Steel industry, analyzing iron ores, blast furnace slags and even magnesites
- Bauxite/alumina
- Base metal (Pb, Zn, Cu, Ni) for the analysis of sulphides concentrates, silicate slags, mattes sinter etc.
- Mineral sands industry.
- Cement industry, analysing sand, limestone, kiln feed, clinker, milled meal etc.
- Universitys and research organizations.

One new feature that is now available in the Phoenix Model is an automatic ammonium iodide injector unit. This unit automatically injects precisely weighed ammonium iodide tablets into the crucible.

The fusion concept lends itself ideally to an automatic mode. Great improvements in quality control and savings in manpower costs are achieved when a laboratory is automated.

Easy to operate, the Phoenix is capable of manufacturing beads of unparalleled quality.

For companies who need to produce tens of thousands of samples annually, the Phoenix is a key component of the fully automated laboratory where each function in the total processes, from the selection of bulk samples to the transfer of the bead to XRF, is automated by robotics.

Productivity can be further enhanced by the provision of oxygen generation equipment to obviate the need for bottled oxygen and reduce running costs.

No matter what the task or the level of sample production sought, PREMIER can assist with a custom designed Phoenix to meet the most exacting specifications.



Phoenix VFD 4000

The Benefits of Using a Phoenix

QUALITY

Sample Bead Quality

The quality of the fused bead is paramount in our thinking.

Reproducibility

Independent tests have confirmed that the reproducibility of the fused beads is excellent. The variation between samples (0.3% RSD) compares very favorably with other methods of bead preparation and far better than pressed powders (2 – 4% RSD). The homogeneity, both within and between beads, is the result of detailed attention to every aspect of the bead preparation process.

Mixing of Flux and Sample

The swirling mixing motion is pre-programmed into the operating cycle which ensures that the sample material is evenly dispersed throughout the flux producing a homogeneous mix.

Cooling of Moulds

The cooling of the fused sample in the mould is another critical aspect of bead quality. The rate of cooling can be precisely controlled with two cooling rates available.

Auto Locking Crucible Holders

These eliminate the possibility of cross contamination which was always a concern with the old style crucible clamps.

Variable Speed Swirling

This feature allows the chemist to select the correct speed to enable the inside wall of the crucible to be washed by the swirled sample, therefore, giving both planetary and vertical mixing in standard crucibles.

Pre-Heat/Oxidation

We offer this feature for the most important reason of all – our clients want it! It is typically used in the cement industry, where pre-heat allows for the slow dissipation of gases during the fusion process, thereby preventing the sample material from overflowing the top of the crucible. This option is also used in other applications to slowly bring the crucible up to temperature thereby increasing crucible life.

Individual Burner Select

Each set of crucible and mould burners can be selected individually. This is an extremely useful feature for experimental work or when different temperatures are required for separate burners. Savings in oxygen and gas usage can be achieved by careful selection and management of this function.

Oxygen Injection Facility (Optional)

An oxygen injector can further enrich the atmosphere resulting in a more even fusion process within the mix and protects Pt/Au ware from excessive corrosion.

Ammonium Iodide Injection (Optional)

Ammonium iodide tablets may be added as a wetting, mixing or releasing agent when pouring the fused sample into the mould. This unique pre-programmed development allows the ammonium iodide injector system to dispense the pre weighted tablet automatically into the crucible during the fusion process.

Melt-Loss (Optional)

To enable melt-loss to be calculated accurately, the Phoenix can be pre-programmed so that each crucible and its contents are weighed after fusion has taken place and the results compared with the original weights. After the melt-loss has been calculated, the program will re-heat the now solidified samples to melt point and then pour them into moulds.



The Benefits of Using a Phoenix

DESIGN & BUILD QUALITY

Computerized Controls

The Phoenix has a new proprietary designed microprocessor control system with USB connection for program loading and upgrades. Another major benefit of owning a Phoenix is that it can form a vital component in the laboratory's own Quality Assurance System, particularly if the organization wishes to gain accreditation under an International Quality Standard (ISO).

Moulds

The use of ringed mould holders and circular moulds reduces the usage of platinum and leads to more uniform cooling.

Construction

The internal componentry is attached to either the chassis of the machine or to internal panels. This method of construction results in better build quality and ease of access for servicing.

User-Friendly Features for the Operator

The Phoenix is fitted with a tray to catch any sample material in the event of a spillage. The tray simply pulls out for cleaning. Granite pads are located in front of the moulds and on each shoulder of the machine for temporary placement of platinum wear.

Individualized Burner Manifolds

Each burner is mounted on its own manifold block which allows precise positioning of each burner under the crucible and mould.



Phoenix VFD/D



Phoenix VFD LOI option

SAFETY

The Phoenix is designed so that the most potentially dangerous part of the operation - the transfer of the sample to the mould - is done automatically and not by hand.

In addition every Phoenix is fitted with:

Thermal Temperature Cut Outs

power, gas and oxygen shut down if the internal temperature of the Phoenix exceeds a pre-set level.

Pressure Sensors

monitor pressure on the oxygen and air supplies. If the pressure drops below a pre-set value, a cut out will be activated.

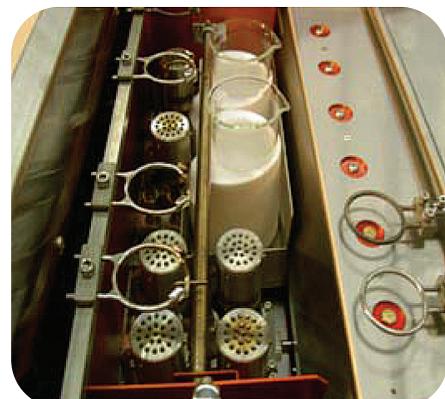
Pour Cycle Interlocks

prevent pouring until the moulds are in position above the burners.

Teflon Hose

is used for all gas and oxygen lines. The thermal cut outs are designed to shut down the machine before temperatures are high enough to effect this heat resistant and fire retardant material.

The above might be termed the primary safety features built into every Phoenix. PLS supports these features by personally commissioning each machine, by our willingness to service the machine throughout its life and by offering training courses for laboratory personnel in the operation of the Phoenix.



ICP/XRF Combo

Phoenix Range Specifications

FEATURES	PX-VFD/M	PX-VFD/R	PX-VFD/S	PX-VFD/MD (MOULDABLE)	PX-VFD/I	PX-VFD/I	PX-VFD/D
Analysis Method	XRF	XRF	XRF	XRF	ICP	ICP	ICP
Number of beads produced simultaneously	3,4 or 6	2 or 3	1	4 or 8	NA	NA	NA
Number of dissolutions produced simultaneously	OPT	NA	NA	NA	2, 3 or 4	6, 8 or 12	2 or 4
Variable speed swirling	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Separate mould timer	Yes	Yes	Yes	NA	NA	NA	NA
Can be used at high altitude without modification	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual burner selection	Yes	Yes	NA	Yes	Yes	Yes	Yes
Reset any time	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual burner manifolds	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjustable pour delay	Yes	Yes	Yes	NA	NA	Yes	Yes
Can heat moulds heavy duty moulds to 160gm	Yes	Yes	Yes	NA	NA	NA	NA
Automatic pouring into moulds	Yes	Yes	Yes	NA	NA	NA	NA
Two stage cooling	Yes	Yes	No	Yes	NA	NA	NA
Fully regulated cooling	Yes	Yes	Yes	Yes	NA	NA	NA
Autolocking crucible holders	Yes	Yes	Yes	NA	Yes	Yes	Yes
Moulds retracted & cooled over separate cooling jets	Yes	No	No	No	NA	NA	NA
Moulds cooled in-situ above burners	No	Yes	No	Yes	NA	NA	NA
Recipe database	Yes	No	Yes	No	No	No	No
Pre-Melting	Yes	Yes	No	Yes	Yes	Yes	Yes
Separate Oxygen Injector	Optional	Optional	NA	Optional	Optional	Optional	Optional
Ammonium Iodide Injector	Optional	Optional	NA	Optional	Optional	Optional	Optional
Melt Loss	Optional	Optional	Optional	NA	NA	NA	NA
Loss on Ignition	Optional	Optional	Optional	NA	NA	NA	NA
Size - Height	310mm	250mm	200mm	310mm	250mm	310mm	310mm
Size - Width	880mm	620mm	350mm	880mm	620mm	880mm	880mm
Size - Depth	630mm	450mm	290mm	630mm	450mm	630mm	630mm



New and replacement crucibles and fusion moulds available.



Phoenix Specifications

SPECIFICATION CODE

PX-VFD/M = The VFD series is a full size machine designed for high sample output. Samples are dissolved and mixed into a lithium borate flux. The sample is automatically poured into pre-heated moulds. The moulds are then retracted over separate cooling jets for precise control of cooling.

PX-VFD/R = The VFD-R series has a smaller footprint and is designed for lower sample output. The sample is automatically poured into pre-heated moulds. The moulds are then cooled in situ above the burners.

PX-VFD/S = The Phoenix S Machine has all of the capabilities of the larger production instrument including clear and precise time setting utilizing touch button control. There are no special programming techniques required. The control panel incorporates straightforward instructions prompting the user as required. Each program can be loaded with a touch of a button for ease of use.

The Phoenix S Machine is ideal for commercial laboratories and quality control laboratories including research/educational institutions when performance counts.

Operation — A recipe is selected from the database, all timing functions are preset, the samples are then automatically pre heated before being dissolved and mixed into a lithium borate flux. The sample is automatically poured into Pre-heated moulds. The moulds are then retracted over separate cooling jets for precise control of cooling.



Phoenix VFD 1000/S

SERVICE QUALITY

PREMIER is committed to service quality which we define by a variety of aspects including dedication to customer service, knowledgeable service technicians, trusting and responding promptly to our customers. Our services include OEM spare parts for the entire line of PHOENIX fusion machines including training, service agreements with our on site field service technicians, and fusion method development. Please visit our website for more information at www.premierlabsupply.com.

PX-VFD-I = The I series is a full size machine. Samples are dissolved and mixed in platinum/gold crucibles. The crucible and solidified sample is removed from the machine, placed into a separate beaker to dissolve and heated/swirled over a separate hotplate.

PX-VFD/D = The D series is a full size machine. Samples are dissolved and mixed in platinum/gold crucibles. The sample is automatically poured into beakers. The beakers are then removed and heated/swirled over a separate hotplate.

LOI = The LOI series is a full size machine designed for the automated laboratory. Its simplicity of design makes it easy to adapt to robotic automation.

Operation — Samples are weighed into specially designed crucibles, a lid is placed on the crucible and then placed into the machine. The burners ignite and automatically heat (typically 1000 deg C) and cool the crucible for pre-selected times. Crucibles are removed for weighing and loss determination.

PX-VFD/MD = This series of machine allows for both melting and casting to be done in one vessel (mouldable). Once melted the sample is mixed, the mouldable is levelled and cooled to form the bead automatically.

Platinum/Gold
Labware
Ammonium
Iodide Tablets



SPECIFICATIONS

There are four different capacities of Phoenix VFD Series: Phoenix 6000/4000, Phoenix 3000, Phoenix 1000.

The first number in the suffix indicates the number of samples that can be made simultaneously. For example the Phoenix 6000 produces six samples in the same operating cycle. The operating cycle will vary from 5 to 20 minutes depending on the nature of the material.

The Phoenix 6000/VFD-3000/VFD share the same overall dimensions. We have found that such is the ease and accuracy of sample production, that some clients elect to increase their sampling program to improve quality control. In those circumstances, a Phoenix 3000 can be readily upgraded to a 4000 or 6000 by the addition of extra burners in the spaces reserved for them.

The Phoenix 6000 – 1000 VFD are fully automatic. The Phoenix R is semi-automatic but shares the same safety features as its larger brothers. No human intervention is required after the operating cycle has been activated.

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