ALUMINUM KING MFG LTD

Aluminum Sweat Furnaces

An Essential Tool in the Recycling of Aluminum

700 E. Van Buren Street • Mitchell, IA 50461-8016
641.732.5558 ph • 641.732.1385 fax • e-mail jmostek@hughes.net

SAFETY

Precautionary Safety Measures

Before operating the furnace make certain that you have read and understand this manual. If you do not understand, please contact us at 641-732-5558 during normal business hours.

-Before operating the furnace make certain all flammable material and debris is well clear of the furnace. (25 ft)

-Make certain all gas and/or oil fittings are secured tightly and not leaking at any point from the main to the furnace.

-Make certain the furnace operator(s) is the ONLY person around the furnace while it is running.

-Operators must wear protective clothing and equipment while operating the furnace.

-Laceless safety pourers boots that can easily be removed if aluminum splashes is recommended

-Laced boots can be worn if laces are covered.

-Leggings should be worn to keep splashes of metal from entering the top of the boot.

-Always make certain sow molds are COMPLETELY DRY before pouring molten aluminum into them.

-Recommend Pre-heat mold before first pour

-Never load furnace with back rake door open

-Extreme caution and safety must be used when operating this machine.

-The safety of the furnace depends solely on the operators.

-Aluminum King Furnaces are designed for the processing of aluminum items and the separation of steel and Aluminum.

START UP, LOAD, & POUR

Procedure to Start Furnace

1. Set Regulator to 10 lb. Pressure
2. Start Fan and open Choke door on blower ¼ of the way
3. Turn on Ignitor
4. Turn Gas Valve ½ way open
5. If flame goes out, turn gas off and start procedure over
6. After ignition, adjust gas valves and choke door until you hear a nice deep roar and have a blue flame

NOTE: You may have to increase pressure on regular, depending on which model you have (8 to 15 lbs. while furnace is running)

7. Preheat furnace 45 to 60 minutes until 1600 degrees and lining is red
8. If there is moisture in the primary chamber, run for an hour before loading to dry it out.
9. Proceed to load furnace with Scrap

Loading & Raking

1. Open loading door, watching out for flame flashback from burner
2. Load aluminum, use rake to optimize melting
3. Continue to add until the furnace requires raking. Rake ash into holding bin
4. Repeat loading procedure if necessary

Note: Never put magnesium in furnace- it will burn up the brick
Avoid putting die cast in furnace, it contains high amounts of Zinc

Pouring Metal

1. Operator must put on suitable gear prior to pouring molten metal
2. When chamber is full, prepare molds. Molds must be absolutelydry
3. Open chamber, remove dross, aluminum should be very fluid
4. Position empty mold beneath spout. Remove iron plug, install new cone on the plug. Pierce cone in tapping hole
5. Insert plug and cone into tap out block and seat securely when mold is full
6. Place new mold and repeat procedure as necessary

SHUT DOWN

Procedure to Shut Down Furnace

1. Make sure molten metal is drained and dross has been raked out.
2. When final load is removed, turn off all burners. Do not turn off blowers
3. It is important to keep blower on until furnace has become cool to avoid radiant heat damage to burners. Turn off blowers once the primary holding chamber and the afterburner temp is less than 800°F
4. Turn off main power supply to unit. If unit is being utilized the next day, the procedure may be different.
5. For extended shutdown, cover and protect manual fuel valves

Emergency Shutdown

If an emergency shutdown is necessary such as in the loss of power, remove all metal from the unit (molten as well as dross). Operate blowers if possible to prevent heat damage.

Collecting, Resolving and Storing Temperature Data to Comply with the EPA Sweat Furnace Rule

The Environmental Protection Agency (EPA) has issued a new rule concerning aluminum recycling furnaces (sweat furnaces). The rule required that emissions from these furnaces be held in an afterburner for .8 seconds at 1600° F to remove any dioxins or furans (the chemicals used during the Vietnam War to defoliate forests) created during the melting process. In addition, the ruling requires the owner of the furnace to keep records of furnace operation to show the furnace has operated at an AVERAGE temperature of 1600° F while metal is being melted. To meet these requirements Aluminum King has researched and designed an afterburner that meets the EPA afterburner standards and , with the assistance of Omega Engineering, has put together a package of electronic equipment that will allow you to meet the temperature measurement and data resolution and storage standards.

The new EPA ruling requires that data from the furnace must be collected regularly, averaged properly and that files of the resoled date be kept by the operator for examination by the EPA or state agency upon request.

These instructions will help you create a data file that can be stored as an Excel File in a data folder in your PC or on a floppy disk. The procedure seems complex, but after a few repetitions it will become easier. Keep this manual nearby as you resolve your data, it will be handy for reference until you have learned the process.

Equipment

Afterburner

The Aluminum King afterburner is a large ceramic lined chamber that is attached to the secondary or afterburner portion on the furnace. It is designed to hold and treat the furnace emission gases for .8 seconds at 1600° F. The EPA has determined that this treatment will remove dioxins and furans from the emissions. Since these are hazardous air pollutants the EPA is very serious about them. To address the problem but still allow small businesses to collect and melt aluminum, they have adopted this "Self-Reporting" format. However, if they suspect that the date is not being collected and saved according to the ruling they will begin an inspection and violation procedure that can be very expensive and time consuming. It is important the operator or owner of the sweat furnace pay strict attention to their state license conditions.

Monitoring and recoding equipment

To measure the afterburner temperature properly and perform the mathematical operations required to meet the ruling Aluminum King has included the following equipment with your order:

An electronic thermocouple to measure the temperature in the afterburner.
An Omega Nomad Data Logger to collect temperature data as it is reported by the thermocouple
A digital readout to keep the operator advised of the actual temperature of the furnace in real time
A Windows based program that collects the data and displays it graphically as well as reducing it to a text file that can be read by the Microsoft Excel program
Special Teflon Coated dual lead wire to conduct the thermocouple signals to the logger and the digital readout. This wire carries the weak signal from the thermocouple to the data logger and the digital readout. Regular copper wire cannot be used as it will cause data loss and inaccuracy.

The measuring Equipment has been selected for its robust design and low cost. Larder readouts and more expensive loggers can be purchased at the cost of the buyer, but the ones selected meet the minimum requirements of the EPA ruling and good operating practice.

How to Download Data From the OMEGA Nomad Data Logger

Note: in the following steps some assumptions are made concerning computer use and conventions. When carrots (<>) are used the symbol or symbols between the carrots should be entered into the computer. For example : <@sum(> Means type the symbols between the carrots but not the carrots. In that example above you should enter only @sum(. The symbol for a division operation is a backslash so < / > means to divide. When two key need to be pressed at once the convention is < Shift+ > and that set of key strokes produces the close parentheses symbol. Finally, in Excel certain mathematical operations are initiated with specific key strokes. For example the term "@sum(X#:Y#)", where X and Y and # indicated columns and row numbers, tell the computer to add all the numbers in the boxes whose addresses are included in the columns and rows indicated by the numbers and letters between the parentheses. Finally, all computers and most programs react slightly differently based on the hardware, the version of windows and the version of Excel being used. The following instructions are based on using Microsoft Word 2000 (version 9.0.2720) and Microsoft Excel 2000 (version 9.0.2720). Older versions may required different formatting, but in general will operate the same. Now you are read to work the Spectrum and Excel.

Loading the Spectrum Program

A. Follow the directions on the floppy disk to load the Spectrum program into your computer. The file will load, unzip and install itself as: "C:\Program|OmegaEngineering\Spectrum". In Windows 95 and 98 you will find it by pressing he start button, scrolling up to programs and looking through the dropdown menu for "OmegaEngineering\Spectrum"
B. After the program downloads a folder will appear on the screen. Double click

General Maintenance

Refractory Repair

Due to the severe nature of the applications, refractory is subject to both thermal and physical shock leading to the need for refractory repair. To extend refractory life, the interior of the furnace should be cleaned and inspected weekly during regular operations. If the unit is shutdown for an extended period, then it should be inspected monthly. When cracks appear to be more severe than normal or when physical shock results in damage, repairs should be made at once. Because every repair will be different, we recommend calling the home office for repair procedures.

Scheduled Maintenance

The following items are to be maintained on a regular basis:

Combustion air Blowers

Blow dirt out of the fan wheels with an air hose monthly. If dirt builds up on the fan blades, first scrape clean, then blow out with air.

Flame sensors

Safety switch with thermocouple sensor-replace annually

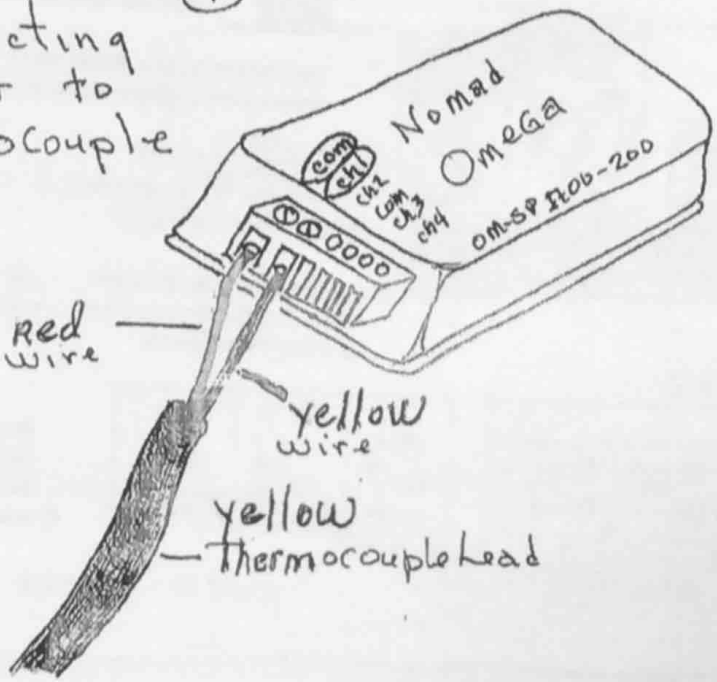
Oil burners (not all furnaces)

Check and clean burner nozzles every six months. If system is equipped with a fuel filter, the cartridge should be replaced after the first two weeks of operation and every six months following that.

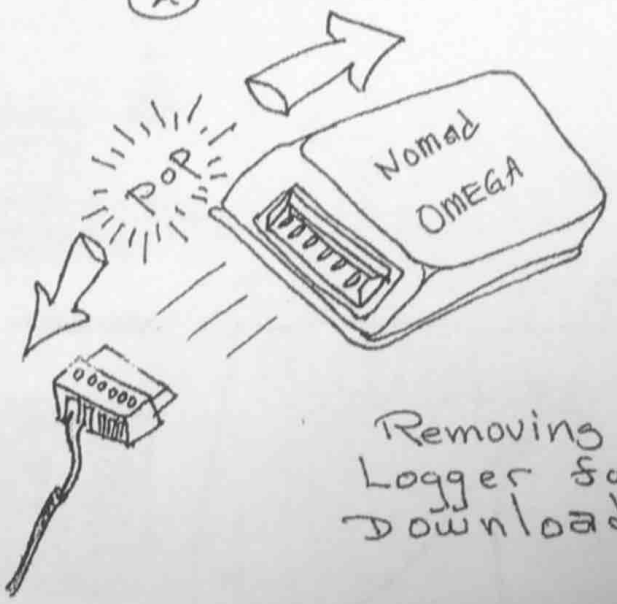
The burner internals should be checked at the same time the nozzles are inspected to be sure the spark electrodes and wires are in good condition and are not corroded. The internals should be cleaned and checked for leaks at that time. This would also be a good time to clean the blower. The oil pump on the burner is direct driven by the blower motor through a flexible coupling. The coupling is a vital part of the oil system, and should be periodically inspected for wear, damage and loose components.

(1)

Connecting Logger to Thermocouple

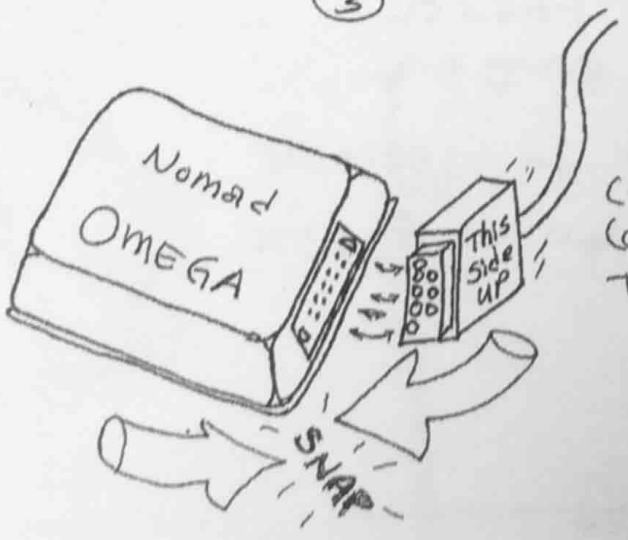


(2)



Removing Logger for Data Downloading

(3)



Connecting Computer to Logger

Logger Connections

1. Connect Red wire to "com" and black wire to "ch 1". Screw terminals tight.
2. To download snap Logger off thermocouple Lead. Carry Logger to Computer with Spectrum Software.
3. Connect computer to Logger and download data from Logger.

Power Storm

DHF-20

20 hrs

5,000 | 6,000

Sweetcast

Gas & oil fuel

Spec Dist

AK3500

The AK3500 will hold as many as 8-9 whole transmissions and has a 20 minute cycle time. The AK3500's holding chamber holds 500-600 lbs. and can fill a 600 lb. sow in one pour.

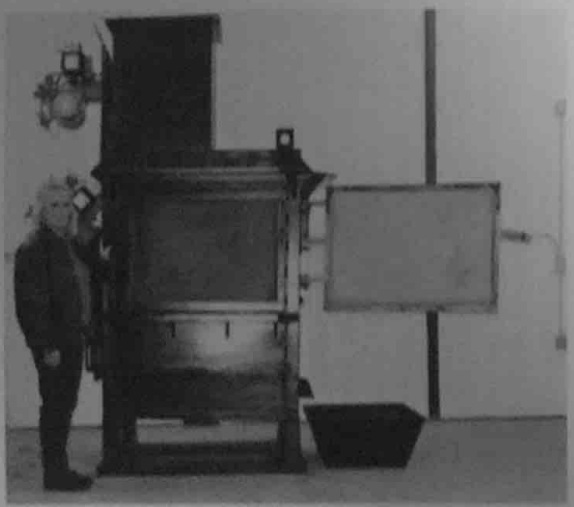
$18,899.00

SPECS:

- Overall Size: 90"Hx35"Wx46"L
- Feeding Door Opening: 23"Hx35"W
- Rake Out Door Opening: 11"Hx27"W
- Inside Chamber: 50"Hx27"Wx37"L
- Shipping Weight: 10,800 lbs. approx.
- Accessories: 2 - 500 lb. sow molds, 2 - Rakes, 1 - Plug
- Electrical: 110 volt hook-up
- Fuel: Natural gas or propane
- Construction: 1/4" steel sheel, 4 1/2" of fire brick
- Warranty: 1 year on electrical, components & burner, 6 months on structure fabrication
- Main Burner: 750,000 to 1 million BTUs
- After Burner: Same as main burner

700 East Van Buren Street, Mitchell, Iowa 50461 - phone: 641.732.5558 - fax: 641.732.1358

Prices are subject to change.



Hues Machy
402-571-5004
Ron

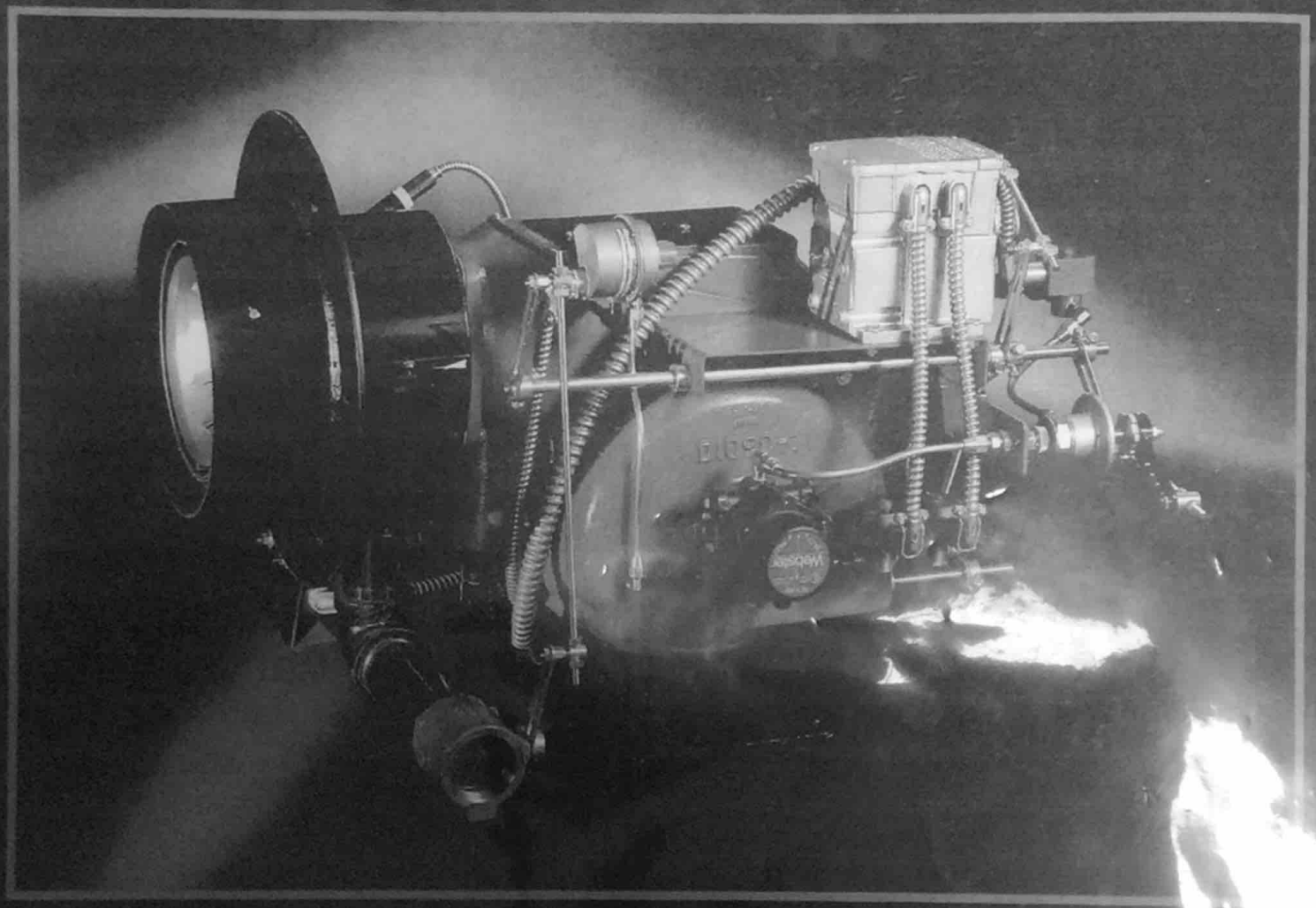
Johnson Burners

JOHNSON

Model DHF

Gas - Light Oil - Combination Fuel Units

Pressure Atomizing Oil Systems



CAPACITIES:

10 to 250 Boiler Horsepower
400,000 to 10,500,000 BTU/Hr

FUELS:

Gases
- Natural Gas
- LPG
- Digester
- Others

Oils
- No. 2 or lighter

Combination
- Gas/Oil or Gas/G

U.L LISTED

Control options to meet IRI, FM, CSD-1, NFPA and other agency requirements are availa
Low NOx systems are available to meet any EPA, state or local requirements.

johnson burners

Since 1903

BURNER QUOTATION REQUEST

Please fax the completed form to: (510) 652-4302 or Email to: sales@johnsonburners.com

Company:		Contact:	
Address:		Phone:	
		Fax:	
Reference:		Email:	

ALL SYSTEMS:

Burner capacity or boiler HP: _____ (select units)

Type of boiler or furnace: (select type) _____

Boiler make: _____ Model: _____

Furnace dim.: D: _____ L: _____

Furnace pressure: _____ (select units)

Motor voltage: (select voltage) _____ Control voltage: (select voltage) _____

Phase: (select phase) Cycles: (select cycles)

Cycles: (select cycles)

Elevation (if greater than 2000 ft.): _____ Feet Above Sea Level

Insurance, code requirements: ☐ CSD-1 ☐ UL ☐ cUL ☐ IRI ☐ FM ☐ NFPA ☐ NYC-DAR

Control system: (select)

Desired programmer & options: _____

GAS FIRED SYSTEMS:

Type of gas: (none) _____

Supply pressure: _____ (units) LHV: _____ Sp. Gr.: _____

OIL FIRED SYSTEMS:

Grade of oil: (none) _____

LHV: _____ Viscosity: _____ Sp. Gr.: _____

Type of oil atomization: (select)

Oil supply temperature: _____ (units)

Note: Oil pump included standard. Additional transfer pump required? NO

Note: In-line electric oil heater included standard on heavy oil units. Separate fuel oil heater required? NO Type: (select type)

NOTES:

S.T. Johnson Company

925 Stanford Ave. • Oakland, CA 94608 • USA • Phone (510) 652-6000 • Fax (510) 652-4302 • www.johnsonburners.com